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Changing Invention Economics By Encouraging Corporate Inventors to Sell Patents

William A. Drennan

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Changing Invention Economics by Encouraging Corporate Inventors to Sell Patents

WILLIAM A. DRENNAN*

“Every short statement about economics is misleading (with the possible exception of my present one).”¹

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1. PAUL A. SAMUELSON, *ECONOMICS* 58 (10th ed. 1976) (quoting Alfred Marshall).

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I. INTRODUCTION

A. Overview

An economic analysis of patents could be summarized as follows: We adore them, and we hate them! We adore the ability of the patent system to encourage the creation of beneficial new products, and thereby stimulate economic growth. Patents have played a role in the develop-

ment and commercialization of the automobile,² the radio,³ the telephone,⁴ aspirin,⁵ the light bulb,⁶ and many other breakthrough inventions. We praise the great inventors and their brilliant achievements.⁷ The patent system provides an important economic incentive to inventors. Without the patent system (or some other incentive system), inventions would be under-produced, resulting in slower economic growth, and slowing the arrival of products and processes that improve the quality of life.⁸

However, if a patent creates a monopoly (or an oligopoly or a monopolistic competition situation), we hate the consequent economic inefficiencies — the patented product will sell at a higher price, and the quantity will be restricted, so that fewer consumers will be able to purchase the product than in a truly competitive market.⁹ The ability to sell at a higher price (above the marginal cost of producing the product) is called “market power.”¹⁰

Whether a patent allows the patent holder to exercise market power

2. George Selden, a patent lawyer and some-time inventor, obtained a patent for a prototype automobile in 1895. Henry Ford began selling cars in 1903. Selden sued Ford for patent infringement, and Ford prevailed on appeal in 1911. Mark A. Lemley, *An Empirical Study of the Twenty-Year Patent Term*, 22 *AIPLA Q. J.* 369, 378 (1994). See also Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 *COLUM. L. REV.* 839, 846-47 (1990) (discussing the Selden patent); *Id.* at 888-89.

3. See *Marconi Wireless Tel. Co. of Am. v. United States*, 320 U.S. 1 (1943), *reh'g denied*, 320 U.S. 809 (1943); Merges & Nelson, *supra* note 2, at 891 (“The earliest radio patent was a broad patent granted to the British inventor Marconi in the field of radio transmission. These patents helped the Marconi Wireless and Telegraph Company establish an imposing presence in the early radio industry . . .”).

4. See *The Telephone Cases*, 126 U.S. 1 (1887).

5. See A. Samuel Oddi, *Un-Unified Economic Theories of Patents — The Not-Quite-Holy Grail*, 71 *NOTRE DAME L. REV.* 267, 303-04 (1996).

6. Merges & Nelson, *supra* note 2, at 849 (“In 1895, Thomas Edison brought a Supreme Court challenge to a very broad patent held by Sawyer and Mann for materials used in light bulb filaments.”). *Id.* at 885 (“In the field of incandescent lighting, Edison’s early patent gave his company, later General Electric, a dominant position. Most important, the history of the early electrical industry supports the notion that broad pioneering patents can play a pivotal role in the evolution of industry structure.”).

7. See generally EDMUND FULLER, *TINKERS & GENIUS, THE STORY OF YANKEE INVENTION* (1955); EGON LARSEN, *THE PEGASUS BOOK OF INVENTORS* (1965); EVAN I. SCHWARTZ, *THE LAST LONE INVENTOR: A TALE OF GENIUS, DECEIT AND THE BIRTH OF TELEVISION 2* (2002) (“[Philo Farnsworth] was convinced that television would wipe out ignorance and misunderstanding, and his resolve to get people to watch television was just as great as his will to create it in the first place”); CATHERINE THIMMESH, *GIRLS THINK OF EVERYTHING: STORIES OF INGENIOUS INVENTIONS BY WOMEN* (2000).

8. See *infra* notes 102-09 and accompanying text.

9. JOSEPH E. STIGLITZ, *ECONOMICS* 388 (2d ed. 1997) (“In the minds of most Americans, monopolies are not a good thing. They smell of income inequities and undemocratic concentrations of political power. To economists, however, the concern is economic efficiency.”).

10. *Id.* at 403 (“[M]arket power is the extent to which a firm can raise its price without losing its customers.”).

is an empirical question. A patent holder's potential market power was indicated by events involving the AIDS pandemic in Africa. On May 10, 2000, President Clinton issued Executive Order 13155,¹¹ stating that the United States would not impose trade sanctions against sub-Saharan African countries for certain actions that otherwise would infringe the patents on anti-AIDS drugs held by U.S. companies. The next day, five major brand-name drug companies announced they would reduce the prices of their patented anti-AIDS drugs by 80% or more for sales to Africa.¹² Even with this 80%+ drop in price, analysts stated that the brand-name drug companies would still make substantial profits, and the anti-AIDS drugs would still be too expensive for most Africans.¹³

Reports published in connection with the Executive Order indicate that patent rights enable the brand-name drug companies to charge a price to U.S. consumers that may be thirty times higher than the marginal cost of producing the anti-AIDS drugs.¹⁴ If the market were truly competitive, the market price for the drugs would be close to the marginal cost of production. If the patent rights were ignored, presumably generic drug companies would enter the market and create competition, and prices would drop sharply (approaching marginal cost).¹⁵

Similarly, in connection with the anthrax threat in the Fall of 2001, when the Bush administration threatened to ignore the patent rights for

11. Executive Order 13155, 65 Fed. Reg. 30521 (May 10, 2000).

12. Donald G. McNeil, Jr., *Companies to Cut Cost of AIDS Drugs for Poor Nations*, N.Y. TIMES, May 12, 2000, at A1. See *infra* notes 305-11 and accompanying text.

13. See *infra* note 308.

14. See *infra* notes 315-25 and accompanying text (indicating that the price charged to U.S. consumers can be \$15,000 to \$17,000 per year, while generic manufacturers in foreign countries may charge as little as \$245). In May of 2000, the brand-name drug companies were charging up to \$15,000 for a one-year supply of the three-drug AIDS cocktail. McNeil, *supra* note 12 ("Drug treatments used in the United States, most commonly the triple-therapy 'cocktails' that suppress the replication of H.I.V., can cost up to \$15,000 a year."). See *infra* note 315. Brazilian and Indian generic manufacturers are willing to sell a one-year supply of the three-drug cocktail for \$600 per year or less. See Huntley Collins, *Pharmaceuticals to Cut Price of AIDS Drugs*, PHILA. INQ., Mar. 8, 2001 ("One of the Indian firms, Cipla, Ltd. has offered a combination of three anti-AIDS medicines which don't include a protease inhibitor like Crixivan — for \$600 a year for governments and \$350 a year for Doctors Without Borders"); see also *infra* notes 319-21. In 2001, one brand-name drug company offered to sell a one-year supply of anti-AIDS drugs to African governments for \$730. *Id.* ("[A] spokeswoman for GlaxoSmithKline, the world's largest manufacturer of AIDS medications, said her company's current offer of \$2 a day for the drug AZT is comparable to the price offered by the Indian generic drugmakers."); *Merck: Lowers AIDS Drug Prices for Africa*, AM. HEALTH LINE, Mar. 8, 2001 ("In May, Glaxo offered to cut the price of Combivir by 90% to \$2 per day, but offered that price only to [African] governments.").

15. Emily Miao, *TRIPS Agreement Impacts Pharmaceutical Sector*, NAT'L L.J., July 24, 2000, at C11 (Surveys have indicated that brand-name drug manufacturers sell at lower prices in markets where generic drugs are available. "These results show that Glaxo Wellcome reduced the price of AZT in markets where competition exists.").

the only drug (Cipro) approved for the treatment of inhalation anthrax,¹⁶ the brand-name drug manufacturer holding the patent (Bayer) agreed to sell the drug to the U.S. government at an 80% discount (compared to the price paid by U.S. individuals and their insurers for the same drug).¹⁷ Again, the reports indicate that the patent allows the patent holder to charge a price greatly in excess of marginal cost. In the absence of the patent, the price would drop and more people could obtain the patented product.

While the patent system leads to higher prices and fewer consumers who can acquire the product (than in a competitive market), the patent system provides important economic incentives to inventors. As a result, the challenge is to preserve the incentive to invent, while improving economic efficiency. The potential economic inefficiency — higher prices and reduced consumption — can be reduced if the patented product is made by an efficient producer. An inventor — such as an R&D firm — may not be capable of manufacturing, marketing, and selling the product efficiently. As discussed below, it can be economically beneficial if the inventor sells the patent to an efficient producer.¹⁸ However, under current law, if a corporate inventor sells a patent, it will be subject to an enormous tax liability — over forty percent of the total proceeds on the sale of the patent may need to be paid promptly in income taxes.¹⁹ As a result, current tax law encourages a corporate inventor to retain the patent, and spend large amounts of time and capital on manufacturing, marketing, and selling the patented product, even if the corporate inventor will be an inefficient manufacturer, marketer, and seller of the patented product.

While a corporate inventor might license an efficient producer to manufacture, market and sell the patented product, as explained below, the royalties that the licensee will pay will increase the licensee's marginal cost of production, which will tend to cause the licensee to charge a higher price and produce a smaller quantity (than if no royalty was paid). As a result, a license to an efficient producer may or may not increase economic efficiency, depending on whether the cost savings arising from the licensee's manufacturing, marketing and selling of the patented product is greater than the royalty payments.²⁰ In contrast, a

16. See *infra* note 267.

17. Keith Bradsher & Edmund L. Andrews, *U.S. Says Bayer Will Cut Cost of Its Anthrax Drug*, N.Y. TIMES, Oct. 24, 2001, at B7 ("Bayer charges \$4.67 a tablet in wholesale transactions with pharmacies . . ."). *Id.* (Bayer agreed to sell 100 million tablets to the U.S. government for \$0.95 per tablet). See *infra* note 270 and accompanying text.

18. See *infra* notes 502-03 and accompanying text.

19. See *infra* notes 449-51 and accompanying text.

20. See *infra* notes 523-27 and accompanying text.

sale at a fixed price to an efficient producer should improve economic efficiency in all cases — the quantity produced should increase and the sale price should drop.²¹

This Article recommends decreasing a corporate inventor's tax liability on the sale of a patent for a fixed sum, so that the corporate inventor will be encouraged to sell the patent to an efficient producer.²² The economic evils associated with a patent can be reduced if the patented product is manufactured, marketed, and sold by an efficient producer.

B. *The Economic Need for Patents (or an Alternative Incentive System)*

The United States' economy is generally a competitive market system. In a competitive market system, many producers sell products, consumers are free to choose what goods they buy, and producers are free to choose what goods they produce. Thanks in large part to the famous "invisible hand,"²³ a competitive market system provides many benefits to society. In a competitive market economy, profit-seeking producers generally will produce the goods that consumers want, in the quantity that consumers want, and at a price that many consumers are willing to pay.

When considering the economic activity of one producer in a competitive market with many producers, the individual producer will tend to be a "price taker" — an individual producer will need to match the price being charged by the competition (which is acceptable to the consumers). The producer seeking to maximize profits will continue to produce goods until her marginal cost of producing a unit equals the selling price per unit.²⁴ In effect, the forces of demand and supply can lead to a

21. See *infra* notes 528-31 and accompanying text. As discussed below, quantity produced will increase if the producer's marginal cost is lower, and if quantity increases, price will drop. In comparison to the inventor as the producer of the patented product, an efficient licensee likely will manufacture, market and sell the patented product at a lower cost, but the licensee will need to pay a royalty based on each additional unit sold. Depending on the level of cost savings compared to the royalty, the efficient licensee's total marginal cost of production may be lower than, equal to, or greater than the inventor's marginal cost of production.

22. See *infra* notes 479-501 and accompanying text.

23. The famous economist Adam Smith wrote:

Every individual endeavors to employ his capital so that its produce may be of greatest value. He generally neither intends to promote the public interest, nor knows how much he is promoting it. He intends only his own security, only his own gain. And he is in this led by an INVISIBLE HAND to promote an end which was no part of his intention. By pursuing his own interest he frequently promotes that of society more effectually than when he really intends to promote it.

ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS, BOOKS I – III (Penguin Classics 1986) (1776) (*quoted in* SAMUELSON, *supra* note 1, at 41).

24. The producer's marginal cost (i.e., the cost to produce the next unit) will eventually rise

balanced and efficient flow of goods and services — producers tend to produce the “right” quantity, and they tend to sell at the “right” price.²⁵

However, the competitive market approach does not work for certain types of goods. In particular, inventions would be under-produced in a purely competitive market economy. The inventor with a new idea for a product faces an economic problem (often referred to as “Arrow’s Information Paradox”).²⁶ After incurring substantial research and development costs, if the inventor simply publishes her breakthrough, or begins producing and selling the product, potential competitors may learn how to produce the product.²⁷ Since these “latecomers” did not bear the research and development costs incurred by the first inventor, the latecomers will not need to recoup these cost when they sell the new product.²⁸ In a competitive market, the latecomers will establish the price at which the product can be sold on the market. The first inventor merely will be one of many producers, and therefore will be a “price taker” — the first inventor will be forced to sell at the market price,²⁹ and the first inventor will be unable to recoup her research and development costs. If no relief is provided, there will be little incentive for anyone to incur significant research and development costs in the future,

as the quantity produced increases (under the law of diminishing returns). See *infra* notes 79-80 and accompanying text. The producer will stop producing once the marginal cost of producing one more unit equals or exceeds the market price — otherwise the producer would lose money on each additional unit produced.

25. The marginal cost of producing the last unit will equal the price that the consumer is willing to pay for the unit because the producer will keep producing as long as the price she will receive for producing the last unit will be greater than her marginal cost (the extra cost she incurs to produce and sell that unit). Thus, in a competitive market, the price will equal the marginal cost to society of producing that unit. As a result, the price is “right,” and the quantity produced is “right” — if a consumer can pay the marginal cost of producing the product, the consumer can obtain the product. However, it should be noted that those consumers who want (or need) the product but do not have enough money to buy it at the market price will *not* think that the market price is the right price.

26. Kenneth Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in RATE AND DIRECTION OF INVENTIVE ACTIVITY 609 (Nat’l Bureau of Econ. Research ed., 1962) (cited in DONALD S. CHISUM ET AL., PRINCIPLES OF PATENT LAW 66 (2d ed. 2001)).

27. Competitors may be able to “reverse engineer” the product. In other words, a competitor may be able to purchase the product, take it apart, and discover how to make it. See ROBERT P. MERGES ET AL., INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 57 (2d ed. 2000) (“Customers who buy a product on the open market are entitled to break it apart to see how it works. This process is called ‘reverse engineering’ the product.”).

28. This is often called the “free-rider” problem because the latecomers copy the invention without incurring significant research and development costs — thus, getting a “free-ride” at the expense of the first inventor.

29. In a competitive market, if the patent holder attempts to charge a price in excess of the market price, consumers will not buy from the patent holder. Instead, the consumers will buy from the latercomers who are charging lower prices. See *infra* notes 104-09 and accompanying text.

and inventions will be under-produced.³⁰

Studies indicate that innovation is a key element to a nation's financial health,³¹ but as discussed above, in a purely competitive market there would be little or no incentive to incur the significant research and development costs necessary to invent. As a result, the United States and many other countries³² allow an inventor to obtain a patent if certain conditions are satisfied.³³ A patent basically provides the inventor with a 20-year "exclusive" on the new product or process.³⁴ If anyone else

30. It should be noted that those who invent for non-economic rewards would still be motivated to invent. For example, university research scientists who gain prestige, awards, and tenure, based in part on their innovations would still be motivated to invent and disclose their inventions. See F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 723 n.118 (2001) ("scientists throughout time have treated reports of a scientist's work, such as through journal publication, and citation thereto, as valuable currencies in the market for scientific kudos . . .").

31. See Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1, 10 (1992); CHISUM ET AL., *supra* note 26, at 59.

32. In August, 2003, the World Trade Organization had 146 member countries. Elizabeth Becker, *In Reversal, U.S. Nears Deal On Drugs for Poor Countries*, N.Y. TIMES, Aug. 28, 2003, at A1; see also PAUL GOLDSTEIN, INTERNATIONAL LEGAL MATERIALS ON INTELLECTUAL PROPERTY 36 (2000) (listing 134 members as of February 1999). Article 27.1 of the TRIPS Agreement provides that subject to various exceptions "patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application." TRIPS Agreement, Art. 27.1, reprinted in GOLDSTEIN, *supra*, at 14 (emphasis added). As a result, subject to various exceptions, WTO member countries grant patent protection to the extent required by the TRIPS Agreement.

33. In the United States, in order to obtain a patent, the invention must fall within the statutory subject matter, 35 U.S.C. § 101 (2000). Namely, the invention must be a "process, machine, manufacture, or composition of matter, or any new and useful improvement thereof", and meet the requirements of utility, *id.* § 101, novelty, *id.* § 102, and nonobviousness, *id.* § 103 ("a patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art . . .").

34. For patent applications filed after June 8, 1995, the duration of a patent ends twenty years from the date of filing the application. 35 U.S.C. § 154(a)(2) (2000). However, it can take a substantial amount of time to get a patent issued after the patent application is filed, so the actual duration of patent protection is 20 years minus the time spent in prosecuting the patent application (the period from the time of filing the patent application to the date the patent is issued is referred to as the "patent prosecution"). A study concluded that the average patent prosecution takes approximately 2 years and 4 months. Lemley, *supra* note 2, at 385 (showing the average length of a patent prosecution was 864 days). This study was based on 2081 U.S. utility patents issued on December 27, 1994, and did not include design or plant patents. *Id.* at 383. A study considering only patents that eventually became the subject of litigation concluded that the average prosecution time was approximately 3 years and 7 months. John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q. J. 185, 237 (1998) ("[T]he average time in prosecution for litigated patents in the population is 3.6 years, although the lower median (2.7 years) indicates that a few patents spent a great deal of time in prosecution, raising the mean."). In some cases, patent prosecution can take decades. Lemley, *supra* note 2, at 379 (discussing several patents held by Jerome Lemelson which had prosecution histories in excess of thirty years). *Id.* at 379 n.41 ("Further, data reported by the [Patent & Trademark Office] in 1994 indicate that at that time, there were 673 currently pending applications which were filed more than twenty years before.").

attempts to make, use, or sell the patented invention during the term of the patent, the inventor can file a patent infringement action and stop the competition.³⁵ Thus, a patent is a right to stop others from doing something they normally would have every right to do in a free society, and acts as a barrier to prevent others from entering the market to produce the patented product.³⁶

C. *Monopolies, Oligopolies or Monopolistic Competition Markets, and Resulting Economic Inefficiencies*

As discussed above, in a competitive market, since there are many producers, each producer is forced to be a “price taker” — each producer can sell its product only by matching the price charged by the competition.³⁷ A “price taker” faces a demand curve that is a horizontal line³⁸ — the producer can sell the product at (or below) the market price, but no one will “demand” the producer’s product if she prices it

35. 35 U.S.C. § 271(a) (2000) (“Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention . . . infringes the patent.”); *Id.* § 283 (“The several courts having jurisdiction of [patent] cases . . . may grant *injunctions* in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable.”) (emphasis added). In order to obtain a preliminary injunction, a patentee generally must demonstrate that (i) there is no reasonable doubt that the patent is valid, infringed, and enforceable; and (ii) she would suffer irreparable harm (as a result of the infringement). See *Smith Int’l, Inc. v. Hughes Tool Co.*, 718 F.2d 1573, 1578 (Fed. Cir. 1983). The Federal Circuit Court of Appeals has held that “where validity and continuing infringement have been clearly established . . . immediate irreparable harm is presumed.” *Id.* at 1581. In deciding whether to issue a preliminary injunction, the court will also consider whether (a) the patentee has demonstrated a “probability of success on the merits,” *id.* at 1578; and (b) what impact will the injunction have, if any, on the public interest. *Id.* at 1579.

A patentee can also obtain money damages, which may be based on lost profits. See *infra* notes 345-61 and accompanying text. 35 U.S.C. § 284 (2000) states that the damages will not be less than a reasonable royalty. A patent holder can also recover pre-judgment interest. See *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 657 (1983), and in “exceptional cases,” the patent holder may be awarded attorneys fees. 35 U.S.C. § 285 (2000). In the case of a finding of willful infringement, the court may increase the damages up to three times. *Id.* § 284.

36. 35 U.S.C. § 271(a) (2000) states that “Except as otherwise provided in this title, whoever without authority, makes, uses, offers to sell, or sells any patented invention . . . infringes the patent.” Independent creation is not a defense to patent infringement, except in the case of the “first inventor.” *Id.* § 273(b)(1) (The “first inventor defense” is only available if the party raising the defense “acting in good faith, actually reduced the subject matter to practice at least 1 year before the effective filing date of such patent, and commercially used the subject matter before the effective filing date of such patent.”). As a result, a patent prohibits a customer from “reverse engineering” the product and employing the resulting knowledge to make, use, or sell a competing product. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 490 (1974) (“While trade secret law does not forbid the discovery of the trade secret by fair and honest means, e.g., independent creation or reverse engineering, patent law operates ‘against the world,’ forbidding any use of the invention for whatever purpose for a significant length of time.”).

37. If an individual producer attempts to charge a price above the amount charged by the competition, presumably it will not be able to sell any of its products.

38. See *infra* notes 92-94 and accompanying text.

above the market price (instead, the consumers will buy from the producers who are selling at the market price). In regard to quantity, each producer (in attempting to maximize profits) will produce as long as her marginal cost of producing one more unit is less than the market price. Thus, each producer will sell the product at her marginal cost.

In contrast, if the market is not competitive, the producer will have discretion in setting the price that she charges, and the quantity that she produces. The producer will be a “price setter.” A non-competitive market may be a monopoly (in which there is only one producer), an oligopoly (in which there are a few producers and there are some differences among the products sold),³⁹ or a monopolistic competition situation (in which there are many producers, and there are real or imagined differences in the products).⁴⁰ In these markets, the producer is faced with a “downward sloping” demand curve,⁴¹ and as a result the producer can sell products even if she raises the price above her marginal cost.⁴² The ability to charge a price above marginal cost (and still sell substantial amounts) is referred to as “market power.”⁴³ If a producer has market power, the quantity produced will be smaller and the price charged will be higher than in a competitive market. Since economic efficiency is defined as producing at maximum output and maximizing consumer satisfaction,⁴⁴ this is an economically inefficient arrangement.⁴⁵ In addition, a monopoly, oligopoly, or monopolistic competition situation creates other economic inefficiencies.⁴⁶

Whether a patent allows the patent holder to exercise market power depends on several factors. There are at least five different scenarios. First, the patent may give the patent holder a pure monopoly in the relevant market — that would be the case if no other producer offers any substitutes for consumers, so that consumers must purchase from the patent holder (in order to satisfy the particular need or desire). In a pure monopoly, the patent holder can exercise significant market power.⁴⁷

39. SAMUELSON, *supra* note 1, at 512.

40. See STIGLITZ, *supra* note 9, at 355-56; SAMUELSON, *supra* note 1, at 512.

41. See *infra* notes 134-35, 181-82, and 195, and accompanying text.

42. See *infra* notes 149-50 and accompanying text.

43. STIGLITZ, *supra* note 9, at 403 (“[M]arket power is the extent to which a firm can raise its price without losing its customers.”).

44. See *infra* notes 67-69 and accompanying text.

45. See *infra* notes 150-55. See also DONALD S. CHISUM, 1 CHISUM ON PATENTS: A TREATISE ON THE LAWS OF PATENTABILITY, VALIDITY, AND INFRINGEMENT, § 3.01 (2004) (“The social cost is higher prices for and underutilization of the patented process or product during the period of the monopoly.”).

46. See *infra* notes 157-68 and accompanying text. One of the economic inefficiencies is a “dead weight loss,” which is the overall loss of consumer satisfaction in excess of the extra profit enjoyed by the producer.

47. See *infra* notes 150 -55 and accompanying text.

Commentators state that a patent seldom creates a “true monopoly.”⁴⁸ Second, if there are a few other producers who sell products that are different from the particular patented product, and some consumers might consider those products as substitutes for the patented product, then the market can be described as an “oligopoly.”⁴⁹ Third, if there are several other producers who sell products that are different from the particular patented product, and some consumers might consider those products as possible substitutes for the patented product, then the market can be described as a “monopolistic competition” situation.⁵⁰ In the case of an oligopoly or monopolistic competition situation, the patent holder can exercise substantial market power.⁵¹ Fourth, the patent holder may have no market power because a substantial number of other producers may sell competing goods (without the benefit of the patent) that many consumers can substitute for the patented product. If the patent holder charges a price above the market price, the patent holder will be unable to sell any of her patented products. In that situation the market remains competitive, and the patent provides the patent holder with no market power. Fifth, there are many situations in which there is no demand at all for the patented product.⁵² Again, in this situation the existence of the patent does not provide the patent holder with any market power (and the patent will cause no economic inefficiency). The five situations for a patent holder can be summarized as follows:

48. See Edmund W. Kitch, *Elementary and Persistent Errors in the Economic Analysis of Intellectual Property*, 53 VAND. L. REV. 1727, 1730 (2000) (The claim that a patent creates a monopoly “is true only if the [patent] claims cover all of an economically relevant market, i.e., there is no alternative way for competitors to provide the same economic functionality to their customers without infringing the claims patents that confer monopoly market power are rare.”) (emphasis added); see also Kirby W. Lee, Note, *Permitted Use of Patented Inventions in the United States: Why Prescription Drugs Do Not Merit Compulsory Licensing*, 36 IND. L. REV. 175, 181 (2003); William Montgomery, Note, *The Presumption of Economic Power for Patented and Copyrighted Products in Tying Arrangements*, 85 COLUM. L. REV. 1140, 1150 (1985) (“The mere existence of a patent or copyright does not create a demand for a product. Indeed, the majority of all patents and copyrights confer little or no monopoly power.”).

49. An example of an oligopoly market would be the market for airline travel between two regions when there are only three or four airlines flying in and out of those regions. See *infra* notes 176-90 and accompanying text.

50. See *infra* notes 191-98 and accompanying text.

51. SAMUELSON, *supra* note 1, at 514 (“[T]his oligopoly equilibrium looks much like the single monopoly equilibrium.”). See *infra* notes 182-86 and accompanying text (regarding oligopoly), and *infra* notes 195-98 and accompanying text (regarding monopolistic competition).

Situation	Extent of Other Producers Selling Substitutes (or Extent of Demand for the Product)	Does the Patent Holder Enjoy Market Power (and Does the Patent Create Economic Inefficiencies)?
“Pure” Monopoly	No Other Producer Selling a Substitute	Yes
Oligopoly	A Few Producers Selling Substitutes	Yes
Monopolistic Competition	Several Producers Selling Substitutes	Yes
Competition	Many Producers Selling Substitutes	No
No Market	There Is No Demand for the Patented Product	No

52. If no consumers want to purchase the patented product, the patent provides no market power. Many patented products likely have never generated significant demand, such as

Boomerang Bullets	“Patented in the U.S. on October 4, 1870, by G. Hope of Kansas, boomerang bullets were designed to fire in a curved line — the only danger being that if they traveled in a complete circle, they could kill the person who fired them.” RUSSELL ASH, <i>BOOK OF 1001 LISTS</i> 134 (2003).
Helmet Gun	“Patented by Albert B. Pratt of Vermont in 1916, the gun and its sights were attached to a helmet and the trigger fired by the wearer’s mouth. A powerful strap held it in place — but may not have been sufficient to prevent the recoil from fatally injuring the wearer.” <i>Id.</i>
Combined Gun and Plow	“Patented on June 17, 1862, by C.M. French and W.H. Fancher of New York, this unusual weapon was designed to be used by farmers who, if they were attacked while plowing, could quickly turn their implement into a powerful gun!” <i>Id.</i>
Combination Umbrella and Lightning Rod	While a patent eventually issued for the invention (U.S. Patent No. 4,447,846), a reviewing court stated, “we do not hesitate to say we would not consider using the claimed device for its intended purpose.” <i>Ex parte Drulard</i> , 223 U.S.P.Q. (BNA) 364, 366 (1983).

In addition, “many technologically important patents have been issued long before commercial exploitation became possible.” Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J. L. & ECON. 265, 267 (1977). A chart provided by Professor Kitch includes the following:

Invention	First Patentability	Commercial Product
Automatic Transmission	1904	1937
Cellophane	1910	1925
Cotton Picker	1850	1942
Helicopter	1912	1941
Kodachrome	1910	1935
Penicillin	1928	1944
Radar	1904	1935
Synthetic Detergents	1900	1930s

Id. at 272 (several examples have been excluded).

D. *Searching for Evidence of Market Power — The Anthrax Threat and the AIDS Pandemic*

A natural question is whether patent holders really exercise market power, which leads to economic inefficiencies, in the real economy. As one commentator has stated, "Whether a [patent] confers an economic monopoly is an empirical question."⁵³ In other words, does a patent holder charge a price for the patented product in excess of marginal cost, and would the related economic inefficiencies be eliminated if the patent were ignored?

In order to empirically determine whether a patent allows its holder to exercise market power, one needs several items of information regarding an actual market: (i) the price charged by the patent holder for the patented product; (ii) the patent holder's "marginal" cost of producing the product; and (iii) the price that other producers would charge if they could ignore the patent and produce and sell the product. While the price charged by the patent holder would be readily available, information about marginal cost likely would be difficult to compute and verify.⁵⁴ In addition, information about what other producers might charge if the patent could be ignored would be pure speculation in most cases, and one might question the thoroughness (and seriousness) of any estimate provided by potential competitors.

However, both the anthrax threat in the Fall of 2001, and President Clinton's Executive Order (issued May 10, 2000)⁵⁵ regarding anti-AIDS drugs for Africa, focused great attention on the types of information necessary to evaluate a patent holder's market power in those particular markets. The reports indicate that in the case of the drug for inhaled anthrax, the patent holder was charging approximately ten times more than its marginal cost (before the anthrax threat); in the case of the anti-AIDS drugs, the patent holders were charging almost thirty times more than the marginal cost of production.⁵⁶ Thus, in these markets, the patent holders exercised significant market power. This Article also considers damage awards in patent cases as an indication of market power in other markets.

53. Kitch, *supra* note 48, at 1731.

54. In order to determine "marginal cost," one would need to deduct fixed costs (such as administration, overhead, and plant and equipment) from total costs. Also, one would need to isolate the costs for the particular patented product from the costs relating to other products.

55. Executive Order 13155, 65 Fed. Reg. 30521 (May 10, 2000).

56. *See infra* notes 274-82 (Bayer generally charged U.S. consumers \$4.67 per tablet for Cipro, while selling Cipro to the U.S. Health & Human Services Dept. for 43 cents per tablet); *see infra* notes 315-25 and accompanying text (regarding the anti-AIDS drugs, the brand-name drug manufacturers charged U.S. individuals \$15,000 to \$17,000 for a one-year supply of anti-AIDS drugs, but generic manufacturers in other countries were willing to sell the drugs in Africa for approximately \$365 per year).

E. *Current Income Tax Laws Encourage a Corporate Inventor to Retain a Patent and Produce the Patented Product Itself, Rather than Sell the Patent to a More Efficient Producer*

After obtaining a patent, a corporate inventor has at least four basic options: (i) retain the patent, and produce, market, and sell the patented product itself; (ii) retain the patent, and license the right to make and sell the patented product to a producer in exchange for royalties based on the economic success of the patented product; (iii) sell the patent to a producer for a stream of payments contingent on the success of the patented product; or (iv) sell the patent to a producer for a fixed amount of money that is payable either in a lump sum or in installments over time.

Two current income tax rules will cause a corporate inventor to pay a substantial income tax on the sale of a patent. First, a corporate inventor can immediately deduct its research and experimental expenses,⁵⁷ and as a result, a corporate inventor likely will have a zero "tax basis"⁵⁸ in the patent. Second, a corporation's gain on the sale of a patent will be taxed at ordinary income tax rates (in contrast, an individual inventor's gain from the sale of a patent is taxed at the lower long-term capital gain rates).⁵⁹ As a result, on the sale of a patent, a corporate inventor may pay 40% or more of the entire purchase price in taxes.⁶⁰ This substantial tax liability can discourage a corporate inventor from selling a patent, even though other firms might be more efficient at manufacturing, mar-

57. I.R.C. § 174(a)(1). (Section 174 is discussed in *infra* notes 433-37 and accompanying text).

58. In general, a taxpayer's "tax basis" in an asset is the taxpayer's cost for the item. I.R.C. § 1012. Upon a sale of an asset, the taxable gain generally is the amount received minus the tax basis. I.R.C. § 1001(a). Thus, if the taxpayer has no tax basis in the asset sold, the entire amount received on the sale will be taxable gain.

59. While I.R.C. § 1235(a) provides that a sale by an individual inventor will be considered the sale of a long-term capital asset (and therefore, the gain on the sale will be taxed at the lower long-term capital gain rates for individuals), this provision is not available to a corporation, whether the corporation is taxed as a C corporation, or is taxed as an S corporation under I.R.C. §§ 1361-1379. See Charles Edward Falk, *Tax Planning for the Development and Licensing of Patents and Know-How*, 557 TAX MGM'T (BNA), at A-17 ("Corporations, including S corporations, cannot qualify as holders under any circumstances."). In any event, a Subchapter C corporation pays the same rate of income tax on ordinary income and long-term capital gains. See I.R.C. § 1201. As a result, merely characterizing the gain on a sale by a corporation as a long-term capital gain would not save taxes for a C corporation. See I.R.C. § 11 (providing that the maximum corporate tax rate is 35%), and I.R.C. § 1201(a)(2) (providing for an "alternative tax" rate on a corporation's net capital gain of 35%).

60. In regard to federal income taxes, a corporation is taxed at the 15% rate on its first \$50,000 of taxable income; on taxable income from \$50,000 to \$75,000, a corporation pays tax at the rate of 25%; on taxable income from \$75,000 to \$10 million, a corporation pays tax at the rate of 34%; and on taxable income in excess of \$10 million, a corporation pays tax at the rate of 35%. In addition to the federal income tax, states impose a tax on corporate income. State Tax Guide — All States (CCH), ¶ 10,040, at page 2529 (for example, the maximum California corporate income tax rate is 8.84%).

keting, and selling the patented product. As discussed below, production by an inefficient producer (such as a corporate inventor that specializes in research and development) will cause the patented product to be sold at an even higher price, and will cause even fewer units to be supplied. Thus, these tax rules exacerbate the economic inefficiencies that can be associated with a patent.

F. *Recommendation to Encourage Corporate Inventors to Sell Patents to Efficient Producers*

This Article recommends that a corporate inventor be entitled to a deduction (or exclusion) from gross income on the sale of a patent for a fixed sum, so that the effective income tax rate would approximate the applicable tax rate when an individual inventor sells a patent.⁶¹ This change would significantly reduce a corporate inventor's income tax liability on the sale, and equalize the tax treatment of individual inventors and corporate inventors.⁶² After May 6, 2003, the maximum federal tax rate on the gain from the sale of a patent by an individual inventor is 15%.⁶³

This recommendation would have three major benefits. First, if the patent purchaser has a lower marginal cost of production than the inventor,⁶⁴ this would increase the number of units sold and reduce the price — significant benefits to consumers. Second, this change could stimulate more invention by providing corporate inventors with additional capital for research and development. The corporate inventor could sell the patent and use the sale proceeds to engage in new research. Third, this change could stimulate more invention by allowing corporate inventors to focus on research, rather than being compelled to expand into manufacturing and other functions merely to avoid a large tax bill. While licensing can allow an efficient producer to exploit a patented product, if the royalty paid by the licensee per unit exceeds the produc-

61. For sales after May 6, 2003, in general, the maximum long-term capital gain tax rate for individuals is 15%. I.R.C. § 1(h)(1)(B). A "deduction" previously was available to individual taxpayers on the sale of long-term capital gain property. I.R.C. § 1202 (repealed for sales occurring in tax years ending after December 31, 1986). *See infra* notes 483-86 and accompanying text.

62. I.R.C. § 1235(a) provides that an individual inventor's gain on the sale of a patent or a patentable invention is taxed at long-term capital gain rates. *See infra* notes 462-65 and accompanying text.

63. *See supra* note 46 (regarding the 15% rate). The rate is 25% for "unrecaptured section 1250 gain" (this is generally the gain from the sale of depreciable real estate, to the extent of depreciation previously claimed). I.R.C. § 1(h)(1)(D). The gain from the sale of collectibles is generally taxed at a 28% maximum rate. *Id.* § 1(h)(5).

64. Presumably the most efficient producer will be the highest bidder, since the most efficient producer will be able to generate the largest profits from the exploitation of the patented invention.

tion cost savings per unit, licensing can cause greater economic inefficiency.

II. THE ECONOMICS OF A COMPETITIVE MARKET

In order to analyze the economic inefficiencies associated with market power, it is helpful to analyze a market in which there is no market power — a competitive market. While no nation likely has ever relied on an exclusively competitive market economy,⁶⁵ the benefits of a competitive market economy are often praised.⁶⁶

Every economic system must answer three basic questions — What will be produced? How much will be produced? Who will consume it?⁶⁷ The goal generally is to maximize output so that consumer satisfaction is maximized.⁶⁸ As economists have stated, “The ultimate yardstick of a country’s economic success is its ability to generate a high level of production of economic goods and services. What could be more important for an economy than to produce and consume large quantities of housing, shelter, food, education and recreation?”⁶⁹

The basic economic questions — What will be produced? How much will be produced? Who will consume it? — are answered through the use of prices. Consumers will be willing to pay a higher price for the goods they value most. In response, producers who wish to maximize profits will produce the goods that consumers want. The famous economist Adam Smith described the functioning of a competitive market as “every individual, in pursuing only his own selfish good, [is] led, as if by an *invisible hand*, to achieve the best good for all”⁷⁰

A. Supply and Demand

The basic economic principles are frequently described in terms of “demand” and “supply.” Assume that a market for some good — for example, wheat — is completely competitive. In this market, we assume there are no barriers to persons who wish to produce and sell

65. PAUL A. SAMUELSON & WILLIAM D. NORDHAUS, *ECONOMICS* 25 (13th ed. 1989) (“There never has been a 100 percent market economy (although nineteenth-century England came close).”).

66. See SAMUELSON, *supra* note 1, at 43; STIGLITZ, *supra* note 9, at 150.

67. See RICHARD G. LIPSEY ET AL., *ECONOMICS* 9 (12th ed. 1999); SAMUELSON & NORDHAUS, *supra* note 65, at 24.

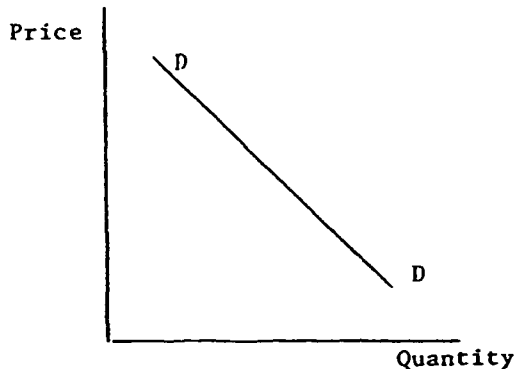
68. SAMUELSON & NORDHAUS, *supra* note 65, at 28 (“[T]he economy is producing efficiently when it cannot produce more of one good without producing less of another.”).

69. *Id.* at 77.

70. SAMUELSON, *supra* note 1, at 43 (emphasis added); STIGLITZ, *supra* note 9, at 150 (“The modern economic faith in markets can be traced back to Adam Smith’s 1776 masterpiece *The Wealth of Nations*. Smith argued that workers and producers, interested only in helping themselves and their families, were the basis of success of the economy.”). See *supra* note 23.

wheat,⁷¹ and no government regulations fix the price at which wheat can be sold, or the amount of wheat that can be produced. In regard to consumer "demand," if the price for wheat, is high, consumers as a group will demand a smaller quantity; if the price is low, consumers will demand more wheat.⁷² As a result, there is an inverse relationship between (i) the price of wheat, and (ii) the quantity of wheat demanded.⁷³ If we chart the demand for wheat, with price on the vertical axis and quantity on the horizontal axis, the demand curve will be "downward sloping." In general, in a competitive market, the demand curve for any good will be downward sloping.⁷⁴ A downward sloping demand curve (D - D) is illustrated by the following chart:

FIGURE #1
THE DEMAND CURVE
(MARKET DEMAND FOR WHEAT)



Now that we have discussed consumer demand, we turn to producers' supply. In general, if the price of a good is low, fewer producers will produce that good, and those who produce the good will produce less,⁷⁵ so that a smaller quantity will be produced. But if the price of the

71. In the real world, there can be barriers for any one individual or entity that otherwise might wish to produce wheat — for example, land is required to produce wheat, and various items of farm equipment would be needed to efficiently produce wheat on a large scale. Thus, in the short run, and for particular individuals and entities, there can be substantial barriers blocking entry into the wheat market.

72. As the price of wheat drops, people who previously did not buy wheat will begin to buy wheat. In addition, those people who previously bought wheat will now start to buy even more wheat (and perhaps cut down on their rye and corn purchases). SAMUELSON, *supra* note 1, at 61.

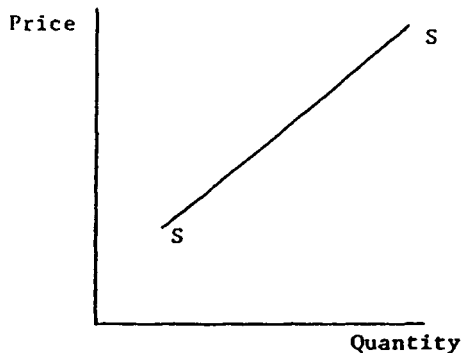
73. See LIPSEY, *supra* note 67, at 71 ("A basic economic hypothesis is that the price of a product and the quantity demanded are related *negatively*, other things being equal. That is, the lower the price, the higher the quantity demanded; and the higher the price, the lower the quantity demanded.") (emphasis added).

74. SAMUELSON, *supra* note 1, at 61 ("This law is true of practically all commodities: wheat, electric razors, cotton, Kellogg's cornflakes, and theater tickets.")

75. LIPSEY, *supra* note 67, at 77 ("for many products, the price of the product and the quantity

good is higher, greater amounts will be produced because as the price increases, existing producers looking to maximize profits will produce more, and new producers will enter the market.⁷⁶ For example, if the market price of wheat rises, farmers may shift acreage that previously was used to grow rye or corn over to wheat production.⁷⁷ Thus, in regard to supply, all other things being held constant, price and quantity move together — as price increases, quantity increases.⁷⁸ If we chart the supply of wheat, with price on the vertical axis and quantity on the horizontal axis, the supply curve will be “upward sloping,” as illustrated by the following chart:

FIGURE #2
THE SUPPLY CURVE



In an actual market, as the quantity produced increases, the supply curve eventually goes upward at a steeper slope because of the “law of diminishing returns.”⁷⁹ Under the law of diminishing returns, at some

supplied are related *positively*, other things being equal. That is to say, the higher the product’s own price, the more its producers will supply; and the lower the price, the less its producers will supply.”) (emphasis added).

76. STIGLITZ, *supra* note 9, at 83 (“In direct contrast to the demand curve, the typical supply curve slopes upward from left to right; at higher prices, firms will supply more. This is because higher prices yield suppliers higher profits — giving them an incentive to produce more.”).

77. SAMUELSON, *supra* note 1, at 63.

78. STIGLITZ, *supra* note 9, at 83 (“The market supply curve slopes upward from left to right for two reasons: at higher prices each firm in the market is willing to produce more, and at higher prices, more firms are willing to enter the market to produce the good.”).

79. LIPSEY, *supra* note 67, at 176 (“The law of diminishing returns states that if increasing amounts of a variable factor are applied to a given quantity of a fixed factor, eventually each additional unit of the variable factor adds less to total production than the previous unit did . . .”). As an example,

[W]hen Southern California Edison was required to modify its Mojave power plant to reduce the amount of pollutants emitted into the atmosphere, it discovered that a series of filters applied to the smokestacks could do the job. A single filter eliminated one-half of the discharge. Five filters in a series reduced the discharge to the 3 percent allowed by law. When a state senator proposed a new standard that

point, in order to produce more and more wheat, a farmer must use resources that are not as efficient in producing wheat.

Example #1

Assume that all farm workers are paid \$10 per hour. However, some workers are very productive, some are average, and some increase production very little. If the farmer produces wheat on only five acres, she may need to hire only five workers, so she hires the five most productive workers. In order to increase production (by farming a sixth acre), she then hires the sixth most productive worker. In this case the result from hiring the sixth farm worker is a diminishing return — the sixth worker will not increase production as much as the fifth worker.⁸⁰

B. *Equilibrium Price and Quantity*

In order to determine the price that actually will be charged and the quantity that actually will be produced and purchased, we combine the demand curve and the supply curve. The intersection of the demand curve and the supply curve produces the “equilibrium price” and the “equilibrium quantity.”⁸¹ “This equilibrium price and quantity are the price and quantity at which buyers willingly buy exactly the amount that sellers willingly sell.”⁸² The equilibrium price and equilibrium quantity are illustrated in Figure #3.

would permit no more than 1 percent of the pollutants to be emitted, the company brought in experts who testified that achieving this goal would require at least 15 filters per stack and would triple the cost. In other words, increasing the number of filters leads to diminishing marginal returns in pollution reduction.

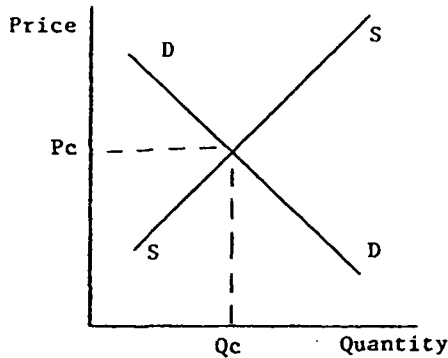
Id. at 178.

80. *Id.* at 176 (“let us consider the use of workers in a manufacturing operation . . . according to the law of diminishing returns . . . sooner or later the marginal production of additional workers must decline. When the decline takes place, each additional worker that is hired will increase total output by less than the previous worker did.”).

81. STIGLITZ, *supra* note 9, at 87-88 (“Equilibrium describes a situation where there are no forces (reasons) for change. No one has an incentive to change the result . . .”).

82. SAMUELSON & NORDHAUS, *supra* note 65, at 423.

FIGURE #3
THE EQUILIBRIUM PRICE AND QUANTITY IN A
COMPETITIVE MARKET



D-D = Demand curve

Pc = Equilibrium price in the competitive market

Qc = Equilibrium quantity in the competitive market

S-S = Supply curve

C. Shifts of the Demand and Supply Curves

As stated above, the demand and supply curves depict consumer demand and producer supply at various prices, with “all other things being constant.”⁸³ In other words, the demand and supply curves depict the demand and supply if the price of the good changes, but nothing else changes.⁸⁴ Over the course of any significant period of time, the “all other things being constant” assumption will be unrealistic.⁸⁵ Over time, “other things” will change, causing “shifts” of the entire demand and supply curves. Different events can trigger a shift of the supply curve. A change in the price of “inputs” — such as materials, labor, and

83. See *supra* note 78.

84. LIPSEY, *supra* note 67, at 73 (“The demand schedule is drawn with the assumption that everything except the product’s own price is being held constant.”).

85. As one commentator has stated,

Other things being equal, as economists are fond of saying, there is a unique schedule of supply or demand in any period of time. But other things will not remain equal. The demand for cotton is declining over the years because of the reduction in the price of synthetics. The supply schedule of radios is shifting because technological progress permits more to be produced at the same cost. As costs and tastes change, as incomes vary, as the prices of substitute products (coffee in relation to tea) or of cooperating products (sugar in relation to tea) change, our schedules will *shift*.

SAMUELSON, *supra* note 1, at 388 (emphasis added). Demand and supply curves are generally created for the “short run” — that period of time in which certain equipment, resources, and commitments of the producer are fixed; but it is a period long enough for the producer to vary its output by changing variable factors of production such, as labor and raw materials. *Id.* at 66, 388.

machinery — will shift the supply curve.⁸⁶ For example, if labor costs to produce a product decrease, greater profits can be generated, so producers will produce more at every price — causing a “rightward” shift of the supply curve.⁸⁷ Also, improved technology will shift the supply curve.⁸⁸ In various markets, other changes can shift the supply curve.⁸⁹ Figure #4 shows a “rightward” shift of the supply curve from S1 to S2 caused by a decrease in the cost of production. At every price, a greater quantity is supplied on the S2 curve.⁹⁰

FIGURE #4
RIGHTWARD SHIFT OF THE SUPPLY CURVE FROM S1 TO S2 (BECAUSE THE COST OF PRODUCTION DECREASED)

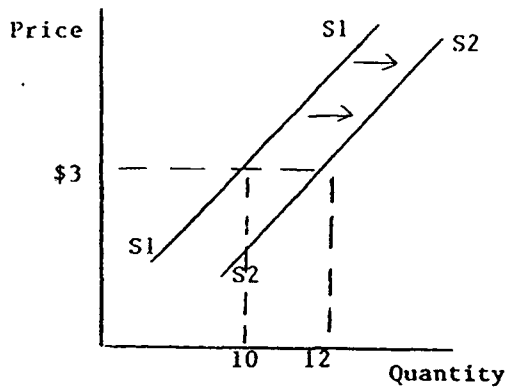


Figure #5 below shows the same two supply curves (S1 and S2), but a demand curve (D-D) has been added. Figure #5 shows that the rightward shift in the supply curve (from S1 to S2) will reduce the “equilibrium price” of wheat from \$4 a bushel to \$3 a bushel, and will

86. LIPSEY, *supra* note 67, at 78; SAMUELSON & NORDHAUS, *supra* note 65, at 423 (A rise in the “costs of production” will decrease supply.).

87. LIPSEY, *supra* note 67, at 78 (On the other hand, “the higher the price of any input used by a firm, the less the firm will produce and offer for sale at any given price of the product.”).

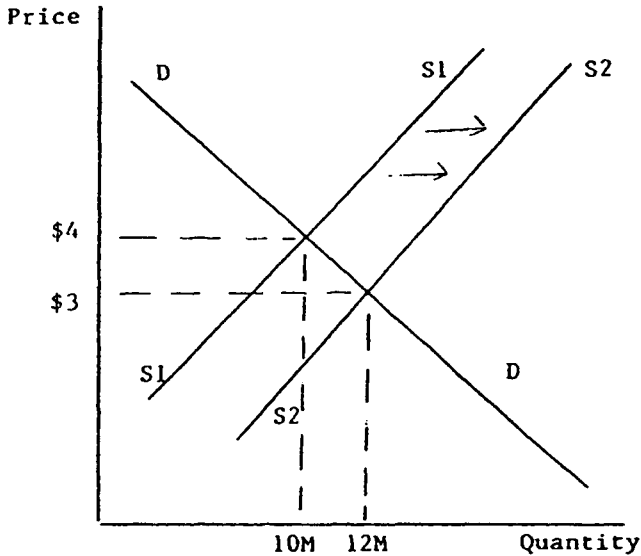
88. *Id.* at 79 (“Any technological innovation that decreases production costs will increase the profits that can be earned at any given price of the product. Because increased profitability leads to increased production, this change shifts the supply curve to the right, indicating an increased willingness to produce the product and offer it for sale at each possible price.”).

89. STIGLITZ, *supra* note 9, at 85-86 (for example, in agricultural markets changes in the weather, insect infestations, animal diseases, and the availability of credit may cause shifts in the supply curve).

90. For example, S1 might show the market supply curve for wheat before the introduction of the new “bushel-buncher” technology. When the price of wheat is \$4 per bushel, the farmers are willing to produce 10 million bushels of wheat. When the new “bushel-buncher” technology has been adopted by the farmers, the market supply curve for wheat may move to S2. Because the new “bushel-buncher” technology allows wheat to be made cheaper, the farmers will be willing to produce 12 million bushels of wheat even if the market price drops to \$3 per bushel.

increase the “equilibrium quantity” from 10 million bushels to 12 million bushels.

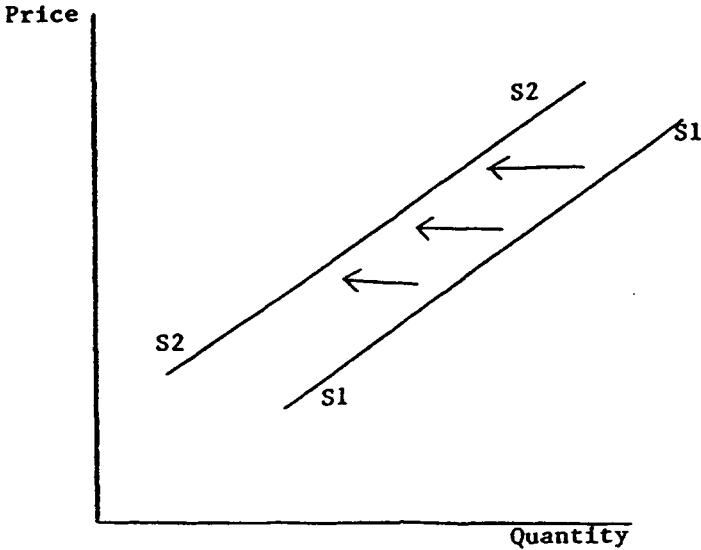
FIGURE #5
RIGHTWARD SHIFT OF THE SUPPLY CURVE CAUSING A DECREASE IN THE EQUILIBRIUM PRICE AND AN INCREASE IN THE EQUILIBRIUM QUANTITY



In contrast, if the cost of production increases (for example, because the cost of production increases, or a tax on each bushel sold increases),⁹¹ the farmers will produce less at each price. This can be reflected by a “leftward” shift of the supply curve, which is shown in Figure #6. The shift in supply is represented in Figure #6 as a shift from S1 to S2.

91. This might be caused by the imposition of a flat tax on each unit sold (for example “a tax of \$1 for every bushel of wheat”). See SAMUELSON, *supra* note 1, at 389.

FIGURE #6
LEFTWARD SHIFT OF THE SUPPLY CURVE FROM S1 TO S2
(BECAUSE THE COST OF PRODUCTION INCREASED)



D. *Focus on the Economic Behavior of an Individual Producer in a Competitive Market*

The discussion to this point has focused on the way in which price and quantity are determined in an entire market. In order to appreciate the difference between competitive markets and monopolies (or oligopolies, or other situations in which a patent may grant "market power"), this section considers how the individual producer in a competitive market acts.

1. THE INDIVIDUAL PRODUCER IN THE COMPETITIVE MARKET AS A "PRICE TAKER"

When considering all the producers in a competitive market, the actions of the producers as a group can change the price at which the product is sold.⁹² However, if there are many producers in a market, each individual producer will not be able to influence the price.⁹³ In other words, if the prevailing price for wheat is \$3 per bushel, one indi-

92. To illustrate, if all the producers agreed to restrict supply (and actually restricted supply), the shortage would cause the price to increase.

93. SAMUELSON, *supra* note 1, at 455 ("A perfect-competitor is too small and unimportant to affect the market price. Like a wheat farmer, he is a 'price taker' who can sell all he wishes at the ruling market price . . . a perfect-competitor faces a (virtually) horizontal . . . demand curve for his product — his elasticity of demand is infinite.")

vidual farmer will have no choice but to sell her wheat for \$3 per bushel. If she charges more than \$3 per bushel, no one will buy her wheat. In effect, the market as a whole sets the price (where the market supply curve meets the market demand curve),⁹⁴ and each individual producer is a “price taker” selling at the market price.

2. THE QUANTITY PRODUCED BY A SINGLE PRODUCER WILL DEPEND ON HER MARGINAL COST

The economic question for the individual producer is the amount (a/k/a the quantity) she will produce. In general, the producer will continue to make units (and sell those units at the equilibrium price) until her marginal cost equals or exceeds her marginal revenue. The producer’s marginal revenue is the amount of revenue the producer will receive by selling one additional unit. For the individual producer in a competitive market, marginal revenue equals the market price (because the individual producer is a price taker).

The producer’s marginal cost is her cost to produce one more unit. Marginal cost does not include sunk costs such as administration, overhead, and plant and equipment.⁹⁵

Since the quantity produced will be determined by marginal cost, rather than fixed cost, even if the producer spends a large amount to create the business,⁹⁶ the producer will be willing to increase quantity (by producing more) as long as marginal revenue (the price she will receive for selling one more unit) exceeds marginal cost (the amount she will spend to produce one more unit).⁹⁷ If the producer cannot recover her original fixed costs, she will not be happy, but she will continue to produce as long as her marginal revenue exceeds her marginal cost.⁹⁸ In effect, once the producer pays the fixed costs, the producer will continue to produce and sell as long as the marginal revenue exceeds the marginal cost, even if the producer will not be able to recover her fixed costs.⁹⁹ “Once the crop is in, so to speak, there is not much [the individual pro-

94. See *supra* notes 81-82 and accompanying text (the intersection of the demand curve and the supply curve determines the equilibrium price).

95. See SAMUELSON, *supra* note 1, at 451-53.

96. Costs in “creating the business” could include the costs incurred in acquiring land, buildings, equipment, fixtures, furniture, intellectual property rights, and assembling a workforce.

97. Marginal revenue is the amount of revenue that will be raised by selling one more unit. Marginal cost is the cost of producing one more unit. See LIPSEY, *supra* note 67, at 178. “[M]arginal cost” is also referred to as “variable cost” — “a cost that varies directly with output, rising as more output is produced and falling as less output is produced . . .” *Id.* at 177.

98. SAMUELSON, *supra* note 1, at 391.

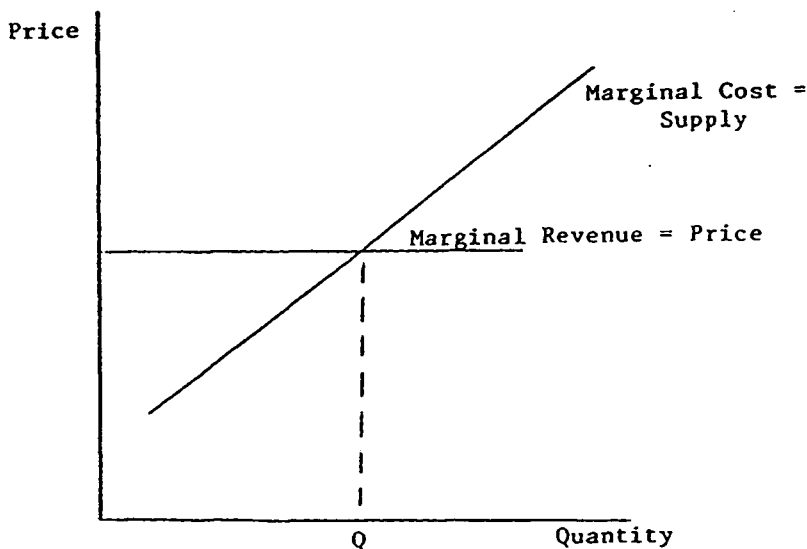
99. LIPSEY, *supra* note 67, at 179 (“[F]or example, the marginal cost of producing a few more potatoes by farming a given amount of land more intensively is not affected by the rent paid for the land.”).

ducer in a competitive market] can do about it . . . [she has] no choice but to minimize [her] short-term losses."¹⁰⁰ However, if the producer is unable to recover her fixed costs, she will be reluctant to ever incur those types of fixed costs again.

As discussed earlier, because of the Law of Diminishing Returns, as quantity increases, the marginal cost curve will become steeper as the producer is forced to use less efficient and more expensive resources to produce each additional unit.¹⁰¹

The quantity of goods that the individual producer will produce will be determined by the intersection of the marginal revenue "curve" (which in a purely competitive market is a straight line equal to the market price) and the producer's marginal cost curve. Figure #7 illustrates the demand curve facing a producer in a competitive market (the demand curve is a straight line, labeled "Marginal Revenue = Price"), and a producer's marginal cost curve (which is the producer's supply curve, labeled "Marginal Cost = Supply"). The quantity produced is "Q," determined by the intersection of the demand curve and the marginal cost (supply) curve.

FIGURE #7
DEMAND AND SUPPLY CURVES FOR A SINGLE PRODUCER IN
A COMPETITIVE MARKET



100. SAMUELSON, *supra* note 1, at 391.

101. *See supra* notes 79-80 and accompanying text.

III. THE ECONOMIC FAILURE OF COMPETITION IN THE “INVENTION MARKET”

Inventions are a key factor in economic growth.¹⁰² Unfortunately, a competitive market will not generate the optimum quantity of inventions because of the free-rider problem.¹⁰³

Imagine that Inventions Inc. spends \$10 million to develop a great new invention, and begins selling the invention at a price that will allow it to recover its \$10 million in development costs. Knock-Off Inc. purchases one of Invention Inc.'s products, takes it apart, learns how it can be made, and begins producing and selling the same product.¹⁰⁴ Many other companies take the same actions as Knock-Off Inc. If there is no patent (or other intellectual property) protection, Inventions Inc. will be unable to stop or otherwise enjoin Knock-Off Inc. and the others. The market price for the product will be based on the intersection of the industry demand curve and the industry supply curve. The industry supply curve will consist of the marginal cost curves of all the individual producers combined.¹⁰⁵ Inventions Inc. presumably will have no advantage over the competition because its marginal cost will be similar to the marginal cost of the other producers. In this competitive market, in which Inventions Inc. is merely one producer of many, Inventions Inc. will be a price taker — in order to sell its products, Inventions Inc. must sell at the industry market price.¹⁰⁶ While Inventions Inc. will find it beneficial to produce the product as long as its marginal cost per unit is below the market price per unit,¹⁰⁷ if the market price is not high enough to allow Inventions Inc. to recover its research and development costs, Inventions Inc. will be trying to minimize its losses.

102. See CHISUM ET AL., *supra* note 26, at 59 (“[M]ost of the economic growth in the United States in the first half of this century could be explained by investments in research and development and education rather than by increases in capital and labor.”) (citing Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 REV. ECON. & STAT. 312, 320 (1957)); Kieff, *supra* note 30, at 699 n.4 (“Economic research over the past sixty years has amply established a causal link between the development of intellectual property and the growth of our national economy, while also showing that intellectual property is an increasingly critical component of United States capital and foreign trade.”). Merges & Nelson, *supra* note 2, at 878 (“First, increases in research and development expenditures yield more inventions. Second, the larger number of inventions from increased research and development have a positive effect on future productivity growth. And third, productivity growth is important for economic well-being.”).

103. See *supra* notes 26-30, and accompanying text (including the discussion of “Arrow’s Information Paradox”).

104. This process is frequently referred to as “reverse engineering.” See *supra* note 27.

105. SAMUELSON, *supra* note 1, at 451 (“[W]e add horizontally all individual demand curves to get the aggregate market demand curve. The same horizontal addition now applies to supply.”).

106. See *supra* notes 93-94 and accompanying text.

107. See *supra* note 95-98 and accompanying text.

Thus, in the case of inventions that can be “reverse-engineered,”¹⁰⁸ in the absence of intellectual property protection, there will be little or no economic incentive for individuals or firms to spend significant amounts of time or money to create inventions, because there will be no opportunity to recoup the research and development costs.¹⁰⁹ Research, development, and innovation are important for economic growth and provide other benefits to society. However, under a purely competitive economic system, the reward to those who engage in such activities will not be commensurate with the societal benefit that those individuals and firms provide. Thus, a purely competitive market would fail to provide sufficient incentive to encourage the creation of an economically beneficial level of research, development, and invention.

IV. THE PATENT RESPONSE TO THE FAILURE OF A COMPETITIVE MARKET TO ENCOURAGE AN ECONOMICALLY BENEFICIAL LEVEL OF INVENTION

A. *Patents and the Under-Production of Inventions in a Purely Competitive Market*

As discussed above, a competitive market economy will under-produce inventions (because inventions are non-rival and lead to free-rider problems).¹¹⁰

108. See *supra* note 27, and accompanying text (discussing reverse engineering).

109. See CHISUM ET AL., *supra* note 26, at 69 (“[I]n a competitive market, the inventor will face being undersold by the competitor; and thereby never recoup the cost of inventing. The inability to recoup the costs of inventing will discourage inventors from inventing in the first place.”); Wendy J. Gordon, *Asymmetric Market Failure and Prisoner’s Dilemma in Intellectual Property*, 17 U. DAYTON L. REV. 853, 854 (1992) (“[I]nventors would not be able to obtain much payment for their work in the absence of a rule that restrained strangers from copying, and, as a result, potential creators [would] produce fewer works than the public would have been willing to pay for.”).

If successful inventions are quickly imitated by free riders, competition will drive prices down to a point where the inventor receives no return on the original investment in research and development. As a result, the original inventor may be unable to appropriate enough of the social value of the invention to justify the initial research and development expenditures. The high risk involved in research compounds the likelihood of underinvestment in invention. Thus inventions with potentially great social benefits might never come about, or at least might be significantly delayed

Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1025 (1989) (citations omitted).

In a competitive market in which anyone is free to use the invention to produce goods without obligation to the inventor, the cost of the goods sold will be driven down to a price approaching the marginal cost of their production, and thus the selling price will not allow for any return on the sunk cost of the research and development necessary to make the invention in the first place.

Id. at 1025 n.31.

110. See *supra* notes 103-09 and accompanying text. The term “non-rival” means that more

If competitors could simply . . . take another's inventions . . . there would be no incentive to spend the vast amounts of time, energy, and money necessary to develop these products and techniques. It would be in each firm's self-interest to let others develop products, and then mimic the results. No one would engage in original development To avoid this disastrous result, the argument claims, we must continue to grant intellectual property rights The grant of property rights to producers is a mere means to an end.¹¹¹

The use of a patent system is nothing new. Laws to promote invention can be traced back to Renaissance Italy.¹¹²

B. *The Economic Necessity for the U.S. Patent System (or Another Reward System)*

While several different justifications can be offered for granting special economic benefits to an inventor,¹¹³ the Patent Clause of the U.S. Constitution indicates that the primary purpose of the U.S. patent system is utilitarian. Article I, section 8, clause 8 provides that Congress shall have the power "[t]o promote the Progress of Science and useful Arts by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writing and Discoveries."¹¹⁴ Thus, inventors are pro-

than one person or entity can own the item and the fact that more persons own it does not reduce the original owner's interest. In other words, if Person A has an idea, Person A will still have that idea even if thousands of other people have the same idea. See Kieff, *supra* note 30, at 727. Thomas Jefferson wrote, "[h]e who receives an idea from me, receives instruction himself without lessening mine, as he who lights his taper at mine receives light without darkening me." Letter to Isaac McPherson (Aug 13, 1813), reprinted in JEFFERSON WRITINGS, 1291-92 (M. Peterson ed. 1984) (quoted in CHISUM ET AL., *supra* note 26 at 67 n.12, and Kieff, *supra* note 30, at 727 n.130).

111. Edwin C. Hettinger, *Justifying Intellectual Property*, 18 PHIL. & PUB. AFF. 31, 48 (1989) (quoted in CHISUM ET AL., *supra* note 26, at 54-55).

112. Edward C. Walterschied, *The Early Evolution of the United States Patent Law: Antecedents (Part I)*, 76 J. PAT. & TRAD. OFF. SOC'Y 697, 707 (1994) ("While it is generally agreed that the custom of granting patents of monopoly, i.e. exclusive rights to practice a particular art, in return for its introduction into the state, originated in Italy, there is some question as to whether it began in Venice or in Florence."); see also CHISUM ET AL., *supra* note 26, at 10.

113. See Wendy J. Gordon, *A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property*, 102 YALE L.J. 1533 (1993) (discussing the philosophy of John Locke, as discussed in his book, *Second Treatise on Civil Government* in "Two Treatises on Government" (3d ed. 1698), arguing that when a person adds her labor, she makes the resulting object something of her own, and thereby makes it her property); Margaret Jane Radin, *Property and Personhood*, 34 STAN. L. REV. 957 (1982) (discussing the philosophy of Hegel, as discussed in his book, *Philosophy of Right*, arguing that claiming property rights is an essential part of being a person — "property is the first embodiment of freedom and so it is in itself a substantive end").

114. U.S. CONST. art. I, § 8, cl. 8 (emphasis added); see also CHISUM ET AL., *supra* note 26, at 54 ("[T]he predominant justification for American intellectual property law has been, without question, utilitarianism or consequentialism According to utilitarianism, but for the prospect of the right to exclude in the form of a patent . . . there will be inadequate incentives resulting in a less than 'socially optimal output of intellectual property.'") (quoting Hettinger, *supra* note 111,

vided with exclusive rights — patents — to promote the useful arts.¹¹⁵

C. *Is the Modern Patent Grant the Appropriate Incentive?*

Many questions can be raised regarding whether the U.S. patent system is the correct response to the need to encourage invention. Some of these questions include:

- (1) Is the patent term appropriate? Should the patent term for every invention and inventor begin when the patent is issued and end 20 years from the date of filing the patent application?¹¹⁶ Should

at 47); Eisenberg, *supra* note 109, at 1024 (“The United States Constitution posits an instrumental justification for patents . . .”).

115. Various sub-purposes have been identified. Commentators assert that in addition to providing a financial reward to the patentee, the patent system “promote[s] the Progress of . . . the useful Arts” in three additional ways — by providing (i) an incentive to disclose; (ii) an incentive to commercialize; and (iii) an incentive to design around. CHISUM ET AL., *supra* note 26, at 70.

Incentive to Disclose — In addition to providing financial rewards to inventors, the patent system requires the public disclosure of the new invention. 35 U.S.C. § 122(b) (2000) (requiring public disclosure of a patent application unless the applicant certifies that there will be no foreign filing that requires public disclosure). In the absence of public disclosure (through the patent system), other researchers might waste resources trying to invent what has already been invented — in other words “re-inventing the wheel.” Under this view, the inventor is rewarded with a patent for publicly disclosing her invention. See Eisenberg, *supra* note 109, at 1024 (“[T]he patent system promotes disclosure of new inventions and thereby enlarges the public storehouse of knowledge.”).

Incentive to Commercialize — A patent provides a degree of certainty. From the date the patent issues until 20 years from the date the patent application was filed, the inventor will have an “exclusive” on her invention. Commentators have stated “[p]otentially, one of the most serious problems facing the inventor is the lack of experience and resources necessary to produce, advertise, distribute, and sell large quantities of the invention’s commercial embodiment. The patent grant creates a degree of certainty allowing venture capitalists and others to invest in the invention and bring the patented product to market. CHISUM ET AL., *supra* note 26, at 73-74. As an example, commentators have stated:

[A scientist] invented an excellent invalid chair, and thinking to give it to the world without recompense to himself, he did not patent it. The result was that no manufacturer dared risk undertaking its manufacture. Each knew that if it succeeded, competitors would spring up and rob him of most or all of his profits, while, on the other hand, it might fail.

Id. at 74 (quoting Giles S. Rich, *The Relation Between Patent Practices and the Anti-Monopoly Laws*, 24 J. PAT. OFF. SOC’Y 84, 179 (1942)). For additional discussion regarding the incentive to commercialize, see generally Kieff, *supra* note 30.

Incentive to Design Around — Since the patent system requires that the invention be publicly disclosed, 35 U.S.C. § 122(b) (2000), it provides all of the patentee’s competitors with an opportunity to study the new invention and create a new invention that will not infringe the existing patent. Thus, while the patentee gains an “exclusive” in the new patented invention, everyone else in the industry can be educated and take up the challenge of finding the next breakthrough invention. See CHISUM ET AL., *supra* note 26, at 75.

116. See Kitch, *supra* note 48, at 1740 (“Another economist wrote a whole book on the issue of the length of the patent term.”) (citing WILLIAM D. NORDHAUS, *INVENTION, GROWTH, AND WELFARE: A THEORETICAL TREATMENT OF TECHNOLOGICAL CHANGES* (1969)); Merges & Nelson, *supra* note 2, at 840 (“[S]everal economists have explored the question of optimal patent duration.”).

- every inventor working in every industry receive the same reward from the patent system?
- (2) Should the extent of patent protection depend on the level of “work” or “effort” put forth by the inventor?
 - (3) Should the extent to which the patentee has relied on the work of others impact the duration or degree of patent protection?¹¹⁷ “The most famous formulation of this . . . is credited to Sir Isaac Newton, who reportedly said, ‘If I have seen further it’s by standing on the shoulders of giants.’ This is occasionally referred to . . . as the OTSOG (On the Shoulders of Giants) principle.”¹¹⁸
 - (4) Are there areas of innovation in which it is unnecessary to grant patent protection?¹¹⁹
 - (5) Should inventors receive an entirely different type of prize or benefit (rather than a patent)?¹²⁰

This Article will not consider whether the patent reward is the best possible response to the need to encourage invention — that subject has been considered by many others.¹²¹ Instead, this Article will (i) consider the theoretical economic principles that suggest that a patent creates economic inefficiencies; (ii) analyze two specific markets to assess whether the economic inefficiencies suggested by economic theory occur in real markets; and (iii) recommend a change to the existing tax rules to improve economic efficiency in markets that are dominated by patent holders.

V. THE PATENT SOLUTION CREATES A MONOPOLY IN THE MARKET FOR THE PATENTED PRODUCT

As stated above, a patent grants to the patentee “the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United

117. See Eisenberg, *supra* note 109, at 1026 (“If . . . one assumes that somebody else would eventually have made the invention, it is no longer clearly appropriate to attribute the full social value of the invention to the efforts of the first inventor.”).

118. Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 TEX. L. REV. 989, 997 n.30 (1997) (citation omitted).

119. For example, many university scientists (and others) may work for fame, prestige, and personal reputation, and would continue to invent (and publish the results) even in the absence of a patent reward. See Kieff, *supra* note 30, at 723 n.118.

120. See Michael Abramowicz, *Perfecting Patent Prizes*, 56 VAND. L. REV. 115 (2003); Eisenberg, *supra* note 109, at 1026 (“Some critics of the patent system have suggested that government should stimulate invention at less social cost by awarding prizes to inventors in lieu of patents. . . such proposals are almost as old as the patent system James Madison proposed a system of prizes and bonuses to inventors in lieu of patents at the Constitutional Convention in 1789.”); John S. Leibovitz, *Inventing a Nonexclusive Patent System*, 111 YALE L.J. 2251 (2002); Oddi, *supra* note 5, at 268 n.6 (discussing various positions regarding the appropriateness of the U.S. patent system); see also Kitch, *supra* note 52, at 289.

121. See *supra* note 120.

States”¹²² Thus, the only producer in the market for the patented product will be the patent holder (and its licensees, if any).¹²³

A “monopoly” exists when there is only one producer in the market.¹²⁴ As discussed below, a monopoly allows the producer to charge a higher price and sell a smaller quantity than in a competitive market, and this is an inefficient economic result because it fails to maximize consumer satisfaction.¹²⁵

If a patented product is the only solution for a broad-based consumer need or desire, the patentee can be the sole producer in a significant market. One economist has stated, “The most important monopolies granted by government today . . . are patents.”¹²⁶ Courts and commentators have stated that patents can create a monopoly.¹²⁷ In addition, Congress has referred to the exclusive rights granted by a patent as a “monopoly.”¹²⁸

VI. ECONOMIC INEFFICIENCIES WITH A PURE MONOPOLY

A. *The Monopolist Has Discretion in Setting Price Above Marginal Cost*

As discussed earlier, in a competitive market, each producer is a “price taker.” The individual producer can charge only the market price for her products; if she charges more, customers will buy from her com-

122. 35 U.S.C. § 154(a)(1) (2002) (emphasis added); Merges & Nelson, *supra* note 2, at 861 n.96 (“[A] patent grant is a right to *exclude*, not an affirmative right to practice an invention.”) (emphasis added).

123. As discussed below, *see infra* note 521 and accompanying text, the patent holder can retain the patent and “license” others to make and sell the patented product.

124. SAMUELSON, *supra* note 1, at 489.

125. *See infra* notes 150-55 and accompanying text (regarding a monopolist charging a higher price and producing a small quantity); *see supra* notes 68-69 and accompanying text (regarding the definition of economic efficiency).

126. STIGLITZ, *supra* note 9, at 349.

127. *See Bonita Boats v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 148 (1989) (“Sections 102(a) and (b) operate in tandem to exclude from consideration for patent protection knowledge which is already available to the public. They express a congressional determination that the creation of a *monopoly* in such information would . . . serve no socially useful purpose”) (emphasis added); *see also* CHISUM, *supra* note 45, § 5.01, at 5-11 (“[The nonobvious requirement] serves to limit *patent monopolies* to those innovations that in fact serve to advance the state of the useful arts.”) (emphasis added); CHISUM ET AL., *supra* note 26, at 21 (“[F]rom about 1930 to 1950, the Court approached patents with a great deal of suspicion, emphasizing the monopolistic and social-cost aspects of patents.”); Eisenberg, *supra* note 109, at 1022 (“Judicial decisions characterize the enabling disclosure in the patent as the ‘quid pro quo’ of the patent monopoly.”). Thomas Jefferson initially warned about the dangerous economic effects that could result from granting patent “monopolies” to inventors. MERRILL D. PETERSON, THOMAS JEFFERSON AND THE NEW NATION 450 (1970) (quoted in CHISUM ET AL., *supra* note 26, at 17.

128. *See* S. REP. NO. 83-1622, reprinted in 1954 C.B. 438, 439; Falk, *supra* note 59, at B-301 (“[Section 1235 of the Internal Revenue Code] does not apply to a property right in an invention differing from the *monopoly* rights evidenced by a patent.”) (emphasis added).

petitors instead.¹²⁹

In contrast, in a pure monopoly, there is only one seller.¹³⁰ We will see that the monopolist has discretion in pricing her product,¹³¹ because there is no competition. Unlike the producer in the competitive market who faces a horizontal demand curve,¹³² the monopolist faces a downward-sloping demand curve. As a result, if the monopolist produces and sells more, the monopolist drives down the price. If the monopolist produces and sells less, the price will rise.¹³³

B. *The Demand Curve and Marginal Revenue Curve in a Monopoly Market*

In order to appreciate the monopolist's economic situation, we need to analyze the demand curve and the marginal revenue curve facing the monopolist. As discussed earlier, the demand curve reflects the quantity that consumers will purchase at each price, for the entire industry.¹³⁴ Because the monopolist is the only producer in the industry, the demand curve facing the monopolist is the demand curve for the entire industry. The demand curve is downward sloping because as price rises, fewer consumers will buy (and those who will still buy will buy less).¹³⁵

In contrast, the marginal revenue curve plots the increase (or decrease) in revenue from the sale of each additional unit.¹³⁶ The marginal revenue curve can be explained by an example. Figure #8 provides information from which a demand curve and a marginal revenue curve can be plotted.

129. See *supra* notes 93-94; SAMUELSON, *supra* note 1, at 484 (“[A] perfect competitor is a firm that has no control over price . . . only potatoes, tobacco, wheat, and cotton come within our strict definition of perfect competition.”).

130. SAMUELSON, *supra* note 1, at 489 (“[S]he is called a ‘monopolist’ from the Greek word *mono* for ‘one’ and *polist* for ‘seller.’ [S]he is the only one producing in [her] industry, and there is no industry producing a close substitute for [her] goods.”).

131. *Id.* However, if there are competing goods, the monopolist's discretion in setting price will be limited by the price and consumer demand for the competing goods. See Kitch, *supra* note 48, at 1729-30; CHISUM ET AL., *supra* note 26, at 61.

132. See *supra* notes 93-94, and accompanying text.

133. See *supra* notes 149-50 and accompanying text. See SAMUELSON, *supra* note 1, at 485; LIPSEY, *supra* note 67, at 232 (“Because a monopolist is the sole producer of the product that it sells, its demand curve is simply the market demand curve for that product. The market demand curve, which shows the total quantity that buyers want to purchase at each price, also shows the quantity that the monopolist will be able to sell at each price.”).

134. See *supra* notes 72-74 and accompanying text.

135. See *supra* note 72 and accompanying text.

136. SAMUELSON, *supra* note 1, at 494.

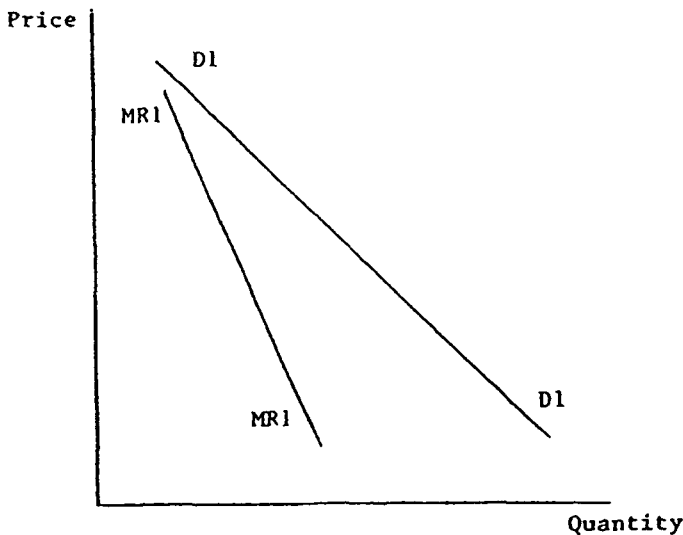
FIGURE #8
 EXAMPLE OF TOTAL REVENUE AND MARGINAL REVENUE IN A
 MONOPOLY MARKET¹³⁷

(1) Quantity <i>q</i>	(2) Price <i>P</i>	(3) Total Revenue <i>TR = P x q</i>	(4) Marginal Revenue <i>MR*</i>
0	1,000	-0-	+900
1	900	900	+700
2	800	1,600	+500
3	700	2,100	+300
4	600	2,400	+100
5	500	2,500	-100
6	400	2,400	-300
7	300	2,100	-500
8	200	1,600	-700
9	100	900	-900
10	-0-	-0-	

*Marginal Revenue is the charge in Total Revenue caused by the production and sale of one additional unit.

The demand curve (D1 - D1) and the marginal revenue curve (MR1 - MR1) can be plotted as follows:

FIGURE #9
 SAMPLE DEMAND CURVE AND MARGINAL REVENUE CURVE IN A
 MONOPOLY MARKET



The relationship between the demand curve and the marginal revenue curve has been described as follows:

[Marginal Revenue] is definitely less than [Price or Average Reve-

137. This chart is adapted from SAMUELSON, *supra* note 1, at 492.

neue] for the imperfect competitor. True, I sell my last unit . . . for the [Price]. But what did I have to do to coax out that last unit of sale? Clearly, I had to lower my [Price], since I didn't face a perfect-competitor's horizontal [demand curve]. But in lowering my [Price] for the last new buyer, I also had to lower [the Price] for all the previous buyers. So my extra revenue [the Marginal Revenue], is evidently less than [the Price] by this loss on previous units from the price drop. . . . Graphically, a straight line Marginal Revenue curve always has twice the steepness of the [demand] curve.¹³⁸

For example, in Figure #8, when the producer dropped the price from \$600 to \$500, the producer sold one more unit, which increased total revenue by \$500. However, the producer had to drop the price from \$600 to \$500 for all the other consumers.¹³⁹ The other consumers would have purchased four units total at the \$600 price, but now the sales price on each of those four units will drop by \$100, for a total drop of \$400 (a drop in total revenue of \$400). Thus, the net charge in total revenue — called the marginal revenue — is \$100 [$\$500 - \$400 = \100].¹⁴⁰ When the demand curve is a straight line, the marginal revenue line will drop twice as fast as the straight-line demand curve (as indicated in Figure #9).¹⁴¹

138. SAMUELSON, *supra* note 1, at 494-95; SAMUELSON & NORDHAUS, *supra* note 65, at 578.

139. In this situation, it is assumed that price discrimination is not practical. Price discrimination is the ability to charge different prices to different consumers (normally based on their ability to pay). If the monopolist could practice perfect price discrimination, she could generate greater total revenue. A monopolist practicing perfect price discrimination would produce and sell the same amount as if the products were being produced by many firms in a competitive market. LIPSEY, *supra* note 67, at 246. There are several potential barriers to effective price discrimination.

Discrimination among buyers is only possible if the buyers who face the low price cannot resell the goods to the buyers who face the high price . . . [E]ven though the local butcher might like to charge the banker twice as much for steak as [she] charged the taxi driver, [she] cannot succeed in doing so. The banker can always shop for meat in the supermarket where her occupation is not known. Even if the butcher and the supermarket agreed to charge [the banker] twice as much, [the banker] could hire the taxi driver to shop for her.

Id.

There are some examples of price discrimination — cheaper prices at movies and restaurants for children or seniors, and higher airfares for business travelers who do not spend Saturday night at their travel destination. Price discrimination gives a seller “an opportunity to capture some (if not all) of the consumer surplus. In general, the larger the number of different prices a firm can charge, the greater its ability to increase its revenue at the expense of consumers.” *Id.* at 244. However, for most products, everyone pays the same price. As one commentator has stated, “perfect price discrimination is not practicable.” Gordon, *supra* note 109, at 855 n.9; see also LIPSEY, *supra* note 67, at 242. When price discrimination is not available, the decision to lower the price to sell one more unit to a new buyer will decrease the price that all consumers will pay. As a result, the marginal revenue curve will be inside the demand curve (as in Figures #9 and #11).

140. See LIPSEY, *supra* note 67, at 232.

141. *Id.* at 233 n.1; SAMUELSON, *supra* note 1, at 483, 495.

C. *The Monopolist's Marginal Cost*

As discussed above,¹⁴² a producer's marginal cost is the cost to produce one more unit. Marginal cost does not include sunk costs such as administration, overhead, and plant and equipment. Like any other producer, a monopolist seeking to maximize profits will continue to produce units as long as her marginal revenue exceeds her marginal cost. In other words, the monopolist will produce one more unit if the sale of that unit will generate more revenue that it will cost to produce. On the other hand, if the marginal cost from producing that unit will exceed the marginal revenue from selling that unit, there is no incentive to produce that unit.¹⁴³ An example of Marginal Revenue and Marginal Cost is set forth in Figure #10:

FIGURE #10
MARGINAL COST AND MARGINAL REVENUE
IN A MONOPOLY MARKET¹⁴⁴

(1) Quantity Q	(2) Price P	(3) Total Revenue TR (P x Q)	(4) Total Cost TC	(5) Total Profit TP (TR-TC)	(6) Marginal Revenue MR	(7) Marginal Cost MC*
0	1,000	0	725	-0-	+900	150
1	900	900	875	+25	+700	125
2	800	1,600	1,000	+600	+500	110
3	700	2,100	1,110	+990	+300	140
4*	600	2,400	1,250	+1,150	+100	250
5	500	2,500	1,500	+1,000	-100	350
6	400	2,400	1,850	+550	-300	450
7	300	2,100	2,300	-200	-500	550
8	200	1,600	2,850	-1,250	-700	
9	100	900				
10	-0-	-0-				

* The marginal cost figures reflect the Law of Diminishing Returns that was discussed earlier.¹⁴⁵ As column (7) indicates, as production increases, at some point (in this case at the point of producing the fourth unit), it becomes more and more expensive to produce each unit).

142. See *supra* notes 95-97 and accompanying text.

143. As one commentator has stated:

[B]usiness firms don't make goods and services available in markets for the pleasure of doing good deeds. Instead, their purpose is to earn income for their owners. Like your personal goals, the goals of a business firm can be multifaceted. However, much of economic theory about the behavior of business firms assumes that their primary goal is to make profits — just as your primary goal as a rational consumer is to maximize your satisfaction.

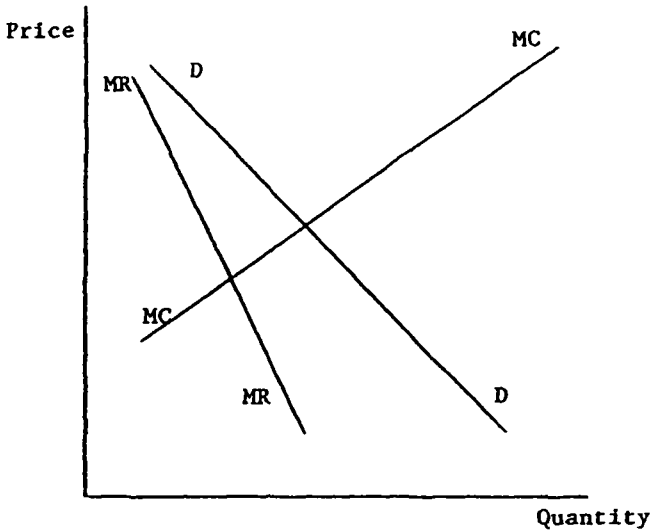
DAVID N. HYMAN, *MICROECONOMICS* 170 (1989). "When asked to list their goals, 36.7% of the [chief executive officers] listed as their key goal maintaining or improving profits of the company. The profit goal outranked all other objectives. The runner-up to profit as an objective was company growth, which is probably related to long-term profits." *Id.* at 175.

144. This chart is adapted from SAMUELSON, *supra* note 1, at 496.

145. See *supra* notes 127-30 and accompanying text.

The demand curve (D–D), marginal revenue curve (MR–MR), and marginal cost curve (MC–MC) can be plotted as follows:

FIGURE #11
DEMAND CURVE, MARGINAL REVENUE CURVE, AND
MARGINAL COST CURVE IN A MONOPOLY MARKET



D. *The Price and Quantity in a Monopoly Market*

As in the case of a competitive market,¹⁴⁶ the monopolist will produce (and sell) the quantity determined by the intersection of the marginal revenue curve and the marginal cost curve¹⁴⁷ because the monopolist will produce (and sell) one more unit as long as the additional revenue generated from the sale of that unit exceeds the cost of producing that unit. However, unlike a producer in a competitive market, for the monopolist the marginal revenue curve does not match the market price (or the market demand curve). Instead, the marginal revenue curve lies well inside the demand curve.¹⁴⁸ Thus, unlike the situation in a purely competitive market in which the quantity is determined by the intersection of the industry demand curve and the industry supply curve, in a monopoly the quantity is set by the intersection of the marginal revenue curve and the marginal cost curve (and the marginal revenue curve is inside the industry demand curve). As a result, in the case of a monop-

146. See *supra* notes 95-97 and accompanying text.

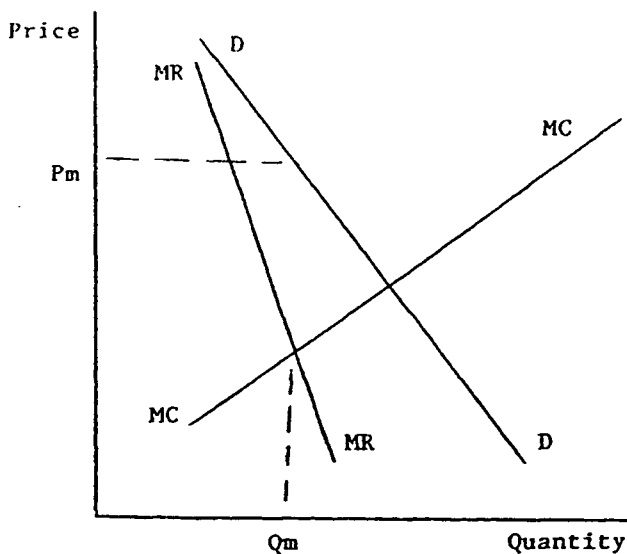
147. See *supra* notes 81-82 and accompanying text.

148. SAMUELSON, *supra* note 1, at 495 ("Graphically, a straight line Marginal Revenue Curve always has twice the steepness of the [demand curve].").

only the quantity produced will be lower.¹⁴⁹

For the monopolist, price is not established at the intersection of the marginal revenue curve and marginal cost curve. Because there is no competition, the monopolist can set her price above her marginal cost. However, the monopolist is constrained by the market demand curve — in other words, once the monopolist determines how much to produce, the monopolist must set the price low enough so that consumers will buy the quantity produced. The monopolist can sell at any price between (i) the price at which the marginal revenue curve intersects the marginal cost curve, and (ii) the price corresponding to the position on the demand curve for the quantity at which the marginal cost curve intersects the marginal revenue curve.¹⁵⁰ The profit maximizing monopolist will sell at the price corresponding to the position on the demand curve at the quantity established by the intersection of the marginal cost curve and the marginal revenue curve, shown as P_m in Figure #12.

FIGURE #12
PRICE AND QUANTITY IN A MONOPOLY MARKET



- D-D = Market demand curve
 MC-MC = Marginal cost curve (also the industry supply curve)
 MR-MR = Marginal revenue curve
 P_m = Price in the monopoly market
 Q_m = Quantity in the monopoly market

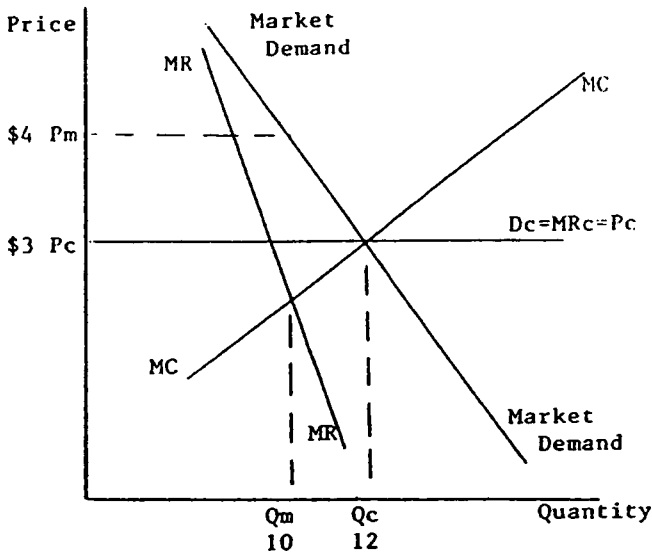
149. This is reflected in Figure #13 below.

150. See LIPSEY, *supra* note 67, at 235 ("For a monopolist, there is no unique relationship between market price and quantity supplied.").

E. *The Monopolist's Price Will Be Higher, and the Quantity Supplied Will Be Lower, than in a Competitive Market*

Figure #13 compares the price and quantity in a monopoly market with the price and quantity in a competitive market.

FIGURE #13
COMPARISON OF PRICE AND QUANTITY IN A COMPETITIVE MARKET AND A MONOPOLY



D_c = Demand in the competitive market facing the individual producer (the same as the market price and the marginal revenue curve in the competitive market)

MC = Marginal Cost

MR_c = Marginal Revenue in the competitive market facing the individual producer (the same as the market price and the demand curve)

P_c = Price in the competitive market = \$3

P_m = Price in the monopoly market = \$4

Q_c = Quantity in the competitive market = 12 units

Q_m = Quantity in the monopoly market = 10 units

Figure #13 demonstrates that in a monopoly market the price will be higher — in the monopoly market the price is P_m (which is \$4), and in the competitive market the price is P_c (which is \$3).¹⁵¹

151. One commentator has stated:

[M]onopolists can make profits in ways not available to competing firms. One way is to drive up the price of a good by restricting output They can, to use the popular term, gouge their customers. Consumers, by choosing to buy the monopolist's good, are revealing that they are better off than they would be without

In addition, in the monopoly market the quantity will be lower.¹⁵² Specifically, in Figure #13, the quantity produced and sold in the monopoly market is only 10, while the quantity produced and sold in the competitive market is 12. "The canny seller contrives an artificial scarcity of his product so as not to spoil the price he can get . . ."¹⁵³ Thus, less of the product will be consumed.

As discussed at the outset, an efficient economy produces at maximum output and satisfies consumer demand to the maximum extent possible.¹⁵⁴ Thus, a monopoly results in economic inefficiencies — the economy is failing to maximize output and is failing to maximize consumer satisfaction.

[The monopolist] does not produce output up to the point where the social cost . . . is equal to the value of the good to consumers Rather, the monopolist is keeping its output a little scarce. It does not produce up to the point of [Price = Marginal Cost] because to do so would require lowering [Price] to all consumers, which would lose the monopolist some profit. So society does not get as much of the monopolist's output as it wants in terms of the good's marginal cost and marginal value to consumers.¹⁵⁵

Another commentator has stated,

Because price exceeds marginal cost for a monopolist, society as a whole would benefit from a reallocation of resources that [would produce] more of the monopolist's product — because the gain to society of additional output, as reflected in the marginal value (price) of the product, exceeds the marginal cost of producing the additional output. In contrast, a perfectly competitive industry has price equal to marginal cost. Thus, the marginal value (price) to society of addi-

the product. But they are paying more than they would if the industry were competitive.

STIGLITZ, *supra* note 9, at 389. Another commentator has stated:

In economic terms, intellectual property rights prevent competition in the sale of the particular work or invention covered by the intellectual property right, and therefore allow the intellectual property owner to raise the price of that work above the marginal cost of reproducing it This means that in many cases fewer people will buy the work than if it were distributed on a competitive basis, and they will pay more for the privilege.

Lemley, *supra* note 117, at 996.

152. See LIPSEY, *supra* note 67, at 236 ("The level of output in a monopolized industry is therefore less than the level of output that would be produced if the industry were composed of many price-taking firms.")

153. SAMUELSON, *supra* note 1, at 497.

154. See *supra* notes 68-69 and accompanying text; SAMUELSON, *supra* note 1, at 500 ("it is a social inefficiency when monopolists' outputs are too small."); SAMUELSON & NORDHAUS, *supra* note 65, at 582 ("the ability to control the entire market would allow a monopolist to raise its price above marginal cost, thereby reducing output below the most efficient levels.")

155. SAMUELSON & NORDHAUS, *supra* note 65, at 583.

tional output is just equal to the marginal cost of producing it, and there is no scope for improving the outcome.¹⁵⁶

The consequences of this failure can be significant. For example, imagine that Figure #13 represents the market for a life-saving drug. If the market for the drug is purely competitive, the industry will produce and sell 12 units (designated by Q_c), and the drug will sell for \$3 (designated at P_c). Thus, many people will buy the drug and will be cured. In contrast, if the drug is patented and the market for the drug is a pure monopoly, the industry (in which the only producer is the patent holder) will produce only 10 units (designated by Q_m), and will charge \$4 per unit (designated by P_m). As a result, fewer consumers will be able to buy the drug and be cured. In effect, some consumers (who could have purchased the drug at the \$3 competitive price) will be "priced out of the market." Nevertheless, without a patent system (or a different system) to stimulate invention, the life-saving drug may have never been produced, and none of the potential consumers would have been cured.¹⁵⁷

F. *A Monopoly Also Leads to a Dead-Weight Loss*

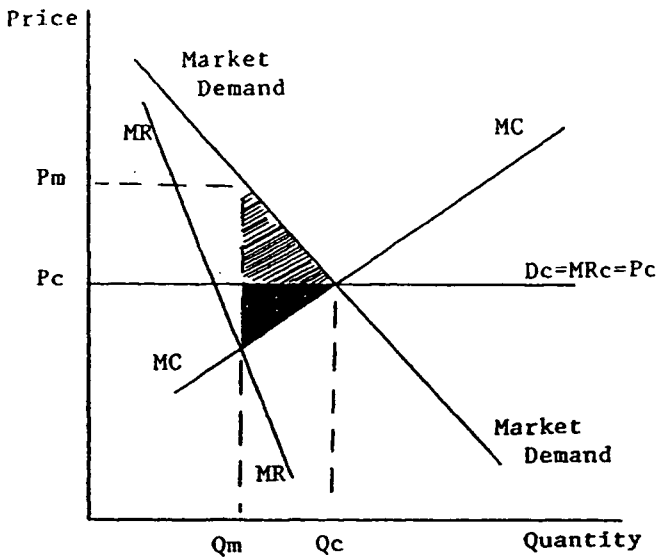
In addition to the economic inefficiency of higher prices and lower quantities supplied, pure monopolies are criticized for creating a dead-weight loss. A dead-weight loss is illustrated in Figure #14.¹⁵⁸

156. LIPSEY, *supra* note 67, at 236.

157. See CHISUM ET AL., *supra* note 26, at 53 (citing Jeremy Waldron, *From Authors to Copiers: Individual Rights and Social Values in Intellectual Property*, 68 CHI-KENT L. REV. 841, 866 (1993)).

158. Kieff, *supra* note 30, at 703 n.22 ("Dead-weight loss refers to the loss in potential social wealth when a competitive market is compared to an otherwise identical market in which there is monopoly power, or power over price").

FIGURE #14
DEAD WEIGHT LOSS IN A MONOPOLY MARKET¹⁵⁹



- Dc = Demand in a competitive market
 MC – MC = Marginal Cost curve
 MR – MR = Marginal Revenue curve
 MRc = Marginal Revenue curve in a competitive market
 Pc = Price in a competitive market
 Pm = Price in a monopoly market
 Qc = Quantity in a competitive market
 Qm = Quantity in a monopoly market

As the monopolist produces and sells a smaller quantity (Q_m in Figure #14) than in a competitive market (Q_c in Figure #14), the consumer surplus relating to the difference in quantity is lost (in Figure #14 that is the shaded area above the “ $D_c = MR_c = P_c$ ” line), and the producer’s surplus relating to that difference in quantity (in Figure #14 that is the solid area below the “ $D_c = MR_c = P_c$ ” line) is lost. While the monopolist makes a larger profit than in a competitive market (represented by the area from P_c to P_m and bounded by the market demand line), the loss in consumer surplus plus the loss in producer surplus exceeds the producer’s extra profit. The excess is the dead-weight loss.¹⁶⁰ This dead-weight loss represents a detriment to the economy as

159. Figure #14 is adapted from CHISUM ET AL., *supra* note 26, at 65.

160. Consumer surplus is the benefit enjoyed by consumers who would pay a higher price for the product, but are able to pay the lower market price. As discussed earlier, the market demand curve for almost all products is downward sloping. See *supra* note 80. For example, 10 people might be willing to buy a product at \$10. In the competitive market for that product, the actual

a whole.

While the dead-weight loss is viewed as an overall loss to society, “[i]t is not the profit a monopoly . . . exacts that constitutes its greatest evil, but rather its setting too high a price in relation to social marginal-cost pricing.”¹⁶¹

G. Other Economic Inefficiencies Caused by a Monopoly

Economists have identified other inefficiencies that result from a monopoly. First, monopolists do not have as great an incentive to reduce or maintain expenses when compared to firms in a competitive market.¹⁶² This has been called managerial slack.¹⁶³

Second, a monopolist may not be as motivated to pursue research and development to develop new products and new methods, as a firm in a competitive market.¹⁶⁴ Because the monopolist already controls the market, there is limited incentive to change the market. Economists have stated, “the impact of monopoly on dynamic innovation and technical change is likely to far outweigh any dead-weight losses.”¹⁶⁵

Third, the monopolist may expend resources in an attempt to preserve or extend the monopoly,¹⁶⁶ instead of devoting those resources to

market equilibrium price might be \$6. Thus, each consumer who would pay \$10, but need only pay \$6, receives a benefit — or has a surplus — of \$4. The total consumer surplus for the 10 consumers who would have paid \$10, would be \$40 [10 consumers x \$4 surplus per consumer = \$40]. See STIGLITZ, *supra* note 9, at 390. (“At points left of the intersection of the price line and demand curve, people are willing to pay more for the goods than they have to”); Kieff, *supra* note 30, at 703 n.22; see also SAMUELSON & NORDHAUS, *supra* note 65, at 583 (“for each unit of quantity reduction . . . the net social loss is the vertical distance “shifts” between the demand curve and the [marginal cost] curve . . .”).

161. SAMUELSON, *supra* note 1, at 518.

162. STIGLITZ, *supra* note 9, at 391.

In the absence of competition, it can be difficult to tell whether managers are being efficient. How much, for instance, should it cost for AT&T to put a call through from New York to Chicago? In the days when AT&T had a monopoly on long-distance telephone service, it might have claimed that its costs were as low as possible. However, not even trained engineers could really tell whether that was true. When competition developed for intercity telephone calls, shareholders in AT&T could compare its costs with those of Sprint, MCI, and other competitors, and competition provided each company with an incentive to be as efficient as possible. *Id.*

163. *Id.*

164. *Id.* at 392; Merges & Nelson, *supra* note 2, at 873 n.143 (“To the extent that the holder of a broad patent has market power, it is relevant to note that analysts of monopoly power often remark on the monopolist’s reduced incentives to innovate”).

165. SAMUELSON & NORDHAUS, *supra* note 65, at 584. Nevertheless, eventually the patent will expire, and the monopolist will have a strong incentive to develop a new innovation that will allow it to continue to control the market once the first patent expires.

166. STIGLITZ, *supra* note 9, at 392 (“How much would a firm be willing to spend to gain and hold a monopoly position? The firm would be willing to spend up to the amount it would receive as monopoly profits. The waste from this rent-seeking activity can be much larger than the loss

developing new products or finding ways to reduce costs. For example, the patent holding monopolist may buy related patents or technologies that might threaten the monopoly,¹⁶⁷ and then suppress the technology (if that is the most profitable course of action).

Commentators have noted that a patent holder may employ a number of tactics to preserve market power even after a patent expires.¹⁶⁸ These tactics can include predatory pricing, excess capacity, and limit pricing.¹⁶⁹

VII. RATHER THAN A PURE MONOPOLY, A PATENT MAY CREATE AN OLIGOPOLY OR A MONOPOLISTIC COMPETITION SITUATION — RELATED ECONOMIC INEFFICIENCIES

A. *Whether a “Monopoly” Exists Depends on How the Market Is Defined*

While a patent creates a “pure monopoly” in the market for the patented product,¹⁷⁰ in many cases this may not be the relevant market.¹⁷¹

from the reduced output”); Merges & Nelson, *supra* note 2, at 873 n.143 (“[the monopolist] may become more concerned with protecting its current monopoly position than in acquiring a new one”).

167. See *infra* note 232 and accompanying text (discussing a situation in which a drug maker with a patent paid approximately \$400 million to prevent other drug companies from entering the market).

168. STIGLITZ, *supra* note 9, at 350-51, 353-54.

169. *Id.* at 353-54. In predatory pricing, each time a new producer enters the market the incumbent drops the price below the new entrant’s marginal cost. While the new entrant may argue that this violates the antitrust laws, the incumbent may argue that there have been changes in its cost patterns which justify the price drop. In an excess capacity strategy, the incumbent builds extra plant and equipment (and otherwise develops excess capacity) so that if a new entrant appears, the incumbent can increase production without a significant investment. In limit pricing, the incumbent attempts to demonstrate that its costs are low to any potential entrant. See *id.*

170. If another entity uses a process or makes a product that is described by the claims of the patent (which could be said to be anticipated by the claims of the patent), the patent holder could obtain an injunction to prevent that other entity from making, using, or selling the process or product. 35 U.S.C. § 283 (2000). As a result, the patent holder would continue to be the sole producer.

171. Walker Process Equip., Inc. v. Food Mach. & Chem. Corp., 382 U.S. 172, 177-78 (1965) (“It may be that the [patented] device . . . does not comprise a relevant market. There may be effective substitutes for the device which do not infringe the patent”). Strictly speaking, a pure monopoly exists where there is only one producer in the industry, and “there is no industry producing a close substitute for [her] good . . . [so that] a change in another firm’s price would shift [her demand] curve negligibly.” SAMUELSON, *supra* note 1, at 489.

Exclusive monopolies, like public utilities or telephones, are usually regulated by the government; and even they must usually take account of the potential competition of alternative products — oil for coal, or cables for telephone. This shows how relatively unimportant complete monopolies are.

Id. See *id.* at 490 (“few firms in real life enjoy anything like a complete monopoly; usually some other products will be partially substitutable for the ones you sell”); SAMUELSON & NORDHAUS,

Whether a monopoly exists depends on the relevant market.¹⁷² In general, a market involves providing a product to satisfy a consumer need or desire.¹⁷³ If the only product that will satisfy the need or desire is the patented product, then the patent holder has a pure monopoly. On the other hand, if the goods offered by multiple producers will satisfy the need or desire, the patent holder does not have a pure monopoly.¹⁷⁴ In the later situation, the items provided by the other producers may be considered substitutes — a consumer can substitute one producer's product for another.

If the need or desire is defined broadly, it is less likely that a pure monopoly will be found; if the need or desire is defined narrowly, it is more likely that the market can be described as a pure monopoly.

Example #2: The Reverend Praiseworthy has developed (and patented) a revolutionary new miracle device called Snow-Be-Gone. The user rides the Snow-Be-Gone device in the same manner as a riding lawn-mower. Like a snow-blower, the Snow-Be-Gone picks up snow in its path; but unlike any other machine, it heats the snow to the point where the snow simply evaporates into the heavens. Thus, unlike using a snow-blower in which one might clear the sidewalk but simultaneously bury the driveway, the Snow-Be-Gone actually causes snow to vanish. If one defines the applicable market as snow removal, the market in which the Snow-Be-Gone is sold would *not* be a pure monopoly — substitute products would include the ordinary snow-blower, or the good old-fashioned shovel.

However, if the market is defined to include only those who do not want to merely move the snow but want to make it vanish, the only product in the relevant market is the Snow-Be-Gone. In that market, because of the patent, Reverend Praiseworthy's product may be the only one that can satisfy the need or desire (for approximately 20 years from the date the patent application is filed),¹⁷⁵ so in that mar-

supra note 65, at 568 (“Exclusive monopolies are rare today”); STIGLITZ, *supra* note 9, at 346 (“imperfect competition is more typical”).

172. CHISUM ET AL., *supra* note 26, at 61 (“We now see that in the context of a market for solutions, a patentee can prevent others from selling a certain solution, though not all solutions to a given problem”). *Id.* at 66 (example involving the invention of a better mousetrap, and the market for rodent catchers (which includes cats)); Kieff, *supra* note 30, at 730 (“people will buy better mousetraps only if they cost less than cats, accounting for all costs and benefits such as cat food and companionship”).

173. *Id.* (“Markets order themselves around consumer demand — producers sell what consumers will buy. In general, consumers buy to satisfy their needs or desires”).

174. Kitch, *supra* note 48, at 1730 (a patent creates a monopoly “only if the claims cover all of an economically relevant market, i.e., there is no alternative way for competitors to provide the same economic functionality to their customers without infringing the claims”).

175. 35 U.S.C. § 154(a)(2) (2000) (For patent applications filed on or after June 8, 1995, patent protection begins when the patent is issued, and ends twenty years from the date the patent application was filed.). Of course, others might develop new products that perform the same

ket the Reverend Praiseworthy would enjoy a pure monopoly.

In some situations the market for a patented product might be better described as an oligopoly rather than a monopoly. In discussing the rarity of a pure monopoly, one commentator states:

A continuing problem is that the literature contains a number of elementary but persistently repeated errors. The literature . . . [has] over a long period of time, not infrequently (1) analyzed intellectual property rights on the assumption that they confer an economic monopoly on their owner This assumption is most commonly made in connection with patents. Patents . . . are the intellectual property right most plausibly characterized as a monopoly. But this is true only if the [patent] claims cover all of an *economically relevant market, i.e.*, there is no alternative way for competitors to provide the same economic functionality to their customers without infringing the claims.¹⁷⁶

In order to evaluate the economic impact of patents, it is not only appropriate to consider the case of pure monopoly, but also (i) oligopoly, and (ii) monopolistic competition.

B. *Oligopoly*

In an oligopoly,¹⁷⁷ there are a few sellers who sell differentiated products that respond to the consumers' need or desire.¹⁷⁸

In describing oligopoly, one commentator states:

In heavy machinery, such companies as General Electric, Westinghouse, Allis-Chalmers, and others illustrate the case of an oligopoly that has few sellers and some differentiation of product.¹⁷⁹

Example #3: Same as Example #2 except that shortly after Reverend Praiseworthy hits the market with the Snow-Be-Gone, two other producers each develop (and patent) a product that can perform the same function as the Snow-Be-Gone. None of the three products infringes the patents of the other two producers. At that point, there are three producers who can satisfy the consumer need or desire, but no other producers can enter the market — the patents act as a barrier to keep

function and which do not infringe the Reverend Praiseworthy's patent, so it is possible that the Reverend could have competition before the patent term expires.

176. Kitch, *supra* note 48, at 1729-30 (emphasis added).

177. The term "oligopoly" means "few sellers." SAMUELSON, *supra* note 5, at 489.

178. *Id.* at 489-90. Markets characterized as an oligopoly include aluminum, meat packing, soap, the communications industry, and aircraft manufacture. *Id.* at 512. There are also oligopoly markets in which there are a few sellers who sell identical products — such as the steel industry — but since only a patentee can sell the patented product, presumably the patentee's product will always be somewhat different from the competition. As a result, the oligopoly market in which the products are identical will not be considered in this Article.

179. SAMUELSON, *supra* note 1, at 489-90; STIGLITZ, *supra* note 9, at 361.

out other potential competitors.¹⁸⁰ This market can be described as an oligopoly.

Advertising, brand names, trademarks, patents, and customs may explain why there is product differentiation.¹⁸¹

An oligopolist's situation differs from the situation facing the individual seller in a purely competitive market. As discussed above, the individual in a competitive market faces a horizontal demand curve so that she will sell nothing if she charges a price above the market price.¹⁸² In contrast, the oligopolist faces a downward sloping demand curve, because the oligopolist will still be able to sell some of her products if she increases price above marginal cost. The extent to which the oligopolist can increase price above marginal cost and still sell units is her market power.¹⁸³

The oligopolists in a market have a mutual interest in keeping price above marginal cost. If one firm cuts its price, initially that firm may be able to capture additional market share (and profits), but the increased market share (and profits) will disappear if the other producers in the market lower their prices. In that case, the initial price cutter (and all the other producers in the market) may then have smaller profits than when prices were high. As a result, all the oligopolists as a group will have an incentive to keep prices high so that profits will be high.¹⁸⁴ On the other hand, if one oligopolist *increases* price, the other oligopolists in the market will be reluctant to increase their price — the other oligopolists may not change their price in hopes that they will capture some of the market share and profits from the one firm that increased its price.¹⁸⁵ The oligopolist's determination of price and quantity is illustrated in Figure #15 below.

180. It is possible that other producers could design around the three existing patents and obtain a new patent, but in this example it is assumed that no other potential competitor is successful in designing around the patents.

181. SAMUELSON, *supra* note 1, at 517 (emphasis added).

182. *See supra* notes 93-94 and accompanying text.

183. *See infra* note 200.

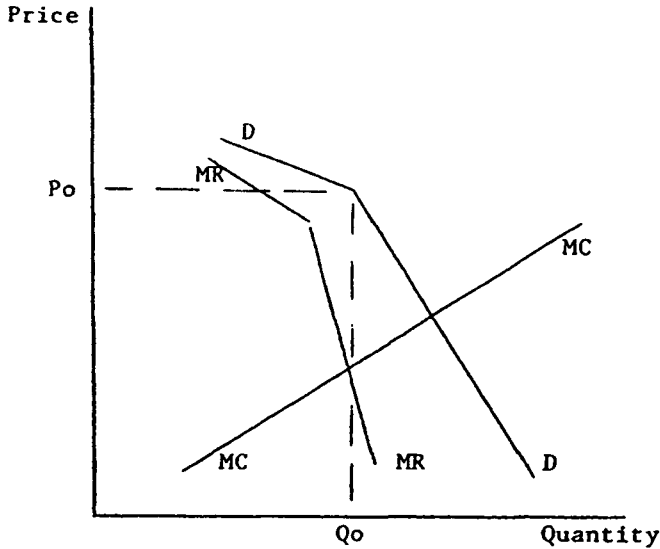
184. In describing the pricing strategy of oligopolists, one commentator states:

We can deduce a theory of [price] inflexibility from the fact that rivals may behave one way when you *cut* your price — namely, *matching* your cuts and thwarting your hope for new sales; and they behave another way when you *raise* your [price] above the customary level — namely, holding their prices constant in order to pick up some of your customers. In consequence, you have little motive to change your price in either direction. Instead, you “administer” your price in a rigid fashion, particularly since each oligopolist learns from game-theoretic experience that it is easier to agree — tacitly or explicitly — on a common [price] that is fixed rather than one that is changing from month to month.

SAMUELSON, *supra* note 1, at 515 (emphasis added).

185. *Id.* at 515.

FIGURE #15
THE OLIGOPOLY MARKET: DETERMINATION OF PRICE
AND QUANTITY



- D – D = Demand curve
 MC – MC = Marginal Cost curve
 MR – MR = Marginal Revenue curve
 P₀ = Price in the oligopoly market
 Q₀ = Quantity in the oligopoly market

The tendency of its competitors to respond to a decrease in price, and not respond to an increase in price, presents the oligopolist with a “kinked” or “cornered demand” curve. In summarizing an oligopoly, one economist states, “[T]his oligopoly equilibrium looks much like the simple monopoly equilibrium”¹⁸⁶

In describing the price charged in an oligopoly market, this economist states, “With or without a price leader, the sellers may be quoting rather similar prices — prices which come nowhere near the level of [marginal cost] as would have been the case of the perfectly competitive industry”¹⁸⁷

An explicit agreement among the producers in an oligopoly market presumably would violate the antitrust laws.¹⁸⁸ In 1946, the U.S. Supreme Court held that cigarette oligopolists could be guilty of price

186. *Id.* at 514 (emphasis added). In this Article, the monopoly equilibrium is shown in Figure 12.

187. *Id.* at 516.

188. See 15 U.S.C. §§ 1-3 (2000); JULIAN O. VON KALINOWSKI ET AL., 1 ANTITRUST LAWS AND TRADE REGULATIONS, § 13.01, at 13-1-13-4 (2d ed. 2003).

fixing even if there was no overt collusion.¹⁸⁹

Oligopolists may set their price below the price that would be established in a pure monopoly “to take account of the fact that setting a high price would tempt new rivals into their field, [thus] they would agree on a price higher than a purely competitive one, but set with some moderation for fear of attracting [a] new [rival].”¹⁹⁰

Since oligopolists generally cannot profit by competing on the basis of price, they attempt to compete based on “forms of product differentiation, product innovation, customer service, quality, performance, convenience of use, terms of credit, styling and design, durability, advertising, and sales promotion. Indeed billions of dollars are spent each year in efforts to maintain, strengthen, and promote product differentiation.”¹⁹¹

C. Monopolistic Competition

In addition to a monopoly or an oligopoly, the relevant market for a patent holder might be described as a monopolistic competition situation. In a market characterized as monopolistic competition,¹⁹² there are many sellers in the market selling differentiated products. The key to market power in this situation is the level of product differentiation. Product differentiation may be achieved by obtaining a patent because the patent holder can sue any competitor for infringement if the competitor’s product is the same or substantially equivalent to the patented product.¹⁹³ Other ways to achieve product differentiation include developing brand name recognition, advertising, and varying the features of the

189. *Am. Tobacco v. United States*, 328 U.S. 781 (1946) (applying section 2 of the Sherman Act); *VON KALINOWSKI ET AL.*, *supra* note 187, § 25.05, at 25-113 (“the Supreme Court upheld convictions of three tobacco companies for both actual monopolization and conspiracy to monopolize where the three companies had combined market shares of 68 to 80 percent”). See also SAMUELSON, *supra* note 1, at 516 (“on the other hand, if a few large firms encounter the same problem, experience suggests that they may — even without meeting, phoning, winking or corresponding — arrive at a *tacit* mode of behavior that avoids fierce competition”) (emphasis added).

190. SAMUELSON, *supra* note 1, at 516 (emphasis added).

191. ARTHUR A. THOMPSON, JR., *ECONOMICS OF THE FIRM: THEORY AND PRACTICE* 427 (3d ed. 1981); see also SAMUELSON, *supra* note 5, at 517 (“Oligopolists particularly love to shift rivalry and competition into dimensions other than price; into advertising the real or fancied merits of the brand . . .”).

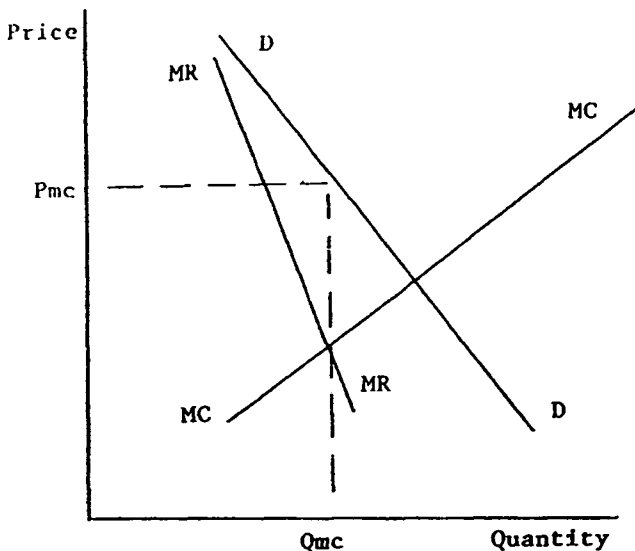
192. SAMUELSON & NORDHAUS, *supra* note 65, at 569.

193. In regard to suing a competitor making an equivalent product, “the doctrine of equivalents provides that accused products or process that do not fall within the literal scope of the patent claims nonetheless infringe the patent if they are only ‘insubstantially different’ from the patent claims. The effect is to create a ‘penumbra’ around the literal scope of the [patent] claims, and therefore to expand the protection given to the patent owners.” Lemley, *supra* note 118, at 1004 (citing *Warner-Jenkinson Co. v. Hilton Davis Chemical Co.*, 520 U.S. 17 (1997)). Also, if the patentee has patented a process, the patentee can sue anyone for infringement who uses the same or a substantially equivalent process. 35 U.S.C. § 271(a) (2000).

product (such as taste, color, style, or other factors that consumers may find significant).¹⁹⁴ Producers desire to create product differentiation in order to avoid price competition.¹⁹⁵

In a case of monopolistic competition (many sellers, selling differentiated products), the demand curve facing each seller is downward sloping — because of the product differentiation, the individual seller will not lose all of its customers if it increases price above marginal cost.¹⁹⁶ Like the monopolist or the oligopolist, the monopolistic competitor will produce the quantity determined by the intersection of the marginal revenue and marginal cost curves, and will determine the price based on the market demand curve.¹⁹⁷ This is illustrated in Figure #16.

FIGURE #16.¹⁹⁸
MONOPOLISTIC COMPETITION MARKET — DETERMINATION
OF PRICE AND QUANTITY



- D – D = Demand curve
 MC – MC = Marginal Cost Curve
 MR – MR = Marginal Revenue Curve
 Pmc = Price in the monopolistic competition market
 Qmc = Quantity in the monopolistic competition market

194. SAMUELSON, *supra* note 1, at 488; SAMUELSON & NORDHAUS, *supra* note 65, at 569 (“Often, custom, familiarity, or inertia leads consumers to prefer one seller over another”).

195. SAMUELSON, *supra* note 1, at 487-88.

196. *Id.* at 517; STIGLITZ, *supra* note 9, at 355.

197. *Id.* at 356.

198. Figure #17 is based on *id.* (figure #14.9, item A).

One economist has stated, “One can think of this situation as a sort of *minimonopoly*, where each firm has a monopoly on its own brand or its own store location [or its own patented product or process].”¹⁹⁹

D. *Comparing Monopoly, Oligopoly, and Monopolistic Competition*

When compared to a pure monopoly, the economic inefficiencies are not as extreme in the cases of oligopoly or monopolistic competition.²⁰⁰ Nevertheless, once we leave the world of perfect competition, “we have left the Garden of Eden.”²⁰¹ When the seller has a downward sloping demand curve, unlike a case of pure competition, the seller’s price will exceed marginal cost, and the quantity will be less than in a competitive market. The goal is then to “minimize the evil and waste involved in such imperfections,”²⁰² while still providing a sufficient economic incentive to inventors.

VIII. ATTEMPTING TO VERIFY THAT VALUABLE PATENTS PERMIT A PATENT HOLDER TO EXERCISE MARKET POWER: THE ANTHRAX THREAT, THE AIDS PANDEMIC, AND PATENT DAMAGES IN GENERAL

“Whether a particular [patent] confers an economic monopoly is an empirical question.”²⁰³ In the great majority of cases, patents likely provide the inventor with no market power whatsoever. Most patents likely fall into one of three categories: (i) the patent never results in a commercially viable product; (ii) the patent might be used in a commercially viable product but consumers place no extra value on the patented product, or (iii) if a commercially viable product is ever developed, it is developed after the patent has expired.²⁰⁴ However, this Article will consider the income tax consequences on the sale of a patent, and a patent that can be sold for a significant price likely provides the patent holder with market power.

The extent of a patentee’s market power — and the resulting economic inefficiencies — will depend on several factors, including the

199. *Id.* (emphasis added).

200. *Id.* at 403 (“The extent to which a firm’s demand curve is downward sloping, so it can raise prices without losing all its customers . . . its market power . . . is related to both the number of firms in the industry and the extent of product differentiation”).

201. SAMUELSON, *supra* note 1, at 500. “Once the rules of perfect competition are left behind, there is no Invisible Hand principle which sets up a presumption that the working out of *laissez faire* is likely to be in the direction of satisfying wants most efficiently.” *Id.* at 517.

202. *Id.* at 500; SAMUELSON & NORDHAUS, *supra* note 65, at 567 (“prices are higher and outputs are lower under imperfect competition than under perfect competition”).

203. Kitch, *supra* note 48, at 1731.

204. See *supra* note 52 and accompanying text.

definition of the relevant market,²⁰⁵ the extent of the market demand,²⁰⁶ the availability of substitutes, and the presence of competing producers.

In order to assess the market power of a patent holder, one would want to analyze the “relevant market,” which is the actual market in which the patented product is sold. As discussed above, obtaining the relevant data for evaluating market power — such as the patent holder’s marginal cost for the patented product and the price that potential competitors would sell the product for if the patent did not exist — can be difficult.²⁰⁷

Nevertheless, two major events triggered the disclosure of substantial information about two patented products and the market power available to those patent holders. First, this Article examines the market for Bayer A.G.’s (Bayer) patented drug, Cipro, prior to the anthrax threat. Second, this Article examines the market for the three-drug cocktail used to treat HIV and AIDS in connection with President Clinton’s issuance of an Executive Order regarding the rights of patent holders and the availability of anti-AIDS drugs in Africa.

A. *Market Power and Cipro, as Reported in Connection with the Anthrax Threat*

1. A BRIEF HISTORY OF CIPRO

The development of ciprofloxacin (Cipro), an antibiotic, began in the 1970s.²⁰⁸ Bayer filed patent applications in the United States and in foreign countries from 1980 to 1982.²⁰⁹ Some foreign patents were

205. If the market is defined narrowly to include only the patented product, then a monopoly exists. See *supra* notes 124-28. However, if the market is defined broadly, there may be other products that consumers can substitute for the patented product. CHISUM ET AL., *supra* note 26, at 61.

206. If no consumers want to purchase the potential product, the patent provides no market power. See *supra* note 52.

207. See *supra* note 54 and accompanying text. In addition, some commentators assert that patent holders may intentionally avoid disclosing information that would indicate market power. Halbert, *supra* note 15, at 277; Rosalyn S. Park, Note, *The International Drug Industry: What the Future Holds for South Africa’s HIV/AIDS Patients*, 11 MINN. J. GLOBAL TRADE 125, 147-48 (2002) (the brand name pharmaceutical industry withdrew from a lawsuit involving South Africa’s access to the generic versions of patented anti-AIDS drugs because it “did not want to face the possibility that their actual expenditures and profit margins would be scrutinized during a trial”). See also Keith Bradsher, *Bayer Halves Price for Cipro, But Rivals Offer Drugs Free*, N.Y. TIMES, Oct. 26, 2001, at A1 (“Executives in the generic drug industry say Bayer is still at least breaking even, and may even be making large profits . . . [Bayer’s chief executive of American operations] refused to discuss whether Bayer was making a profit on the deal”).

208. For a discussion of the history of the Cipro patent, see *Bayer AG v. Schein Pharmaceuticals, Inc.*, 301 F.3d 1306, 1309-11 (Fed. Cir. 2002).

209. *Id.* at 1311.

issued as early as 1982,²¹⁰ and the U.S. patent was issued in 1987.²¹¹ Cipro can be prescribed to treat a variety of infections, including urinary tract infections, various infections that arise after surgery,²¹² pneumonia, cystic fibrosis, and Crohn's disease.²¹³ For the nine-month period immediately preceding the anthrax threat, Cipro was the 43rd most popular prescription drug in the United States.²¹⁴ Cipro was the largest selling drug for Bayer,²¹⁵ the 15th largest pharmaceutical company,²¹⁶ which held the patent²¹⁷ and manufactured Cipro. While Cipro was a popular antibiotic,²¹⁸ if the relevant market is defined as "antibiotics," Bayer likely did not enjoy a "monopoly" — other classes of antibiotics would include penicillin and tetracyclines.²¹⁹

In 2000, at the urging of the U.S. government,²²⁰ Bayer obtained approval from the U.S. Food & Drug Administration (FDA) for Cipro to be used to treat inhaled anthrax.²²¹ While many other drugs had been

210. *Id.*

211. *Id.* See also *Foreign Patents Don't Invalidate Cipro Patent*, ANDREWS INTELL. PROP. LITIG. REP., Aug. 20, 2002.

212. Edmund L. Andrews, *Demand for Cipro May Be Break for Bayer, and a Headache*, N.Y. TIMES, Oct. 18, 2001, at B8.

213. Leslie Kaufman and Milt Freudenheim, *Some Wholesalers Rationing Their Shipments of Antibiotic*, N.Y. TIMES, Oct. 19, 2001, at B7. Cipro is also used by AIDS patients to treat secondary brain infections. Donald G. McNeil, Jr., *The Rush for Cipro, and the Global Ripples*, N.Y. TIMES, Oct. 17, 2001, at B7. It is also "used to treat pneumonia and blood infections in critically ill patients . . ." Bradsher, *supra* note 206.

214. HAROLD M. SILVERMAN, *THE PILL BOOK* 1179 (10th ed. 2002).

215. Andrews, *supra* note 211 ("Cipro has been Bayer's biggest-selling drug for several years. . . . Sales of Cipro totaled about \$1.6 billion last year, and about two-thirds of that was in the United States"); Edmund L. Andrews, *Bayer Is a Bit Taken Back By the Frenzy to Get Its Drug*, N.Y. TIMES, Oct. 26, 2001, at B8 ("For Bayer, the main value of Cipro is its effectiveness against a wide variety of more conventional infections. Cipro generated more than \$1.6 billion in sales last year, but Bayer executives say treating anthrax was never really a part of their commercial strategy").

216. Andrews, *supra* note 211.

217. *Bayer AG v. Schein Pharmaceuticals, Inc.*, 301 F.3d 1306, 1309 (Fed. Cir. 2002).

218. *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, 261 F. Supp. 2d 188, 194 (E.D.N.Y. 2003) ("Cipro has been the best selling antibiotic in the United States for many consecutive years and is described as 'the most prescribed antibiotic in the world.' . . . since 1997, Bayer has derived over \$1 billion in U.S. net sales of all Cipro products").

219. Gina Kolata, *Cipro Isn't the Only Drug That Can Be Prescribed, Anthrax Experts Say*, N.Y. TIMES, Oct. 17, 2001, at B7.

220. Edmund L. Andrews, *Bayer Is a Bit Taken Back By the Frenzy to Get Its Drug*, *supra* note 214 ("Bayer . . . applied last year for a label indicating its effectiveness against anthrax only after they were asked to do so by the Pentagon and other government agencies"); Edmund L. Andrews, *Drug Maker Seems Uncertain In Response to Cipro Frenzy*, N.Y. TIMES, Oct. 20, 2001, at B8 ("Bayer executives admit they had given little thought to anthrax before Sept. 11. Cipro had long been approved for fighting a wide variety of other infections, and it was the Food and Drug Administration rather than Bayer that pressed to have Cipro approved as an anthrax treatment. 'We are experts in Cipro, but we are not experts in anthrax,' one Bayer executive said . . .").

221. Kolata, *supra* note 218.

approved for use in connection with other forms of anthrax,²²² Bayer's Cipro was the only drug approved for inhaled anthrax.

The timing of Bayer's patent protection on Cipro makes Cipro particularly relevant for analyzing a patent holder's market power. By 2001, Bayer's Cipro patent had already expired in several non-U.S. countries.²²³ As a result, in several non-U.S. countries, generic drug manufacturers were already producing and selling ciprofloxacin in competition against Bayer.²²⁴ However, at the time of the anthrax threat, Bayer still enjoyed patent protection on Cipro in the United States. Bayer's original U.S. patent on Cipro expired on December 9, 2003.²²⁵

2. THE ANTHRAX THREAT PUTS THE SPOTLIGHT ON CIPRO

Shortly after the September 11, 2001, terrorist attack on the World Trade Center in New York, several letters containing anthrax were mailed to prominent U.S. Congressmen and U.S. media personalities.²²⁶ In some cases the anthrax had been milled to the extent that very small anthrax spores could travel significant distances by air if released. The mere processing of an envelope containing this type of anthrax through standard mail sorting and handling equipment could release the spores into the air and infect postal workers.²²⁷ The potential threat of air-

222. *Id.* An anthrax infection caused by touching anthrax is referred to as "cutaneous anthrax."

223. *Bayer AG v. Schein Pharmaceuticals, Inc.*, 301 F.3d 1306, 1311 (Fed. Cir. 2002) ("The Chilean, South African, Spanish, and Argentinean patents issued between May and September of 1982"). Assuming a 17-year patent term (beginning from the date the patent was issued), Bayer's Cipro patents would have expired in those countries in 1999. *See Bradsher, supra* note 206 ("[Cipro] is manufactured by dozens of factories around the world because Bayer's patent has expired in practically every country except the United States . . .").

224. In addition to those producers, "Indian patent laws cover only the drug patent holders' manufacturing process and not the drugs themselves, and Indian drug companies have produced 'no fewer than 78 knock-offs of Cipro.'" *Bioterrorism Cipro: Senate Committee Targets Trade Agreements*, AMERICAN POLITICAL NETWORK, AMERICAN HEALTH LINE, Oct. 19, 2001.

225. *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, 261 F. Supp. 2d 188, 194 (E.D.N.Y. 2003); Donald G. McNeil, Jr., *The Rush for Cipro, and the Global Ripples*, N.Y. TIMES, Oct. 17, 2001, at B7.

226. David Johnston & Alison Mitchell, *Anthrax Mailed to Senate Is Found to Be Potent Form; Case Tied to Illness at NBC*, N.Y. TIMES, Oct. 17, 2001, at A1.

227. *See Postal Service Is Ready to Begin Test of System to Detect Anthrax*, N.Y. TIMES, July 13, 2003, at A17. The greatest concern arose with the examination of the anthrax sent to Senator Tom Daschle's office.

The key to understanding the danger, experts said, is in the size of the particles. The anthrax sent to Mr. Daschle, government officials said, was finely milled so that it would float a considerable distance on the smallest of air currents.

Producing germs that could be spread as a mist had been the main technical challenge facing germ warriors throughout the 20th century. Anthrax is what the Nobel laureate Joshua Lederberg calls a "professional pathogen," a hardy germ that could wreak havoc if inhaled. The trick was turning it into an aerosol that lingers.

Stephen Engelberg & Judith Miller, *Sign of Escalating Threat*, N.Y. TIMES, Oct. 17, 2001, at A1. In regard to the number of actual reported anthrax infections, 22 people were infected and 5

borne anthrax led many physicians to prescribe Cipro for their patients, and led the U.S. government to embark on an ambitious program to acquire enough drugs to treat 12 million people for inhaled anthrax for 60 days.²²⁸ Tom Brokaw held up a bottle of Cipro on the NBC Nightly News and declared, "In Cipro we trust."²²⁹ The demand for Bayer's Cipro soared overnight.²³⁰ One reporter stated that Cipro became the "most sought-after pharmaceutical since Viagra."²³¹ As a result, the press began searching for (and reporting) information regarding the price charged for Cipro and similar drugs, the quantities supplied, and the costs of production — precisely the type of information that can indicate a patent holder's market power.

3. BAYER'S MARKET POWER BEFORE THE ANTHRAX THREAT

Newspaper accounts indicate that Bayer exercised substantial market power in setting the price for Cipro before the anthrax threat. As discussed above, market power is the ability of a producer to increase its price above marginal cost and still sell substantial quantities.²³² It is clear that Bayer itself greatly valued its market power, because over a span of six years (1997 through December of 2003), Bayer paid potential competitors approximately \$400 million not to produce drugs that could compete with Cipro.²³³

people died. *Postal Service Is Ready to Begin Test of System to Detect Anthrax*, N.Y. TIMES, July 13, 2003, at A17 ("[The system] was developed after the anthrax letter attacks in the fall of 2001 that killed five people and sickened 17 others").

228. Melody Petersen & Robert Pear, *Production of Cipro Is Being Tripled, German Company Says*, N.Y. TIMES, Oct. 17, 2001, at B7 (in order to reach this goal, the U.S. government would need to increase its inventory of Cipro by six times the amount available at the time the threat began).

229. Andrews, *supra* note 214. At the time of the anthrax threat, Cipro was the only brand-name drug with a label explicitly stating that it was effective against pulmonary anthrax. *Id.*

230. Petersen & Pear, *supra* note 227 (a Bayer spokesperson stated that as a result of the threat, it would increase production from 60 million tablets every three months to 200 million tablets every three months); Andrews, *supra* note 211 ("Bayer A.G. would finally seem to be blessed with the most hotly desired drug in the United States: Cipro, the drug of choice for treating inhaled anthrax").

231. Andrews, *supra* note 219.

232. STIGLITZ, *supra* note 9, at 403.

233. *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, 261 F. Supp. 2d 188, 196 (E.D.N.Y. 2003) ("To date, Bayer has chosen to make payments to the Barr Escrow Account, which through December 2003 will total approximately \$398 million"); See also *Barr Cleared of Antitrust Charges in Cipro Agreement*, GENERIC LINE, June 4, 2003. In 1991, Barr Laboratories (a competing drug company) filed forms with the U.S. Food & Drug Administration indicating that it had developed a drug similar to Cipro that did not violate Bayer's patent on Cipro. *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, 261 F. Supp. 2d at 188. In 1992, Bayer sued Barr Laboratories for patent infringement. *Id.* In 1995, Barr Laboratories received tentative FDA approval pending the resolution of the patent infringement litigation. *Id.* ("In a letter dated January 4, 1995, while the patent litigation was pending, the FDA granted tentative approval of Barr's ANDA for generic Cipro"). In settlement of the lawsuit, Barr Laboratories agreed not to

In regard to Bayer's ability to charge a price in excess of its marginal cost, in the United States Bayer typically sold Cipro to individuals for \$4.67 per tablet.²³⁴ At the same time, Bayer was planning to sell Cipro to the U.S. government for \$1.75 to \$1.83 per tablet.²³⁵ Ultimately, in connection with the anthrax threat, Bayer agreed to sell large quantity of Cipro to the U.S. government for 95 cents per tablet, and there were reports that Bayer was still making significant profits on the sales at 95 cents.²³⁶ Generic²³⁷ manufacturers indicated that they would

produce the drug, and Bayer agreed to pay Barr Laboratories approximately \$25 million per year (presumably until Bayer's patent on Cipro would expire in December of 2003). Bayer entered into similar agreements with several other drug companies, including The Rugby Group, Inc., Hoechst Marion Roussel, Inc., and Watson Pharmaceuticals. *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, 261 F. Supp. 2d at 195; *Barr Cleared of Antitrust Charges in Cipro Agreement*, *supra*. By the end of 2001, those payments had totaled approximately \$200 million. 17 No. 7 ANDREWS PHARMACEUTICAL LITIG. REP. 7, (Dec. 2001); Petersen & Pear, *supra* note 227 ("Senator Shumer pointed to an agreement between Bayer and Barr Laboratories in 1997 in which Bayer pays Barr about \$30 million a year not to make a generic version of Cipro"). The amount of the payments by December of 2003 (when Bayer's U.S. patent on Cipro expires) has been estimated at \$398 million. *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, 261 F. Supp. 2d at 196. The Prescription Access Litigation group, an activist organization, sued Bayer arguing that the "pact unlawfully blocked access to adequate supplies and cheaper versions of Cipro." *Id.* In what may be just the first round of the litigation, a U.S. District Court for the Eastern District of New York rejected the claim by the Prescription Access Litigation group. *In re Ciprofloxacin Hydrochloride Antitrust Litigation*, 261 F. Supp.2d 188. At the time of the anthrax threat, Congress expressed concern about such agreements. *Bioterrorism Cipro: Senate Committee Targets Trade Agreements*, AMERICAN POLITICAL NETWORK, AMERICAN HEALTH LINE (Oct. 19, 2001) ("the Senate Judiciary Committee yesterday approved a bill that would force drugmakers to disclose agreements with generic manufacturers that 'keep less expensive' treatments off the market"). In commenting on the Bayer arrangement, one particularly cynical report states, "To most people, that sounds suspiciously like a payoff to avoid competition . . ." *Cipro Saga Exposes How Drugmakers Protect Profits*, USA TODAY, Oct. 29, 2001 ("Bayer . . . paid off [several potential competitors] years ago to keep [them] from introducing a cheaper version of the drug").

234. Keith Bradsher & Edmund L. Andrews, *U.S. Says Bayer Will Cut Costs of its Anthrax Drug*, N.Y. TIMES, Oct. 24, 2001, at B7 ("Bayer charges \$4.67 a tablet in wholesale transactions with pharmacies . . ."). *But see* Andrews, *supra* note 211 (stating that the price was about \$4.40).

235. Bradsher & Andrews, *supra* note 233 ("Bayer offered . . . to sell the medicine for \$1.75 to \$1.83 a tablet, . . . [Tommy Thompson, secretary of Health and Human Services] rejected the bid."). The reduced price to the U.S. government may have been, in part, in recognition of the government's ability to issue a compulsory license to a U.S. generic manufacturer to produce Cipro (in which case Bayer would have received only a reasonable royalty). 28 U.S.C. § 1498(a) (1994); *Standard Mfg. Co., Inc. v. United States*, 42 Fed. Cl. 748, 756-57 (Ct. Cl. 1999); *see also* Donald G. McNeil, Jr., *A Rush for Cipro, and the Global Ripples*, N.Y. TIMES, Oct. 17, 2001, at A1 ("American law is very clear: when the United States government needs a patented product, any official authorized to make purchases can ignore the patent and license someone else to make it Any employee of the United States government can authorize a compulsory license for the product without even holding a hearing . . .").

236. Denise Gellene, *Anthrax Cases Reshape Drug Price Debate*, L.A. TIMES, Nov. 9, 2001, at B3 (Bill Haddad, chief executive of generic drug maker U.S. Research & Development Corp. is reported to have stated that at a price of 95 cents a pill, Bayer is making 75 cents profit).

237. A generic is a drug that is not produced under a patent. Samantha Shoell, *Why Can't the*

have been willing to manufacture and sell Cipro for 40 cents per tablet.²³⁸ As a result, it appears that Bayer's Cipro was selling for 10 times more than its marginal cost. With a patent, Bayer was able to charge \$4.67 per tablet; apparently without a patent, Bayer likely would have been able to charge only 40 cents per tablet.²³⁹

4. APPROACHES DURING THE ANTHRAX THREAT TO REDUCE BAYER'S MARKET POWER

The anthrax threat greatly increased the demand for Cipro almost overnight. In the absence of special action, this increase in demand would tend to exacerbate the economic inefficiencies associated with a monopoly, oligopoly, or monopolistic competition situation — the price would increase significantly, and the “gap” between the quantity demanded (at a competitive market price) and the quantity actually supplied would increase. In response, the parties involved demonstrated a variety of approaches to prevent Bayer's market power from growing.

a. The Canadian Government's Attempt to Disregard Bayer's Patent

The Canadian government initially disregarded Bayer's patent on Cipro and hired a Canadian generic drug manufacturer to produce approximately one million tablets for the Canadian government.²⁴⁰ Bayer threatened to sue,²⁴¹ and eventually the Canadian government agreed to buy Cipro from Bayer at \$1.30 per tablet, and the Canadian generic manufacturer agreed to bear its costs incurred in attempting to respond to the Canadian government's order.²⁴² Eventually, Bayer agreed to reduce the price it charged the Canadian government to 95

Poor Access Lifesaving Medicines? An Explanation of Solving the Patent Issue, 4 MINN. INTELL. PROP. REV. 151, 168-69 (2002).

238. See Andrews, *supra* note 211 (\$4.40 per tablet); Linda Loyd, *The New Good Guy: It's Your Drug Firm*, PHILA. INQ., Oct. 28, 2001, at E1 (“[M]akers of generic drugs and consumer groups say Bayer's price is still high. Generic manufacturers would sell the pills for as little as 40 cents each”).

239. *Id.*

240. Amy Harmon & Robert Pear, *Canada Overrides Patent for Cipro to Treat Anthrax*, N.Y. TIMES, Oct. 19, 2001, at A1, B7 (“the government has ordered a million tablets of a generic version of Cipro from Apotex Inc., which is based in Toronto . . .”).

241. Bernard Simon, *The Good, the Bad, and the Generic*, N.Y. TIMES, Oct. 28, 2001, §3, at 2. (“Bayer . . . threatened to sue the [Canadian] health department for patent infringement, if it went ahead with the order. And on Thursday, Apotex and Bayer came up with a solution that helped [the Canadian] health minister find his way out of a corner”).

242. *Anthrax Fears Rise in U.S. as New Cases Lack Known Link to Previous Targets or Tainted Mail*, FACTS ON FILE WORLD NEWS DIGEST, Oct. 31, 2001 (“Toronto, Canada-based generic-drug manufacturer Apotex Inc. October 24 agreed to bear the \$1.5 million (US \$950,000) cost of the Canadian government's canceled order for a generic version of Cipro”); Bernard Simon, *The Good, the Bad, and the Generic*, N.Y. TIMES, Oct. 28, 2001, §3 at 2 (“Apotex has agreed to absorb the \$1 million cost of the tablets that it said had already been produced”).

cents per tablet.²⁴³

b. The Threat of Compulsory Licensing

Another government option was to grant other drug manufacturers a “compulsory license” to make, use and sell Cipro. In compulsory licensing, the patentee loses its “exclusive” on the patented product, and the government authorizes other producers to take actions that otherwise would constitute patent infringement.²⁴⁴ In a compulsory licensing scheme, the patent holder is entitled to receive a reasonable royalty.²⁴⁵ In effect, compulsory licensing transforms the patent law “property rules” into “liability rules” — the patent holder cannot enjoin its competitor,²⁴⁶ but the patent holder must be paid for the use. Compulsory licensing basically assigns a royalty rate to the patent holder, and the patent holder loses the flexibility to establish its own price and restrict the supply. In the case of manufacture for the U.S. government, the compulsory licensing rate is established consistent with the Fifth Amendment “taking” clause.²⁴⁷ Bayer opposed the adoption of a compulsory licensing scheme.²⁴⁸

c. Moves by Other Drug Companies

Other drug companies attempted to encourage the U.S. government to approve their drugs for treatment of pulmonary anthrax. Several drug companies offered to manufacture and donate drugs for free *if* the FDA would approve their particular drug.²⁴⁹ In effect, these drug companies

243. *Anthrax Fears Rise in U.S. as New Cases Lack Known Link to Previous Targets or Tainted Mail*, FACTS ON FILE WORLD NEWS DIGEST, Oct. 31, 2001.

244. See 28 U.S.C. § 1498(a) (1994).

245. *Standard Mfg. Co., Inc. v. United States*, 42 Fed. Cl. 748, 756-7 (Ct. Cl. 1999) (“Whenever an invention described in and covered by a patent of the United States is used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same, the owner’s remedy shall be by action against the United States in the United States Court of Federal Claims for the recovery of his reasonable and entire compensation for such use and manufacture”).

246. *Id.* at 758 (“[I]njunctive relief [is] not permitted in eminent domain proceedings”).

247. *Id.* at 756 (“Use by the government of a patented invention without an express license from the patentee is properly viewed as a taking of property under the Fifth Amendment to the Constitution through the government’s exercise of its power of eminent domain”); McNeil, *supra* note 234 (“That [reasonable royalty] . . . is based on eminent domain, the principle used when the government seizes land for a highway or military base. A judge picks an amount based on lost value, but not necessarily the highest price that could have been charged . . . In the 1960’s, [the U.S. government] used the law to buy a drug, and the reason was simply that the patent holder charged too much”).

248. See *infra* note 251 and accompanying text.

249. Bradsher, *supra* note 206 (“[Johnson & Johnson, Bristol-Myers Squibb, and Glaxo Smith Kline] have offered to provide large quantities of their drugs *if* the Food and Drug Administration will approve their use for the treatment of anthrax”). Keith Bradsher & Melody Petersen, *Offers of Free and Discounted Medicine May Help Industry Prevent New Regulations*, N.Y. TIMES, Oct.

were willing to employ a “loss leader” approach — they would agree to lose money on a certain number of tablets if they could then enter the “pulmonary anthrax market” and share in the profits.²⁵⁰

5. BAYER’S RESPONSE TO SURGING DEMAND AND GOVERNMENT PRESSURE

Commentators criticized Bayer for being slow to respond,²⁵¹ arguing that Bayer focused on defending its patent rights instead of responding to national security needs.²⁵² Bayer fought the attempt to disregard its patent (or allow compulsory licensing),²⁵³ but agreed to substantially increase supply.²⁵⁴ In effect, Bayer stated that it would increase supply (so that adequate Cipro would be available in the case of a national emergency), but resisted measures that would have restricted Bayer’s ability to set the price of Cipro.²⁵⁵

27, 2001, at B8. (Five companies have offered to provide antibiotics free or at cost to treat people exposed to anthrax.)

250. See Melody Petersen, *4 Drug Makers Finally Outline Their Intentions*, N.Y. TIMES, Oct. 25, 2001, at C2 (“Johnson & Johnson said that it was offering to give 100 million tablets of Levaquin, an antibiotic that is in the same class of drugs as Cipro, to the government for free”). Bradsher, *supra* note 206 (One reporter stated that “While the various offers of free drugs are generous, they could also benefit the companies by raising sales as the public becomes aware of their brands.”).

251. Andrews, *supra* note 219 (“Few companies have seemed as unprepared as Bayer A.G. was when the reaction to anthrax attacks transformed its antibiotic Cipro into the most sought-after pharmaceutical since Viagra . . . public relations executives say, the company has appeared to be detached”).

252. Andrews, *supra* note 211 (“Bayer . . . argued today that there was no need for the United States government to override its patents and buy the drug from companies that produce it without Bayer’s approval”); Amy Harmon & Robert Pear, *Canada Overrides Patent for Cipro to Treat Anthrax*, N.Y. TIMES, Oct. 19, 2001, at A1 (“Bayer A.G. condemned the move [Canada’s decision to override Bayer’s Canadian patent on Cipro] and said it could meet the demand for Cipro on its own”); *New Bill Would Extend 100 Drug Patents, Consumer Group Says*, 8 No. 12 ANDREWS INTELL. PROP. LITIG. REP. 17, (Dec. 11, 2001). Frank Clemente, director of Public Citizen’s Congress Watch stated, “The drug industry has put up a cynical PR front about its patriotic effort to fight bioterrorism . . .”.

253. Harmon & Pear, *supra* note 251 (One Bayer executive stated, “We take patent infringement very seriously, and we are prepared to consider all options in order to defend our patents.”); Edmund L. Andrews, *Bayer, Defending Its Turf, Says It Can Meet Demand*, N.Y. TIMES, Oct. 19, 2001, at B7 (“Bayer A.G. is fighting efforts by other companies to supply generic versions of the drug . . . and is insisting that it can produce enough to meet soaring demands”); *Id.* (“Mr. Morich [a Bayer management board member] warned sharply against any efforts to circumvent Bayer’s patents by buying the drug from other manufacturers”).

254. McNeil, *supra* note 234 (“Bayer . . . said today that it was tripling production of the antibiotic in the face of growing public fears about anthrax”).

255. See *supra* note 251; Robert Pear, *Government Talks with Drug Companies About Buying Antibiotics That Treat Anthrax*, N.Y. TIMES, Oct. 20, 2001, at B8. (Senator Charles E. Schumer, Democrat of New York, stated “Such a licensing arrangement would get a quick supply of Cipro, but it does not solve the *price problem* . . . Bayer charges a lot more than generic manufacturers would. Our goal is to ensure that the nation has an adequate supply of ciprofloxacin at reasonable prices”) (emphasis added).

Although Bayer was sharply criticized, it should be noted that Bayer: (i) did not increase the price of Cipro after Sept. 11, 2001;²⁵⁶ (ii) eventually agreed with government scientists that someone with pulmonary anthrax would only need ten tablets of Cipro (rather than 120 as previously recommended by federal guidelines);²⁵⁷ (iii) offered to donate two million tablets for free to the U.S. government;²⁵⁸ and (iv) offered to donate 200,000 tablets for free to the Canadian government.²⁵⁹

6. U.S. GOVERNMENT RESPONSE

While Senator Schumer of New York argued that the U.S. government should either disregard Bayer's patent or establish a compulsory licensing scheme,²⁶⁰ President Bush's administration did not advocate either of those approaches (at least until the final hour of negotiations).²⁶¹ Instead, the Bush administration appeared to take four approaches.

256. Petersen & Pear, *supra* note 227.

257. Keith Bradsher, *Bayer Insists Cipro Supply Is Sufficient; Fights Generic*, N.Y. TIMES, Oct. 21, 2001, at B7 ("Cipro supplies would also go a lot farther if people took the drug for only the first five days after exposure to anthrax and switched to other antibiotics for the remaining 55 days of the typical 60-day treatment Federal officials recommended this approach a week ago, but today was the first time Bayer officials had urged the public to follow this advice"); See also Edmund L. Andrews, *Bayer Defending Its Turf, Says It Can Meet Demand*, N.Y. TIMES, Oct. 19, 2001, at B7 ("Bayer, which has been conferring with the Center for Disease Control and Prevention in Atlanta, calculates that anybody suspected of being infected with anthrax will need a five-day treatment of Cipro — 10 tablets — and can then follow up with treatment involving other antibiotics"); Keith Bradsher, *supra* ("Until a week ago, federal guidelines called for Cipro for 60 days for someone who inhaled anthrax, but only 5 days of Cipro and then other antibiotics for anthrax absorbed through the skin or ingested. Regulators declared a week ago that Cipro was needed for only five days in inhalation cases as well, but many doctors continue to prescribe 120 tablets").

258. Bradsher, *supra* note 206 ("The Bayer deal on Wednesday included the donation of two million tablets beginning next week").

259. Andrews, *supra* note 219 ("Bayer offered today to donate 200,000 tablets for the government to give to 'front line' workers in government offices and the media").

260. McNeil, *supra* note 234 ("Senator Charles E. Schumer, Democrat of New York, proposed today that the government buy generic versions for its emergency stockpile, noting that such a step would reduce dependence on a single supplier and could significantly reduce the costs of getting the amount of ciprofloxacin needed"). A compulsory licensing scheme would be permitted under 28 U.S.C. § 1498, but would require that the United States pay a reasonable royalty. See *Standard Mfg. Co., Inc. v. United States*, 42 Fed. Cl. 748 (Ct. Cl. 1999); see also Lee, *supra* note 48, at 186 ("If the federal government infringes a patent, the infringement may amount to a 'taking' under the Fifth Amendment, and the patentee is entitled to compensation for the infringing use").

261. Elisabeth Bumiller, *Administration Won't Allow Generic Versions of Drug*, N.Y. TIMES, Oct. 18, 2001, at B8 ("Tommy G. Thompson, the health and human services secretary, said . . . that violating the patent on Cipro, . . . was illegal"); Harmon & Pear, *supra* note 251 ("'We don't feel there's a need to lift the patent at this time,' said Anthony T. Jewell, a spokesman at the [U.S.] Department of Health and Human Services").

First, scientists re-evaluated the need for Cipro.²⁶² At the beginning of the anthrax threat, federal guidelines provided that the proper prescription for pulmonary anthrax would be 120 Cipro tablets (two a day for 60 days), and many physicians prescribed 120 tablets to their patients.²⁶³ However, several scientists concluded shortly after the anthrax threat began that an effective approach to treatment would be to take Cipro for the first five days (a total of ten Cipro tablets), and then use other drugs for approximately fifty-five days.²⁶⁴ Eventually the Center for Disease Control approved that approach.²⁶⁵ Second, the Bush administration emphasized that other antibiotics could be used to treat anthrax.²⁶⁶ Third, in an apparent attempt to reduce consumer demand for Cipro, government officials emphasized the potential side effects and other negative consequences of unnecessarily taking Cipro.²⁶⁷

Fourth, the Bush administration negotiated with Bayer for a deep discount on government purchases. During these negotiations, the Bush administration allegedly threatened to disregard Bayer's patent.²⁶⁸

262. Kolata, *supra* note 218 ("The Food and Drug Administration has also approved two other types of drugs against anthrax, tetracyclines, including doxycycline, and penicillins. Originally, they were meant to prevent and treat cutaneous anthrax [anthrax that is absorbed through the skin or ingested]. But both drugs are also generally expected to work against infections caused by anthrax spores").

263. Bradsher, *supra* note 256 ("Until a week ago, federal guidelines called for Cipro for 60 days for someone who inhaled anthrax, but only 5 days of Cipro and then other antibiotics for anthrax absorbed through the skin or ingested. Regulators declared a week ago that Cipro was needed for only five days in inhalation cases as well, but many doctors continue to prescribe 120 tablets . . ."); Bradsher & Andrews, *supra* note 17 ("many private doctors initially prescribed 60 days' worth of Cipro for people who demanded the medicine . . ."); Petersen & Pear, *supra* note 227 ("The standard full course of Cipro is two pills a day for 60 days . . ."). *Id.* ("Instead of prescribing two tablets of Cipro a day for five days, or 10 tablets in all, and then prescribing another antibiotic, many doctors have been prescribing two [Cipro] tablets a day for 60 days, or 120 tablets").

264. Andrews, *supra* note 256; Bradsher, *supra* note 256.

265. Bradsher, *supra* note 256 ("Regulators declared a week ago that Cipro was needed for only five days in inhalation cases . . .").

266. Bumiller, *supra* note 260 ("Five drug companies . . . have received initial approval to make generic Cipro, pending the expiration of Bayer's patent [on December 9, 2003] . . ."); *Cipro Saga Exposes How Drugmakers Protect Profits*, *supra* note 232 ("Although Cipro has become inextricably linked with treatment for anthrax, the form of anthrax that was used in the latest terrorist attack is susceptible to a variety of antibiotics. Among them: Ciprofloxacin, Penicillin, Doxycycline, Tetracycline, Clarithromycin, Vancomycin, and Clindamycin").

267. See Kolata, *supra* note 218 ("Surgeon General David Satcher said he worried that if people started taking antibiotics 'just in case' that they could do themselves more harm than good, encouraging the growth of the bacterial strains that are resistant to the drugs"); *id.* (in regard to side effects, "Cipro and drugs in its class can cause nausea and diarrhea, and rarely allergic reactions, serious skin rashes, tremors, hallucinations, abnormal heartbeats and liver damage").

268. Bradsher & Andrews, *supra* note 17 ("The Bush administration said tonight that it had won a major price concession from Bayer A.G. for its anthrax medicine, Cipro, after the administration threatened to buy generic alternatives instead"). See also Edmund Andrews, *supra* note 214 ("Anxiety over Cipro was so high this week that the Bush administration threatened to

Before the anthrax threat, Bayer sold Cipro for \$4.67 per tablet to U.S. consumers,²⁶⁹ and Bayer sold Cipro for \$1.83 per tablet to the U.S. government.²⁷⁰ As a result of the negotiations with the Bush administration, Bayer eventually agreed to sell Cipro to the U.S. government for 95 cents per tablet.²⁷¹ Even with this drop in price, Bayer likely will still be making a substantial profit on its sales to the U.S. government.²⁷² Industry analysts indicate that the price cut reduces Bayer's profit margin on Cipro sales to the U.S. government from 95% to 65%.²⁷³ Analysts also state that if Bayer's patent on Cipro had instead been disregarded by the United States, Bayer would have lost an additional \$800 million.²⁷⁴

7. CHART ON BAYER'S MARKET POWER FOR CIPRO

Bayer's power to set the price of Cipro above marginal cost may be indicated by the following chart:

seek Congressional authority to revoke the patent on the drug, held by the German drug maker Bayer, unless the company agreed to cut its price to the government in half. Bayer complied"); *But see* Keith Bradsher & Melody Petersen, *A Nation Challenged: The Drug Makers; Offers of Free and Discounted Medicine May Help Industry Prevent New Regulations*, N.Y. TIMES, Oct. 27, 2001, at B8 ("After Bayer agreed to nearly halve the price, Mr. Thompson denied that his comments had been a threat").

269. Bradsher & Andrews, *supra* note 17 ("Bayer charges \$4.67 a tablet in wholesale transactions with pharmacies . . .").

270. *Id.*

271. *Id.*

272. Gellene, *supra* note 235 (Bill Haddad, chief executive of generic drug maker U.S. Research & Development Corp. is reported to have stated that at a price of 95 cents a pill, Bayer is making 75 cents profit).

273. Leslie Wayne & Melody Petersen, *A Muscular Lobby Rolls Up Its Sleeves*, N.Y. TIMES, Nov. 4, 2001, at C1.

274. *Id.* ("Bayer will still be doing O.K. on [Cipro] . . . If Bayer lost the patent protection and the drug could be sold in the U.S. at generic prices, it would have been devastating for the company"); Bradsher, *supra* note 206 ("Executives in the generic drug industry say Bayer is still at least breaking even and may even be making a large profit"). *Id.* (Bayer's chief executive of American operations "refused to discuss whether Bayer was making a profit on the deal"); *See also id.* ("Agnes Varis, president of Agvar Chemicals, a pharmaceutical trading company in Little Falls, N.J., said ciprofloxacin costs 12.5 cents to 20 cents a tablet in global markets. It is manufactured by dozens of factories around the world because Bayer's patent has expired in practically every country except the United States . . .").

SITUATION	PRICE CHARGED	% Compared to Price Charged by Bayer to U.S. Pharmacies
U.S. — Bayer's Sale Price to U.S. Pharmacies ²⁷⁵	\$4.67	100%
U.S. — Bayer's Sale Price to the U.S. Government Before the Anthrax Threat	\$1.83 ²⁷⁶	39%
Mexico — Generic Manufacturer's Sale Price Offered in Mexico ²⁷⁷	\$1.50	32%
Canada — Bayer's Initial Sale Price to the Canadian Government After the Anthrax Threat ²⁷⁸	\$1.30	28%
U.S. — Bayer's Sale Price to the U.S. Government for the First 100 Million Tablets After Negotiations ²⁷⁹	\$0.95	20%
U.S. — Sale Price Offered by Bayer to the U.S. Government After the Sale of the First 100 Million Tablets ²⁸⁰	\$0.75 to \$0.85	16%
Canada — Canadian Generic Manufacturer's Estimated Sale Price	\$0.62 ²⁸¹	13%
U.S. — Sales Price of Similar Drug (Doxycycline) for which Patent Has Expired	\$0.44 ²⁸²	9%
U.S. — Price that Bayer Charges the U.S. Health & Human Services Dept. for Hospitals in Poor Regions ²⁸³	\$0.43	9%
U.S. — Estimated Price that U.S. Generic Manufacturers Would Charge to Sell a Generic Version of Cipro	\$0.40 ²⁸⁴	9%
U.S. — Estimated Cost to Bayer of Producing Cipro (estimate by a U.S. generic manufacturer)	\$0.20 ²⁸⁵ to \$0.25 ²⁸⁶	4%
India — Sales Price Charged by an Indian Generic Producer ²⁸⁷	\$0.15	3%
India — Sales Price Charged by a Second Indian Generic Producer ²⁸⁸	\$0.10	2%

275. Bradsher & Andrews, *supra* note 17 (“Bayer charges \$4.67 a tablet in wholesale transactions with pharmacies . . .”); Jesse Pesta & Daniel Pearl, *Tapping India for Antibiotics; Ranbaxy Laboratories Ltd.*, ASIAN WALL STREET J. WEEKLY, Oct. 29, 2001.

276. Bradsher & Andrews, *supra* note 17.

277. Greg Winter, *Si, We Have Cipro; the Panicky and the Profiteers Head to Mexico*, N.Y. TIMES, Oct. 20, 2001, at B1 (“The generic drug comes in packages of 36 tablets, which costs \$55 . . . She estimated that the same amount of the drug would cost about \$170 to \$180 in the United States”).

278. Bradsher & Andrews, *supra* note 17.

279. *Id.*

280. Bradsher, *supra* note 206.

281. Harmon & Pear, *supra* note 251 (“Jack Kay, president of Apotex [the Canadian generic manufacturer] said that his company made the drugs through a process that did not infringe on Bayer's patent and that Apotex could deliver the drugs faster and for about 63 cents less than the approximately \$1.25 that Bayer charges the Canadian government for a 500-miligram tablet”).

282. Pear, *supra* note 254 (“Mr. Reicher [the chairman of Halsey Pharmaceuticals of Rockford, Illinois] said doxycycline costs about a tenth of what Cipro does”).

283. *Anthrax Fears Rise in U.S. as New Cases Lack Known Link to Previous Targets or Tainted Mail*, FACTS ON FILE WORLD NEWS DIGEST, Oct. 31, 2001.

284. Loyd, *supra* note 238. (“[M]akers of generic drugs and consumer groups say Bayer's price is still high. Generic manufacturers would sell the pills for as little as 40 cents each”).

285. Gellene, *supra* note 235.

286. Nancy Gibbs, TIME, Oct. 29, 2001, at 40 (“Although [Cipro] reportedly costs less than 25 cents to make, Bayer charges the [U.S.] government \$1.83, and the frightened public is shelling out about \$5 a pill. Generic companies have told the [U.S.] government they would charge it no more than 50 cents”).

287. Bradsher, *supra* note 256 (“Companies in countries that have less stringent patent laws sell the antibiotic for one-thirtieth of the American price and have offered to ship large quantities to the United States”); Buhmiller, *supra* note 260 (“Cipro is also expensive, costing nearly \$350 a month in the United States. A generic drug from reputable suppliers cost only \$10 a month in India”); McNeil, *supra* note 234 (“Alternatively, American consumers might become outraged to learn that while Cipro has cost nearly \$350 a month in the United States, a generic drug from reputable suppliers costs only \$10 a month in India”). Drugs similar to Cipro are made by more than 80 companies in India and elsewhere. *Id.*

288. Pesta & Pearl, *supra* note 274.

Reporters have stated that, “One [sixty]-day supply of Cipro costs just under \$700 in the United States, while a [sixty]-day supply of generic ciprofloxacin — not allowed until [Dec. 9] 2003 in the United States — costs about \$20 in other countries”²⁸⁹

If one defines the relevant market as “antibiotics,” Bayer did not have a pure monopoly (because there are many other manufacturers selling antibiotics). Nevertheless, Bayer had substantial market power — Bayer charged \$4.67 a tablet when its marginal cost likely was below \$0.40. Thus, Bayer appears to have charged a price more than ten times higher than its marginal cost, and Bayer sold substantial quantities of Cipro. In connection with a proposed six-month extension on the term of various patented drugs, including Cipro,²⁹⁰ it was reported that Bayer’s sales of Cipro every day is almost \$2 million.²⁹¹

B. *Market Power of Brand-Name Drug Manufacturers of Anti-AIDS Drugs*

Several different large brand-name drug companies have patented anti-AIDS drugs that are referred to as the “three-drug cocktail therapy.” While each patentee (drug company) has an “exclusive” on its particular patented product or process, if the relevant market is the market for the three-drug cocktail to fight AIDS, the market likely would be considered more of an oligopoly than a pure monopoly (because there are multiple producers selling differentiated products). Actions in connection with an Executive Order by President Clinton to help make anti-AIDS drugs available in sub-Saharan Africa revealed that as in the case of Cipro, the anti-AIDS drugs are commonly sold at a price in excess of the marginal cost of production.

1. MARKET FOR ANTI-AIDS DRUGS IN THE U.S.

The market for anti-AIDS drugs differs significantly depending on the country involved, and can differ for various consumer markets inside one country. In the United States, there are three very distinct ways in which anti-AIDS drugs are supplied, and the pharmaceutical industry has found a way to effectively “price discriminate” among the three U.S. consumer markets.²⁹² First, in the market in which the patient (and/or

289. Julie Rovner & April Fulton, *Senate Panel Approves Bill on Generic Drug Availability*, NAT’L J. CONG. DAILY, Oct. 28, 2001 (quoted in Lee, *supra* note 49, at 175 n.2).

290. The proposal would have granted a six-month extension on the patent term if the drug company tested the product for safety for children. *New Bill Would Extend 100 Drug Patents Consumer Group Says*, ANDREWS INTELL. PROP. REP., Dec. 11, 2001.

291. *Id.* (“Public Citizen’s study reports that Bayer would garner an extra \$358 million in sales of Cipro due to the drug’s patent extension”). See also Wayne & Petersen, *supra* note 272.

292. For a discussion of price discrimination, see *supra* note 139.

his or her insurance company) pays a “market” price for the anti-AIDS drugs, estimates for one year’s supply of the three-drug cocktail therapy are in the range of \$15,000 to \$17,000.²⁹³ Second, Medicaid and other government programs cover the cost of anti-AIDS drugs for some patients.²⁹⁴ In this market, the government may establish or negotiate the price (which may be based on a percentage of the wholesale price, or may be set at the lowest price offered to any other consumer).²⁹⁵ Third, some patients qualify to receive anti-AIDS drugs for free.²⁹⁶

2. PRESIDENT CLINTON’S EXECUTIVE ORDER THAT THE U.S. GOVERNMENT WILL NOT TAKE INTERNATIONAL TRADE ACTIONS AGAINST SUB-SAHARAN AFRICAN COUNTRIES FOR CERTAIN ACTIVITIES REGARDING ANTI-AIDS DRUGS THAT WOULD INFRINGE THE PATENT RIGHTS OF U.S. DRUG COMPANIES

On May 10, 2000, President Clinton issued Executive Order

293. McNeil, *supra* note 12 (“Drug treatments used in the United States, most commonly the triple-therapy ‘cocktails’ that suppress the replication of HIV can cost up to \$15,000 a year”); *id.* (“There are still some people in the United States who cannot get the drugs they need because the price is prohibitive. It costs \$15,000 to \$17,000 a year just for HIV drugs”); *see also*, *Politicians and Drug Firms Playing with Lives in Cynical Squabble Over AIDS*, SYDNEY MORNING HERALD, Mar. 10, 2001, at 20 (A report by Doctors Without Borders “showed that anti-retroviral drugs, which attack HIV itself, . . . cost up to . . . \$1,000 a month in the United States . . .”). Apparently, the \$12,000 price is for a two-drug cocktail. *Id.*

294. McNeil, *supra* note 12 (“Medicaid generally covers the cost of such drugs”).

295. In regard to AIDS drugs,

A United States unit of the German pharmaceutical giant Bayer A.G. has tentatively agreed to pay federal and state governments \$14 million to resolve accusations that it lied about the wholesale prices of certain drugs, including those to treat AIDS.

The settlement requires the company to give state regulators more accurate price information and to cooperate in the ongoing investigation, Bayer A.G. said yesterday. The states will be able to use the information to determine whether changes in reimbursement are appropriate.

. . . .

The investigation began in the mid-1990s after a lawsuit was filed by the Ven-A-Care pharmacy in Key West, Fla. which administers intravenous drugs to patients in their homes. The suit asserted that drug makers were reporting high wholesale prices to make their drugs more attractive to doctors receiving Medicaid reimbursements.

Bayer to Pay \$14 Million in Pricing Case, N.Y. TIMES, Sept. 29, 2000, at C6; *see also* Melody Petersen, *AstraZeneca Pleads Guilty In Cancer Medicine Scheme*, N.Y. TIMES, June 21, 2003, at B1 (“Bayer [was assessed a] . . . \$257 million penalty . . . [as a result of] helping Kaiser Permanente, a health care provider, re-label bottles of Cipro, an antibiotic, to hide the low prices it was charging Kaiser. By law, drug companies must sell to Medicaid at the lowest price”).

296. McNeil, *supra* note 12 (“Low-income people who do not qualify for Medicaid may be able to obtain drug therapy through AIDS drug assistance programs run by the states with substantial federal money. In addition, drug manufacturers have programs to provide drugs free, as a last resort, to patients who have no health insurance”).

13155,²⁹⁷ which briefly described the HIV/AIDS epidemic in Africa, discussed various other measures that should be taken to respond to the crisis,²⁹⁸ and then stated:

This order prohibits the United States Government from taking action pursuant to section 301(b) of the Trade Act of 1974 with respect to any law or policy in beneficiary sub-Saharan African countries that promotes access to HIV/AIDS pharmaceuticals or medical technologies and that provides adequate and effective intellectual property protection consistent with the TRIPS Agreement.²⁹⁹

The TRIPS Agreement is a World Trade Organization treaty requiring that its member countries grant certain intellectual property rights (in August 2003, there were 146 WTO member countries).³⁰⁰ The TRIPS Agreement permits a member nation to issue a compulsory license in the case of a national emergency without the patent holder's authorization.³⁰¹ Executive Order 13155 authorized African nations to declare the AIDS pandemic a national emergency, and hire local manufacturers to produce anti-AIDS drugs without fear of U.S. trade sanctions. In August of 2003, the World Trade Organization adopted a resolution that would allow developing countries to import life-saving drugs in emergency situations, subject to certain restrictions.³⁰² Presumably the resolution will allow sub-Saharan African countries to import the anti-AIDS drugs from countries in which generic manufacturers produce and sell the drugs for a fraction of the price charged by brand-name drug compa-

297. 65 Fed. Reg. 30521 (May 10, 2000). The Executive Order marked a shift in U.S. policy. "[I]n 1997, when South Africa sought to legislate its way around drug patents, it found its way blocked not only by the pharmaceutical firms' lawyers but also by threats from the U.S. and Europe to impose sanctions if their firms' intellectual property rights were breached." *Politicians and Drug Firms Playing with Lives in Cynical Squabble Over AIDS*, *supra* note 292.

298. 65 Fed. Reg. 30521 (May 10, 2000). The additional measures include providing incentives to develop new drugs, improving public education, encouraging practices that will prevent further transmission and infection, and improving health care infrastructure to promote improved access to quality health care. *Id.*

299. *Id.* See also Neil A. Lewis, *Clinton Issues Order to Ease Availability of AIDS Drugs in Africa*, N.Y. TIMES, May 11, 2000, at A7 ("The order issued by President Clinton essentially extended to most of Africa a special arrangement provided last year to South Africa").

300. TRIPS Agreement, Art. 27.1, *reprinted in* GOLDSTEIN, *supra* note 32, at 14 (generally requiring member nations to make "patents . . . available for any inventions . . ."); Becker, *supra* note 32 (the WTO has 146 members).

301. TRIPS Agreement Art. 31(b), *reprinted in* GOLDSTEIN, *supra* note 32, at 15.

302. Elizabeth Becker, *Poor Nations Can Purchase Cheap Drugs Under Accord*, N.Y. TIMES, August 31, 2003, at A1 ("Under the accord, poor countries will be able to import generic versions of expensive patented medicines, buying them from countries like India and Brazil without running afoul of trade laws protecting patent rights"). Scott Miller, *WTO Drug Pact Lifts Trade Talks*, WALL ST. J., Sept. 2, 2003 ("the WTO statement in the drug agreement [provides] that countries could override patents only 'in good faith to protect public health . . . not [as] an instrument to pursue industrial or commercial policy objectives'").

nies in developed nations.³⁰³

Despite speculation to the contrary, President Bush has not reversed Executive Order 13155.³⁰⁴

3. RESPONSE BY BRAND-NAME DRUG COMPANIES TO EXECUTIVE ORDER — 80%+ DROP IN PRICE THE NEXT DAY

Although U.S. drug company officials initially criticized the Executive Order,³⁰⁵ the day after Executive Order 13155 was issued, five of the world's largest pharmaceutical companies³⁰⁶ announced that they would negotiate with the World Health Organization and other international agencies to sell their anti-AIDS drugs to sub-Saharan countries at steep discounts.³⁰⁷ Initially, only Glaxo Wellcome announced the amount of the discount — 80%³⁰⁸ — but subsequent reports confirmed that all five companies were offering similar discounts.³⁰⁹ Before the

303. *Id.* However, a spokesperson for Doctors Without Borders stated, “[the accord] offers little comfort for poor patients. Global patent rules will continue to drive up the price of medicines.” Miller, *supra* note 301.

304. Naftali Bendavid, *Bush Reluctant to Undo Clinton Edicts*, CHI. TRIB., Feb. 22, 2001, at 1N (discussing “a low-profile announcement that the administration would not overturn a policy allowing easier access to AIDS drugs overseas”); *Merck: Lowers AIDS Drug Prices for Africa*, *supra* note 15. After Merck lowered prices on certain of its AIDS drugs sold to Africa, one commentator stated:

Merck’s decision for a second round of price cuts stemmed from President Bush’s decision not to overturn former President Clinton’s executive order supporting the use of generic drugs in emergency situations “Prior to that, the industry felt they had the U.S. government behind them on the issue of intellectual-property rights. Now the industry has found itself without strong allies Merck’s decision was that it was better to placate the enemy rather than wait to be annihilated.”

Id. (quoting health-care analyst Ira Loss); *see also* Collins, *supra* note 15.

305. In response to Executive Order 13155, industry comments included, “[The President’s action] set an undesirable and inappropriate precedent, by adopting a discriminatory approach to intellectual property laws, and focusing exclusively on pharmaceuticals.” Halbert, *supra* note 19, at 275 (statement from Alan F. Homer, President of the Pharmaceutical Research and Manufacturers of America (“PhRMA”)); *see also* Susan Sell, *TRIPS and the Access to Medicines Campaign*, 20 WIS. INT’L. L.J. 481, 509 (2002) (also quoting Mr. Holmer).

Industry officials said that they believed it was wrong to carve out an exception for one disease and one region. “If Africa today, why not Asia tomorrow or even the United States,” one official said. Lewis, *supra* note 299.

306. The drug companies involved were Glaxo Wellcome (a British company), Boehringer Ingelheim (a German company), Bristol-Myers Squibb (a U.S. company), Merck & Company (a U.S. company), and Hoffmann-La Roche (a Swiss company). McNeil, *supra* note 12.

307. *Id.*

308. *Id.* (“Ben Plumley, an official of Glaxo Wellcome, said the company would sell its Combivir, a blend of AZT and 3TC that sells at a global average price of \$16, for \$2 in poor countries”).

309. Joseph Kahn, *U.S. Offers Africa \$1 Billion a Year for Fighting AIDS*, N.Y. TIMES, July 19, 2000, at A1 (“Even at 90 percent discounts a typical cocktail of AIDS suppressing drugs might cost \$2000 a year for [a] single patient in Africa, more than four times the average per capita income in many of the worst-afflicted countries”); Park, *supra* note 206, at 138-39 (“The

discount, U.S. brand-name drugs companies charged approximately \$15,000 to \$17,000 per year for a one-year supply of the three-drug cocktail.³¹⁰ With the discount, the price would drop to \$2000³¹¹ (or less) in sub-Saharan Africa. While each of the five brand-name drug companies would negotiate separately with the World Health Organization and other international agencies³¹² (apparently in order to reduce concerns about antitrust or similar problems), it should be noted that all five of the large brand-name drug producers announced a similar reduction in price at the same time. This is consistent with an oligopoly situation.³¹³ As discussed above, the producers in an oligopoly are faced with a downward sloping demand curve, and can charge prices in excess of marginal cost, and generally each producer is reluctant to charge a price that is significantly different from the other producers in the market.³¹⁴

international organization Doctors Without Borders found that in most cases, even if brand-name prices were reduced eighty-five percent, the prices would still not drop as low as generic copies"). *Id.* at 149 ("Triple drug therapy would still cost \$2,000 per year, and considering the per capita income in Africa is less than [\$500] dollars per month, that is a price beyond the reach of most South Africans"); *Politicians and Drug Firms Playing with Lives in Cynical Squabble Over AIDS*, *supra* note 292; Sheryl Gay Stolberg, *Africa's AIDS War*, N.Y. TIMES, Mar. 10, 2001, at A1 ("Nancy Pekarek, a spokeswoman for GlaxoSmithKline, said her company had offered discounts as high as 90 percent to roughly a dozen African nations, as well as employers there. Glaxo makes a two-drug combination, Combivir, that costs \$17 a day in the United States; in Africa the price is \$2").

310. McNeil, *supra* note 12. *See infra* note 315.

311. Kahn, *supra* note 308.

312. McNeil, *supra* note 12 ("The . . . negotiations [are] to be held with the World Health Organization and other international aid groups . . . Officials said the companies negotiated separately to avoid falling afoul of American price-fixing laws. The five companies will work with five international agencies, the World Health Organization, the World Bank, UNAIDS, the United Nations Children's Fund and the United Nations Population Fund").

313. The tendency of producers in an oligopoly to move in coordination when setting price is discussed at *supra* notes 183-85 and accompanying text.

314. *Id.*

4. CHART ON MARKET POWER OF BRAND-NAME DRUG COMPANIES IN THE MARKET FOR THE THREE-DRUG COCKTAIL³¹⁵

SITUATION	PRICE (for a one- year supply)	Comparison to Price Charged by U.S. Brand-Name Drug Companies to U.S. Consumers & Insurers
Price Charged by U.S. Drug Companies to Individuals (and/or their insurers) ³¹⁶	\$15,000	100%
Estimated Price at Which Brand Name Drug Companies Would Sell to Sub-Saharan African Countries Based on the Arrangement Announced the Day After Executive Order 13155 (May 11, 2000) ³¹⁷	\$2,000	13%
Reported Price Charged by U.S. Brand-Name Drug Companies to ³¹⁸ South African Consumers in January of 2002	\$1,168	10%
Price Offered by Glaxo to African Governments ³¹⁹ in March, 2001	\$730	5%

315. There may be several other medicines that AIDS sufferers require. "In addition to the combination of antiretrovirals necessary to fight the infection and reduce the transfer of the disease, there are AIDS medications that are also necessary — drugs required in order to reduce the impact of opportunistic infections and deal with pain." Halbert, *supra* note 15, at 260. Also, one can argue about which drugs should be in the three-drug cocktail, and that different drugs may be more appropriate than others. See Mark Warner, *Panel I: AIDS Drugs and the Developing World: The Role of Patents in the Access of Medicines*, 12 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 683, 732 (2002).

316. McNeil, *supra* note 12 ("Drug treatments used in the United States, most commonly the triple-therapy 'cocktails' that suppress the replication of H.I.V. can cost up to \$15,000 a year"); *id.* ("There are still some people in the United States who cannot get the drugs they need because the price is prohibitive. It costs \$15,000 to \$17,000 a year just for H.I.V. drugs"). See also *Politicians and Drug Firms Playing with Lives in Cynical Squabble Over AIDS*, *supra* note 292 (A report by Doctors Without Borders "showed that anti-retroviral drugs, which attack HIV itself, . . . cost up to U.S. \$1,000 a month in the United States . . ."). The \$1,000 a month figure apparently is the cost of a two-drug cocktail, rather than a three-drug cocktail. *Id.* Because of the high cost of these drugs in the United States, compared with significantly lower costs in Mexico and Canada, Congress has considered allowing imports from Canada and/or Mexico. See Halbert, *supra* note 15, at 269 (discussing the Medicine Equity and Drug Safety Act of 2000); Shoell, *supra* note 236, at 164. In June 2003, the Senate passed a similar Bill, "[b]ut the proposal is contingent on a finding that the imports would pose no risk to public health, and the Bush administration has made it clear that it will not issue such a finding." Robert Pear, *Senate Votes Again to Allow Importing of Prescription Drugs From Canada*, N.Y. TIMES, June 21, 2003, at A13.

317. Kahn, *supra* note 308 ("Even at 90 percent discounts, a typical cocktail of AIDS-suppressing drugs might cost \$2,000 a year for a single patient in Africa, more than four times the average per capita income in many of the worst-afflicted countries").

318. *South Africa: AIDS Drug Trial*, N.Y. TIMES, Jan. 30, 2002, at A6 ("Pharmaceutical companies have drastically reduced the prices of AIDS drugs, but a daily supply of each still costs \$3.20 in South Africa").

319. Collins, *supra* note 15 (a "spokeswoman for GlaxoSmithKline, the world's largest manufacturer of AIDS medications, said her company's current offer of \$2 a day for the drug AZT is comparable to the price offered by the Indian generic drugmakers"); *Merck: Lowers AIDS Drug*

Price Offered by Cipla, an Indian Generic Manufacturer, to African Governments in March, 2001 ³²⁰	\$600	4%
Price Charged by Brazilian Generic Manufacturers ³²¹ to Doctors Without Borders for Distribution to South African Consumers in January of 2002	\$565	4%
Price Charged by Cipla, an Indian Generic Manufacturer, to Doctors Without Borders ³²²	\$350	2%

Prices for Africa, *supra* note 15 (“In May, Glaxo offered to cut the price of Combivir by 90% to \$2 per day, but offered that price only to governments”).

320. Collins, *supra* note 15 (“One of the Indian firms, Cipla, Ltd. has offered a combination of three anti-AIDS medicines which don’t include a protease inhibitor like Crixivan — for \$600 a year for governments and \$350 a year for Doctors Without Borders”); *Merck: Lowers AIDS Drug Prices for Africa*, *supra* note 15 (“Cipla added more fuel to the fire by asking the South African government to permit it to sell eight AIDS drugs currently available only at high prices from the patent-holding multinational manufacturers . . . Cipla requested compulsory licensing to offer the drugs and their combinations at \$600 per patient per year, a move that would give the generic drug maker ‘the upper hand’ in the African market”).

The Cipla offer of \$600 appears to involve a combination of drugs resembling the one priced at about \$1,008 in Senegal. The higher price quoted to Senegal includes a powerful protease-inhibitor drug, such as Crixivan, sold by Merck. Cipla’s offer involves three anti-AIDS medicines, but doesn’t include a protease inhibitor.

. . . .

Moreover, the Cipla offer carries numerous qualifications. Cipla is offering to sell just three of the roughly 10 drugs commonly combined to form the so-called AIDS cocktail therapy. Those drugs are Zerit, from Bristol-Myers, Glaxo’s 3TC, and the German company Boehringer-Ingelheim GmbH’s Viramune. Spokespersons at several of the large drug makers said their offer of price discounts involves more drugs and therefore provides doctors the ability to prescribe different combinations for different patients.

Rachel Zimmerman & Jesse Pesta, *Cipla AIDS-Drug Offer Changes Outlook*, WALL ST. J., Feb. 8, 2001, at B13.

321. *South Africa: AIDS Drug Trial*, N.Y. TIMES, Jan. 30, 2002, at A6 (“Frustrated at South Africa’s refusal to legalize cheap copies of patented AIDS drugs, the relief group Doctors Without Borders announced that it would import generic versions of the three AIDS medicines, which it began buying from Brazilian companies in December. It plans to distribute them to a small number of AIDS patients in a pilot project in [a] Cape Town suburb Generic versions like those provided in the trial cost \$1.55”).

322. Collins, *supra* note 15. In regard to the offer to sell for \$350 a year, one commentator has stated,

[Cipla] agreed to sell it to [Doctors Without Borders] for \$350 per year. A dollar a day had good symbolic value. [Doctors Without Borders] was immediately swamped by requests for the drugs. The February 7, 2001 announcement of these drug prices, featured on the front page of The New York Times, “shocked the world, and completely transformed the global debate on treatment for HIV in Africa. At this price it was clear that many would die needlessly if steps were not taken to remove barriers to access to medicines.”

Donald G. McNeil, Jr., *New List of Safe AIDS Drugs, Despite Industry Lobby*, N.Y. TIMES, Mar. 21, 2002, at A3 (“Cipla, Ltd., the generic drug maker based in Bombay, India, . . . was the first to try breaking Western patent monopolies in February 2001 by offering AIDS therapy for \$350 a year to charities . . .”). Susan Sell, *TRIPS and the Access to Medicines Campaign*, 20 WIS. INT’L L.J. 481, 510 (2002). See also Collins, *supra* note 15. One commentator has stated, “In some cases the standard United States price for a drug may be discounted by as much as [98%] in other

Price Charged by Hetero Drugs, an Indian ³²³ Generic Manufacturer, Generally in Africa	\$347	2%
Price Charged by Ranbaxy Laboratories, an Indian Generic Manufacturer, to Customers with 5,000 or More AIDS Patients ³²⁴	\$295	2%
Price Charged by Cipla (Indian Generic ³²⁵ Manufacturer) for an Experimental Version in Africa in 2002	\$245	2%
Estimate of the Cost of Manufacturing a Three- Drug Cocktail by a Thai Generic Drug Company in 2000 ³²⁶	\$233	2%

While some of these prices may not apply to precisely the same three-drug cocktail,³²⁷ it seems that brand-name drug manufacturers have substantial market power in the U.S. market for the three-drug cocktail. The brand-name drug manufacturers are able to sell to U.S. consumers at a price in the range of \$15,000 to \$17,000 a year,³²⁸ while it appears that the marginal cost of production in the U.S. may be below \$500. In effect, brand-name drug manufacturers are able to sell in the United States at a price that is perhaps 30 times greater than marginal cost. Thus, even though these brand-name drug companies do not have

countries.” Park, *supra* note 206, at 129. Doctors Without Borders is an international nonprofit organization that provides medical services in the developing world. Zimmerman & Pesta, *supra* note 319. Doctors Without Borders won the Nobel Peace Prize in 1999 for its work in war-torn and impoverished areas. See Donald G. McNeil, Jr., *Indian Company Offers to Supply AIDS Drugs at Low Cost in Africa*, N.Y. TIMES, Feb. 7, 2001, at A1.

323. Merck: *Lowers AIDS Drug Prices for Africa*, *supra* note 15 (“a second Indian generic drug manufacturer, Hetero Drugs Ltd., has announced that it will sell the same drugs for only \$347 per patient per year”).

324. McNeil, *supra* note 321 (“Ranbaxy Laboratories Ltd. . . . makes a three-antiretroviral combination that it offers for as little as \$295 a year to customers with 5,000 or more AIDS patients”). However, Ranbaxy’s drugs did not make the World Health Organization’s first list of manufacturers of safe AIDS drugs. *Id.*

325. James Love, *Panel I: AIDS Drugs and the Developing World: The Role of Patents in the Access of Medicines*, 12 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 683, 701 (2002) (“This is the cheapest possible three-drug cocktail to manufacture in Africa. You can buy it in one pill form taken twice a day. There is a copy of it from Cipla, an Indian manufacturer, for \$0.67 a day. I can buy this for \$0.67 a day in bulk, and I believe if you had competition the price would fall more”). A spokesperson for the brand-name pharmaceutical industry has argued that the \$245 price offered by Cipla is not relevant because the drug has not been adequately tested. Susan Finston, *Panel I: AIDS Drugs and the Developing World: The Role of Patents in the Access of Medicines*, 12 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 683, 728 (2002) (“the Cipla product . . . as far as I am aware, has not been through bioequivalence. It is, in a sense, a clinical study on the people of Africa. That is unacceptable to [Pharmacy Research and Manufacturers of America] members”).

326. Sell, *supra* note 321, at 510 (the head of the Thai government’s Research and Development Institute “estimated that an HIV/AIDS three drug cocktail could be manufactured for 64 cents a day, or 21 cents per product”).

327. See Warner, *supra* note 314, at 732 (At a conference, the moderator stated “I do not know how many people here are really technicians where we can get into a debate about what is in the cocktail or what is not in the cocktail. Frankly, I do not know. It is an important issue . . .”).

328. See *supra* note 315.

a monopoly,³²⁹ the relevant market likely is an oligopoly in which the producers face a downward-sloping demand curve, and can charge a price in excess of marginal cost.

C. *Additional Signs of a Brand-Name Drug Manufacturer's Market Power*

While brand-name drug manufacturers are able to charge a price above marginal cost for Cipro and the three-drug cocktail,³³⁰ one might ask whether this is the case in the market for other brand-name drugs.

By 2011, brand-name drugs with more than \$40 billion in annual sales are expected to go off patent; they can then be sold by generic drug makers at prices of, say, *70 percent less* . . . [T]o prevent huge drops in revenue, drug makers need to hold on to their patent protection for as long as possible — or even extend them further Drug makers depend on patents to help them recoup their research and testing costs, but once those costs are recovered, the high prices they charge for patented drugs give them operating margins that are among the highest in corporate America.³³¹

A legislative proposal that would have extended the patent term for a drug by six-months if the patent holder tested the safety of the drug for children³³² placed the spotlight on the market power available to brand-name drug manufacturers.

Consumer groups say the bill would require the drug companies to do little new research but would cost consumers \$14 billion over what generic equivalents would cost Fighting the hardest is Bristol-Myers, which is also seeking a three-year extension on the use of Glucophage, a diabetes medicine, based on studies on the use of the drug by children. Analysts estimate that the company could reap an

329. As there are several producers selling differentiated products, the market likely can be described as an oligopoly. See *supra* notes 176-90 and accompanying text.

330. See *supra* notes 274 - 87 and accompanying text (regarding Cipro); see *supra* notes 315-25 and accompanying text (regarding the three-drug cocktail).

331. Wayne & Petersen, *supra* note 272 (emphasis added). See also Halbert, *supra* note 15, at 267 (“there is significant evidence that when generic drugs are available, or other mechanisms are in place to provide competition, drug prices fall”) (citing Robert Weissman, *A Long, Strange TRIPS: The Pharmaceutical Industry's Drive to Harmonize Global Intellectual Property Rules, and the Remaining WTO Legal Alternatives Available to Third World Countries*, 17 U. PA. J. INT'L. ECON. L. 1069, 1116-17 (1996) (arguing that the evidence overwhelmingly supports the position that competition equals cheaper drugs)); Miao, *supra* note 15, at C11 (Surveys have indicated that brand-name drug manufacturers sell at lower prices in markets where generic drugs are available. “These results show that Glaxo Wellcome reduced the price of AZT in markets where competition exists”). Another source states that “drug prices typically drop 25% the first year a brand-name prescription gains generic competition.” *Cipro Saga Exposes How Drugmakers Protect Profits*, *supra* note 232.

332. See *New Bill Would Extend 100 Drug Patents, Consumer Group Says*, ANDREWS INTELL. PROP. LITIG. REP., Dec. 11, 2001.

additional \$1 billion in sales for every six month the patent is extended.³³³

Another report states:

Public Citizen [a consumer watchdog group] said the patent extension legislation is based on the premise that if drug companies test their products for safety in children, they should receive a six-month patent extension. [A]s a result of the extension, patent-holding drug companies will recognize added sales of \$29.6 billion, a return 40 times the industry's projected investment in pediatric tests, the group contends.³³⁴

In regard to Glucophage, manufactured by Bristol-Myers, apparently the patent protection allows Bristol-Myers to sell an additional \$5.5 million of the drug per day. Assuming that Bristol-Myers is able to charge at least three times its marginal cost,³³⁵ Bristol-Myers is earning an extra \$3.6 million in profit per day during the term of the patent.³³⁶ When the patent expires, that profit disappears.

It has also been reported that

In 1998 . . . Abbot Laboratories paid generic maker Geneva Pharmaceuticals \$4.5 million a month [or \$54 million per year] to drop its patent challenge to a hypertension drug. All Geneva had to do was agree not to compete. Geneva held to the bargain, despite favorable court rulings on its challenge. The cost to consumers from lost competition was \$100 million a year. After the FTC filed a complaint about the arrangement, the companies finally agreed to abandon it.³³⁷

Apparently because of the high profits available for each day of patent protection, the following "tricks"³³⁸ have been developed that might extend patent protection:

Citizen's petitions. Under the law, anyone has the right to challenge generic competition for a drug, but such petitions are often submitted not by the public, but by the patent-holding drug firms themselves. Filed just before a patent is due to expire, the petition triggers a Food and Drug Administration (FDA) review. The petitions almost never

333. Wayne & Petersen, *supra* note 272.

334. *New Bill Would Extend 100 Drug Patents*, *supra* note 331.

335. *See id.* (estimating that generics sell for 70% less). If the price of the generic drug is discounted 70% from the patented drug, the brand name drug would be selling for approximately three times the price of the generic. For example, if the brand name sells for \$100, and the generic is sold at a discounted price of \$30, the brand-name drug sells at over three times the price of the generic [$3 \times \$30 = \90].

336. If the total additional sales per day are \$5.5 million, and the profit percentage on every sale is 67%, the profit per day is \$3.685 million.

337. *Cipro Saga Exposes How Drugmakers Protect Profits*, *supra* note 232.

338. *Id.*

succeed, but until the review is finished, generics can't come in and compete.

Last-minute patents. Another trick is for the drug company to file an entirely new patent on a drug just before a generic is about to be approved. Under law, that triggers a 30-month delay, while disputes over the new patent are settled. Bristol-Myers Squibb, for instance, won a new patent on its anti-depressant BuSpar in 2000, the day before generics were to start shipping, claiming control over an ingredient created as the drug is digested.

Lobbying. When all else fails, drug firms have tried, usually unsuccessfully, to convince lawmakers to grant patent extensions. Schering-Plough has been trying for years to get Congress to approve an extension on its big-selling allergy drug, Claritin.³³⁹

D. *Damage Awards Indicating the Extent of a Patent Holder's Market Power*

When a party "infringes" a patent, the patent holder has been deprived of the right to exclude another from making, using or selling the patented process or product.³⁴⁰ In addition to obtaining an injunction to prevent further infringement,³⁴¹ a patent holder can obtain money damages.³⁴² It could be argued that the damages awarded in a patent case compensate for the market power that the patent holder would have enjoyed in the absence of competition from the infringer. In calculating damages from infringement, some courts expressly exclude "ordinary profits," and only award damages to the extent that the patent holder's profits would have been greater than ordinary profits.³⁴³ Thus, the damages awarded in patent infringement cases may be viewed as a rough estimate of the economic market power that the patent provides. Commentators have stated, "[I]n modern-day patent infringement cases,

339. *Id.* (recently Claritin became available without a prescription).

340. 35 U.S.C. § 271(a) (2000) ("[W]hoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefore, infringes the patent").

341. *Id.* § 283 (2000) ("The several courts having jurisdiction of cases under this title may grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable").

342. *Id.* § 284 (2000) ("Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court").

343. *TWM Mfg. Co., v. Dura Corp.*, 789 F.2d 895, 899 (Fed. Cir. 1986) (under "the so-called 'analytical approach,' . . . [the court subtracts] the infringer's usual or acceptable net profits from its anticipated net profit realized from sales of the infringing devices." In the *TWM* case, the court concluded that the infringer's anticipated net profits from the sale of the infringing items were in the range of 37% to 42%; the court then subtracted the "industry's standard net profit of 6.56% to 12.5%," and as a result the court based the damages on a 30% reasonable royalty rate).

multi-million dollar damage awards have become commonplace”³⁴⁴

There are two general approaches to awarding damages in patent infringement cases — the “lost profits” approach, and the “reasonable royalty” approach. The patent statute provides:

Upon finding for the [patent holder] the court shall award the [patent holder] damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.³⁴⁵

1. LOST PROFITS APPROACH

In general, patent holders will attempt to recover damages under a “lost profits” approach rather than a “reasonable royalty” approach because the recovery can be greater.³⁴⁶ In order to obtain damages under the “lost profits” approach, the patent holder must satisfy four conditions:

To obtain as damages the profits on sales he would have made absent the infringement, *i.e.*, the sales made by the infringer, a patent owner must prove: (1) demand for the patented product, (2) absence of acceptable noninfringing substitutes, (3) his manufacturing and marketing capability to exploit the demand, and (4) the amount of the profit he would have made.³⁴⁷

In order to meet the second requirement — the absence of acceptable noninfringing substitutes — the patent holder must prove “either that (1) the purchasers in the marketplace generally were willing to buy the patented product for its advantages, or (2) the specific purchasers of the infringing product purchased on that basis.”³⁴⁸ It has been stated that the vagueness of this requirement, “accounts for more appellate litigation . . . than any other aspect of patent damages law.”³⁴⁹ In regard to the fourth element — the amount of profit that the patent holder would have made — “the additional units sold by the infringer may be proven from the infringer’s records . . . any inaccuracy or omission in the infringer’s records is resolved in favor of the patentee. This burden on

344. CHISUM ET AL., *supra* note 26, at 1223.

345. 35 U.S.C. § 284 (2000). In addition, the court has discretion to “increase the damages up to three times the amount found or assessed” if the infringement was “willful,” *id.* § 284, and may award reasonable attorney fees in “exceptional cases.” *Id.* § 285.

346. See CHISUM ET AL., *supra* note 26, at 1252 (“Lost profits are usually the first choice of the patent owner because they provide the possibility of greater recovery . . .”).

347. *Panduit Corp. v. Stahl Bros. Fibre Works*, 575 F.2d 1152 (6th Cir. 1978).

348. *Standard Havens Prods., Inc. v. Gencor Indus., Inc.*, 953 F.2d 1360, 1373 (Fed. Cir. 1991).

349. Paul M. Janicke, *Contemporary Issues in Patent Damages*, 42 AM. U. L. REV. 691, 701 (1993) (*quoted in* CHISUM ET AL., *supra* note 26, at 1230).

the infringer extends to any uncertainty regarding the amount of approximate marginal profit for each individual unit.”³⁵⁰

In regard to calculating lost profits, the Court of Appeals for the Federal Circuit has indicated that only incremental costs may be deducted from lost revenue — in effect, this approach (called the “incremental cost” approach) ignores fixed costs.

The incremental income approach to the computation of lost profits is well established in the law relating to patent damages. The approach recognizes that it does not cost as much to produce unit N + 1 if the first N (or fewer) units produced already have paid the fixed costs. Thus, fixed costs — those costs which do not vary with increases in production, such as management salaries, property taxes, and insurance — are excluded when determining profits.³⁵¹

In some cases the profit margin can be rather high, as indicated by the following cases:

Profit Margin	Case ³⁵²
92%	Pfizer Inc. v. International Rectifier Corp. ³⁵³
83%	Kalman v. Berlyn Corp. ³⁵⁴
45%	Kerwit Medical Prods. v. N & H Instruments ³⁵⁵

Also, in several patent infringement cases, the total amount of lost profits has been substantial.

Amount of Lost Profits*	Case ³⁵⁶
\$873,158,971	Polaroid Corp. v. Eastman Kodak Co. ³⁵⁷
\$211,499,731	Haworth Inc. v. Steelcase Inc. ³⁵⁸
\$204,809,349	Smith Int'l. Inc. v. Hughes Tool Co. ³⁵⁹

350. CHISUM ET AL., *supra* note 26, at 1233.

351. Paper Converting Mach. Co. v. Magna-Graphics Corp., 745 F.2d 11, 22 (Fed. Cir. 1984) (emphasis added). In regard to the burden of proof, the patent holder has the burden to establish a reasonable view of the incremental costs, and then the alleged infringer has the burden to show that the patentee's proofs are unreasonable. See also John O. Butler Co. v. Block Drug Co., 620 F.Supp. 771, 778-79 (N.D. Ill. 1985) (*cited in* CHISUM ET AL., *supra* note 26, at 1234).

352. These cases are discussed in CHISUM ET AL., *supra* note 26, at 1234.

353. 218 U.S.P.Q. 586, 598 (C.D. Cal. 1983).

354. 9 U.S.P.Q.2d 1191, 1194-98 (D. Mass. 1988).

355. 224 U.S.P.Q. 679, 689-90 (N.D. Tex. 1984).

356. These cases are listed and discussed in Jennifer L. Knabb & Michael J. Jeffords, *Trends in Patent Infringement Damages*, ABA INTELLECTUAL PROPERTY LAW NEWSLETTER 22 (Spring, 2003).

357. 17 U.S.P.Q.2d 1711 (D. Mass. 1991) (awarding lost profits, royalties, and interest). Over \$400 million of the award was interest. Knabb & Jeffords, *supra* note 355, at 25.

358. 43 U.S.P.Q.2d 1223 (W.D. Mich. 1996).

359. 229 U.S.P.Q. 81 (C.D. Cal. 1986).

\$178,000,000	Proctor & Gamble Co. v. Paragon Trade Brands, Inc. ³⁶⁰
\$128,700,000	Fonor Corp. and Dr. Raymond V. Damadian v. General Electric Co. ³⁶¹
\$116,797,696	3M v. Johnson & Johnson Orthopedics ³⁶²
\$98,100,000	BJ Servs. Co. v. Halliburton Energy Servs. Co. ³⁶³
\$85,000,000	Mobil Oil Corp. v. Amoco Chem. Co. ³⁶⁴
\$72,750,704	Stryker Corp. and Osteonics Corp. v. Intermedics Orthopedics Inc. ³⁶⁵
\$70,600,000	Odetics Inc. v. Storage Tech. Corp. ³⁶⁶
\$61,000,000	Harris Corp. v. L.M. Ericson Tel. Co. ³⁶⁷
\$46,000,000	Honeywell Int'l., Inc. v. Hamilton Sundstrand ³⁶⁸

*In many cases, these amounts include interest.

2. REASONABLE ROYALTY APPROACH

If the patent holder cannot meet the burden for proving lost profits, she can recover a reasonable royalty as a result of the infringement.³⁶⁹ In determining a reasonable royalty rate, a court may consider many factors, including

the established profitability of the product made under the patent, its commercial success, its current popularity, . . . [t]he utility and advantage of the patent . . . over the old modes or devices, if any, that had been used for working out similar results, . . . [t]he portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses, . . . [and] the portion of the realizable profits that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the

360. 989 F. Supp. 547 (D. Del. 1997).

361. 41 U.S.P.Q.2d 1088 (E.D.N.Y. 1995).

362. See Knabb & Jeffords, *supra* note 356, at 24.

363. No. H-00-0948 (S.D. Tex. 2002) (involving techniques for increasing the yield of oil wells) (*cited in* Knabb & Jeffords, *supra* note 356, at 29 n.7); see also B.J. Servs. Co. v. Halliburton Energy Servs., 338 F.3d 1368 (Fed. Cir. 2003).

364. 915 F. Supp. 1333 (D. Del. 1994); see also Knabb & Jeffords, *supra* note 356, at 24.

365. 891 F. Supp. 751 (E.D.N.Y. 1995), *aff'd*, 96 F.3d 1409 (Fed. Cir. 1996) (earlier stage of litigation in which the court concluded that evidence supported an award of \$26,348,984 in lost profit damages); see also Knabb & Jeffords, *supra* note 356, at 24 (reporting a total award of \$72,750,704).

366. 185 F.3d 1259 (Fed. Cir. 1999) (reporting an award of \$70.6 million in damages) (discussed in Knabb & Jeffords, *supra* note 356, at 24).

367. No. 98 CV-2903 (N.D. Tex. 2002) (involving cell phones) (*cited in* Knabb & Jeffords, *supra* note 356, at 29 n.8).

368. 166 F. Supp. 2d 1008 (D. Del. 2001) (involving aircraft technology).

369. 35 U.S.C. § 284 (2000) ("Upon finding for the [patent holder] the court shall award the [patent holder] damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use of the invention by the infringer . . .") (emphasis added).

infringer.³⁷⁰

In determining the amount of a reasonable royalty, courts have recognized that the "licensee" [or in an infringement case, the infringer] would make a reasonable profit.³⁷¹ As a result, the amount of the royalty paid to the licensor (or in an infringement case, the patent holder) is reduced by the amount necessary to allow the licensee [the infringer] to make a reasonable profit. As a result, it can be argued that the reasonable royalty represents the value of the patent holder's market power.

In reviewing awards from 1982-2002, commentators have stated:

Overall, of the cases in which a reasonable royalty was awarded, approximately 60% had reasonable royalty rates in the range of 5% to 19.9%. The remaining 40% of the cases were split evenly between reasonable royalty rates less than 5% and . . . greater than or equal to 20%.³⁷²

In several cases, patent holders have received "reasonable royalties" at rates of 25% or more, as indicated in the following chart:³⁷³

ROYALTY RATE	CASE ³⁷⁴
70%	Hartness Int'l., Inc. v. Simplimatic Eng'g ³⁷⁵
35%	Williams v. Skid Recycling, Inc. ³⁷⁶
30%	General Surgical Innovations, Inc. v. Origin Medsystems, Inc. ³⁷⁷
30%	TP Orthodontics v. Prof'l Positioners ³⁷⁸
30%	Trans-World Mfg. Co. Inc., v. Dure Corp. and Kiddie, Inc. ³⁷⁹
25%	Additive Controls & Measurement Sys., Inc. v. Flowdata, Inc. ³⁸⁰

370. *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D. N.Y. 1970) (discussing 15 factors).

371. *Georgia-Pacific Corp. v. United States Plywood Corp.*, 446 F.2d 295 (2d Cir. 1971); *TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895 (Fed. Cir. 1986) (under the "analytical approach," the "infringer's usual or acceptable net profit" is deducted from "the anticipated net profit realized from sales of the infringing devices").

372. *Knabb & Jeffords*, *supra* note 356, at 27.

373. For a general discussion of reasonable royalty rates awarded in patent infringement cases, see *id.* at 27-28.

374. See also *Knabb & Jeffords*, *supra* note 356.

375. 819 F.2d 1100 (Fed. Cir. 1986).

376. See *Knabb & Jeffords*, *supra* note 356, at 28.

377. *Id.*

378. 17 U.S.P.Q.2d 1497 (E.D. Wis. 1990) (regarding the damage phase of the patent infringement suit), *aff'd*, 980 F.2d 743 (Fed. Cir. 1992); see also *Knabb & Jeffords*, *supra* note 356, at 28 (stating the 30% royalty amount).

379. See *Knabb & Jeffords*, *supra* note 356, at 28.

380. 96 F.3d 1390 (Fed. Cir. 1996) (stating that a 25% royalty would be charged for prior sales and a 50% royalty would apply to future sales); *Additive Controls & Measurement Sys., Inc. v.*

25%	Joy Tech. Inc. v. Flekt Inc. ³⁸¹
25%	Pentech Int'l Inc. v. Leon Hayduchok ³⁸²
25%	Smithkline Diagnostics v. Helena Labs. ³⁸³

IX. SPECIALIZATION, ECONOMIES OF SCALE, AND THE ECONOMIC PROBLEMS WITH INEFFICIENT PRODUCERS

Based on the analysis set forth above, while most patents create no market power,³⁸⁴ it seems likely that a patent holder who would be able to sell his or her patent for a substantial amount would have market power. These patent holders face a downward sloping demand curve, which can result in economic inefficiencies. Most important, the price for the product will be higher than in a competitive market (the price will be above marginal cost), and the quantity consumed will be smaller than in a competitive market. As explained below, this Article recommends a change in the tax law to encourage corporate inventors to sell patents to efficient producers.³⁸⁵ This recommendation can have three major benefits. First, if the patented product is produced by an efficient producer, this should reduce the price and increase the quantity consumed (thereby improving economic efficiency). Second, it will provide the corporate inventor with the opportunity to specialize in research and development, thus stimulating greater invention. Third, the sale of a patent by a research and development firm may provide the firm with additional capital that can be used for additional inventive activity. Before turning to the specific recommendation, this Article will discuss the economic benefits of specialization and efficient production.

A. *The Division of Labor and Individuals*

As stated above, the efficiency of an economic system can be measured by its ability to maximize production, and maximize consumer satisfaction.³⁸⁶ The division of labor, also called specialization, is recognized as a key element of maximizing production.³⁸⁷ Specialization

Flowdata, Inc., 986 F.2d 476 (Fed. Cir. 1993) (considering injunctive relief); see also Knabb & Jeffords, *supra* note 356, at 28 (stating the 25% royalty amount).

381. See Knabb & Jeffords, *supra* note 356, at 28.

382. 931 F. Supp. 1167 (S.D.N.Y. 1996) (*discussed in* Knabb & Jeffords, *supra* note 356, at 28).

383. Smithkline Diagnostics v. Helena Laboratories, 926 F.2d 1161, 1162 (Fed. Cir. 1991) (25% royalty) (listed in Knabb & Jeffords, *supra* note 356, at 28).

384. See *supra* note 52 and accompanying text.

385. See *infra* notes 479-501 and accompanying text.

386. See *supra* notes 68-69 and accompanying text.

387. STIGLITZ, *supra* note 9, at 52 ("That production is greater with specialization than with self-sufficiency is one of the most fundamental principles in economics"). See also *id.* at 53 (Adam Smith begins his classic book, *The Wealth of Nations* (1776), with a long study of the

occurs when people concentrate their efforts on a particular, sometimes narrow, set of tasks. "Specialization permits each person and region to use to best advantage any particular differences in skills and resources."³⁸⁸

The present-day economy is characterized by an elaborate degree of specialization and an intricate division of labor.

. . . .

One of the major differences between a modern economy and that of frontier days is found in the extensive division of labor and specialization of the modern work force. Our standards of living today are vastly higher than those of an earlier age because of the economics of mass production, which is in turn made possible by specialization.³⁸⁹

Specialization also allows an individual to improve her skills (at the particular tasks) by continually performing the same tasks — in other words, a specialist will be more productive than a jack-of-all-trades.³⁹⁰

B. *Specialization by Corporations*

While specialization by individual workers is the norm, the extent to which corporations specialize varies from industry-to-industry, and can vary among the corporations in an industry.³⁹¹ There are several functions that a corporation might perform in connection with producing a product. Typical functions include research, development, testing, engineering, manufacturing, marketing, wholesale distribution and retail distribution. With respect to any particular product, there can be many other functions and sub-functions.³⁹² A specialized corporation would have one function that it might apply in connection with many products and geographic regions. For example, a corporation with expertise in producing steel might manufacture steel for use in many different products sold by many different corporations — it would focus on its core business of producing steel, and sell its steel as a raw material (or component part) to other corporations that specialize in producing particular products. In effect, the steel manufacturer chooses to make steel, rather than trying to make the steel and then manufacture a myriad of products made of steel. Similarly, a research firm might stick to its specialty of performing research and selling the fruits of its research to many corpo-

division of labor, pointing out that one unskilled worker engaged in pin-making by himself likely would make fewer than twenty pins in one day, but in a small factory employing the division of labor, production could exceed 4,800 pins per worker per day!).

388. SAMUELSON & NORDHAUS, *supra* note 65, at 48.

389. *Id.*

390. STIGLITZ, *supra* note 9, at 52.

391. HYMAN, *supra* note 143, at 178.

392. For example, depending on the product involved, different functions might include the production of raw materials, acquisition of component parts, transportation, and assembly.

rations for use in a wide variety of products, rather than trying to manufacture and sell products based on the inventions it makes.

Under the division of labor theory, a corporation will be a low-cost or efficient producer when performing its specialty, and based on the principle of the learning curve,³⁹³ when a corporation attempts to perform a different function, it will tend to be less efficient than other firms which specialize in that function (for at least some period of time). Nevertheless, many corporations do not stick to their specialty.

C. *Vertical Integration (the Opposite of Specialization)*

The opposite of specialization by a corporation is referred to as vertical integration. Vertical integration describes a corporation's expansion into other functions (in which it may have no expertise) relating to one product.³⁹⁴

There are many examples of vertically integrated businesses that perform nearly all the tasks related to a particular product. For example, the auto industry spends substantial amounts on research and development, engineering, manufacturing, marketing and distribution, and frequently maintains various controls over the ultimate sellers — the car dealers.³⁹⁵ Also,

Holiday Inns, in rapidly expanding its number of inns, diversified into carpeting, candies, furniture items, food-stuffs, and a school of motel management — all of which complemented its main product and serve to supply its 1000-plus inns with basic support services.³⁹⁶

393. See STIGLITZ, *supra* note 9, at 417 (“As firms gain experience from production, their costs fall. This kind of technological change is called learning by doing. This systematic relationship between cumulative experience and costs [is] often called the learning curve . . .”).

394. THOMPSON, *supra* note 190, at 428-29.

395. In regard to methods for conducting the distribution function, one commentator has stated:

[F]or reasons of security and uncertainty reduction, firms with mass production capability may be motivated to integrate forward and develop their own distribution outlets. Access to product markets must be dependable. Where ownership of distribution channels is impractical, the large corporation may employ such strategic devices as franchise systems, leasing provisions, and exclusive-dealing arrangements to give it a stronger foothold in dealing with wholesale and retail outlets. For instance, while most gasoline service stations are independently operated, the facilities may be leased to the operator by the brand-name refiner under terms which permit the refiner to maintain a watchful eye over operating procedures and merchandising policies. In a similar vein, a large manufacturer often grants a wholesaler or a retailer an exclusive franchise to handle its product in a specified geographic area; in return, the franchisee agrees to conform to certain prices, terms of credit, customer service policies, and product guarantees and warranties. Exclusive dealerships are commonly found in tires, automobiles, fast-food firms, articles of clothing, sporting goods, appliances, and paints.

Id. at 430-31.

396. *Id.* at 430.

In addition, vertical integration is common in the oil industry, with refiner-marketer firms tending to integrate backward to be involved in exploration and drilling, and crude-oil producers tending to integrate forward into refining and retail distribution.³⁹⁷ Also, major brand-name pharmaceutical firms do not restrict their activities to research and development; instead, they spend substantial amounts on manufacturing, marketing, and distribution.³⁹⁸

However, there are industries in which different corporations specialize in different parts of the supply function. For example, in the building trade, frequently a building will be designated by an architectural firm; a different firm will act as the general contractor for the building, and a great variety of corporations may be involved as subcontractors — one corporation may perform the steel or concrete work; a separate corporation may do the electric; a separate corporation may do the plumbing; a separate corporation may do the heating and air conditioning; and a separate corporation may do the doors and windows. Similarly, it has been noted that many of the firms that sell personal computers are assemblers.³⁹⁹ “They buy circuit boards, cases, monitors, and keyboards in bulk, assemble the parts into personal computers, and sell them.”⁴⁰⁰

Why doesn't the architectural firm expand into general contracting and the various subcontracting functions (electrical, plumbing, etc.) so that they can control the entire project from start to finish? Why doesn't a company that makes component parts for personal computers form a new division and assemble personal computers? Why doesn't the firm that assembles the computer parts form new divisions to produce the computer parts? These are questions that every business considers, and the answers help determine the size of the corporation.⁴⁰¹

397. *Id.* at 428-29.

398. *See, e.g.,* PFIZER, INC., 2002 ANNUAL REPORT 31 (2003) (For 2002, research and development (R&D) expenses were 16% of sales; cost of sales (C of S) expenses (presumably manufacturing costs) were 12.5% of sales; and selling, informational and administrative expenses (SIA) were 33.5% of sales; for 2001, R&D expenses were 16.5% of sales; C of S expenses were 13.2% of sales; and SIA expenses were 33.5% of expenses; and for 2000, R&D expenses were 16.8% of sales; C of S were 14.4% of sales; and SIA expenses were 36.7% of expenses).

399. STIGLITZ, *supra* note 9, at 499.

400. *Id.* (“In the case of the personal computer market, there is a great deal of decentralization. Companies make extensive use of the market”).

401. *Id.* at 500.

At one time, U.S. Steel owned its own iron ore mines and its own fleet of vessels to transport the iron ore. It not only produced the pig iron, it also used the pig iron to make refinished steel products, such as the beams used in construction. Ford Motor Company at one time owned its own steel mill, for producing the steel used in making its cars.

D. *Economies of Scale, Transaction Costs, and Other Considerations in Deciding Whether to Specialize or Vertically Integrate*

When a firm attempts to vertically integrate, it sacrifices a degree of specialization — in effect, the corporation becomes more of a “jack-of-all-trades” rather than a specialist.

[V]ertical integration of various stages of production isn't always successful in increasing profits. *In many cases companies give up the advantages of specialization and large scale production when they try to become their own supplier. Before a firm can assess the impact of vertical integration on profits, it must carefully weigh the gains from lower transaction costs against possible increases in costs for diseconomies.*⁴⁰²

A firm that attempts to perform a new function (in order to vertically integrate) likely will be less efficient at performing that function (at least for some time) than the firm that specializes in that function. “As firms gain experience from production, their costs fall. This kind of technological change is called learning by doing. This systematic relationship between cumulative experience and costs [is] often called the *learning curve*”⁴⁰³

A key factor when a corporation considers whether to perform a particular function or not is the transaction costs of using an outside supplier or service provider.⁴⁰⁴ If a corporation uses an outside supplier or service provider, the corporation will have to pay for the materials or services provided by the outsider. In addition, there will be costs associated with choosing among the various vendors, negotiating a contract or other arrangement with the chosen vendor, arranging the transaction,⁴⁰⁵ and maintaining the relationship. The corporation will need to weigh these transaction costs against all the costs that will be incurred if the corporation makes the materials or provides the services itself (for example, through a separate division of the corporation). The transaction costs for a research corporation would include the income tax liability if the research corporation sells its invention.

402. HYMAN, *supra* note 143, at 178 (emphasis added).

403. STIGLITZ, *supra* note 9, at 417 (emphasis added); *see also supra* note 378.

404. HYMAN, *supra* note 143, at 177 (“A key factor in determining the degree of vertical integration of a firm is the transaction costs involved in contracting with other firms to provide services needed for the production or marketing of the firm’s output. Firms try to keep their transaction costs, as well as production costs, as low as possible to earn a higher profit”) (emphasis added); STIGLITZ, *supra* note 9, at 500-01 (“Ronald Coase of the University of California at Los Angeles was awarded the Nobel Prize in 1991 partly for his work in identifying the role of transaction costs in determining the ‘boundaries’ of the firm — what activities occur within a firm and what activities occur between firms”).

405. HYMAN, *supra* note 143, at 178.

There are several reasons why a corporation might prefer to be vertically integrated.⁴⁰⁶ First, if the corporation relies on an outside supplier, the corporation needs to consider the reliability and responsiveness of the supplier. For example, will the supplier respond to problems and scheduling constraints? A division within the same corporation may be much more responsive when problems arise.⁴⁰⁷

Second, if the corporation relies on an outsider, the outsider's business risks become business risks for the corporation. For example, if the outside supplier shuts down production because of a labor strike or problems with the firm's machinery, the corporation may not be able to obtain the materials or services that it needs. "[Vertical] integration internalizes such problems as labor disputes, rising production costs, production breakdowns, and delays in scheduled deliveries."⁴⁰⁸ Thus, relying on outsiders creates uncertainty for the corporation.⁴⁰⁹

Third, since there are outside firms ready to provide the products or services, presumably a profit can be made in providing the product or service (and the price paid by the corporation to the outsider includes a

406. It should be noted that there are varying degrees and approaches to vertical integration. In most cases the corporation will simply establish another division that will perform the new function. However, in the case of the distribution function, it is common to establish relationships with outsiders — such as franchisees, lessees, or dealers — which provide the corporation with a limited degree of control over the distribution function. See *supra* note 395. In regard to other creative approaches to vertical integration, see HYMAN, *supra* note 143, at 178 (discussing Toyota Motor Corporation's relationship with approximately 230 corporations which supply about 60% of Toyota's component parts, and which are called the Kyohokai, which means "Toyota Corporation Association").

Directors of Toyota usually serve as directors of the Kyohokai companies and Toyota usually owns a good proportion of the corporate stock of these suppliers.

Although Toyota deals with companies other than those of the *Kyohokai*, its unique relationship with these companies allows it to coordinate planning and other considerations to reduce transaction costs. It also helps Toyota achieve the goals of its . . . system . . . so as to reduce inventory storage costs. The detailed planning with its affiliated companies allows Toyota to synchronize delivery of supplies and get the components from affiliated companies "just in time." This system of quasi-vertical integration through control and planning rather than full ownership of suppliers, has significantly reduced costs for the company.

Id. at 178.

407. THOMPSON, *supra* note 304, at 430 (vertical integration allows the corporation "to escape the disruptive influence of unreliable suppliers . . ."); HYMAN, *supra* note 143, at 177 ("By controlling its own production, a manufacturer can reduce or eliminate delays that might prevent it from shipping its orders on time").

408. THOMPSON, *supra* note 190, at 427 ("A firm is better able to control daily operating problems when they fall within the purview of its own management as opposed to when they are the problems of other managements").

409. *Id.* at 427 ("vertical integration spares a firm the uncertainty of being dependent on suppliers for crucial inputs, as well as what price must be paid for the inputs"). *Id.* at 430 ("To the extent that firms are integrated, they are insulated in part from demand-supply changes at each of the processing stages . . .").

profit margin). Although the corporation may have no expertise in creating the component (or providing the service), if the corporation can eventually develop the same level of expertise and efficiency as the outside supplier, presumably the corporation will be able to capture that profit.⁴¹⁰

Fourth, it may be possible for a division of the corporation to produce a higher quality product than an outsider.

Many managers believe that integrating their advertising operations rather than purchasing services from another firm results in higher-quality advertising. This is because the firm can keep its own advertising people informed about the development of new products at a lower cost than would be possible if the firm used an outside advertising agency.⁴¹¹

On the other hand, there are factors that may lead a corporation to specialize, rather than vertically integrate. First, by focusing on its "core" business, the corporation may achieve economies of scale and be a more efficient producer. By focusing on one task in the production chain and performing a high volume of the task, the corporation can become extremely efficient at that one task.⁴¹²

Second, by being involved in the supply function for a number of products, a corporation avoids "putting all of its eggs in one basket."⁴¹³ For example, if a company is vertically integrated in the personal computer market (making the parts, assembling the parts, marketing the computers, and distributing the computers) and is not involved in any other market, a downturn in the personal computer market would have very serious consequences for the corporation. In contrast, a corporation that makes circuit boards used in a variety of products might not experience financial difficulties if there is a downturn in the personal computer market if at the same time the demand increases for other products using its circuit boards.

One commentator gives the following example in describing a corporation's decision to perform an additional function itself (thereby increasing vertical integration) or specializing on its core function and relying upon an outsider to perform other functions.

Consider, for instance, the problem of a large manufacturing company that offers health insurance to its employees. The company

410. *Id.*

411. HYMAN, *supra* note 143, at 177.

412. STIGLITZ, *supra* note 9, at 500 ("The circuit board manufacturers have a much larger market than just personal computers so they can achieve *economics of scale* they would not enjoy if they restricted their output to supplying circuit boards for personal computers") (emphasis added).

413. *Id.*

could continue to pay premiums to an outside insurance company that would then be liable for any claims. Because of its large work force, however, the option of paying its employees' medical bills directly has become economically viable. The company could set up a division to run its health insurance [program], but then it will face . . . managerial . . . problems Although this company is good at manufacturing, it has no comparative advantage at running a health insurance company, and its managerial talent is scarce. Accordingly, the firm may find it cheaper, once these transaction costs are taken into account, to continue with the outside health insurance company. [In this case, it may be] more efficient to make use of the market in obtaining health insurance services.⁴¹⁴

"The advantages of vertical integration are likely to differ from industry to industry and from firm to firm."⁴¹⁵ Historically, there are examples of research firms.⁴¹⁶ However, today many firms that conduct extensive research (that lead to valuable patents) retain the patents and manufacture the patented products (and/or use the patented processes). For example, large brand-name drug companies that patent new drugs frequently manufacture and sell those new drugs themselves.⁴¹⁷ While these established firms in established industries now may have developed, to a greater or lesser extent, expertise in all phases relating to their particular product — research, manufacturing, marketing, and distribution — presumably the original start-up corporation that developed the new technology at one time was not an efficient manufacturer, marketer, or distributor. As described below,⁴¹⁸ if a patented product is manufactured, marketed, or distributed by a firm that is inefficient at those functions, the price of the patented product will be even higher, and the quantity consumed will be even smaller, than if those functions were performed by a corporation that specializes in that particular function.

In the absence of artificial restraints that discourage the sale of patents,⁴¹⁹ a corporate inventor might find it profitable to specialize in performing research, and selling the resulting patents.

414. *Id.* at 501.

415. HYMAN, *supra* note 143, at 178.

416. For example, Thomas Edison established the Menlo Park laboratory complex twenty-five miles from New York. See LARSEN, *supra* note 7, at 73.

417. See *supra* note 398.

418. See *infra* notes 422-26 and accompanying text.

419. The artificial restraint considered in this Article is an excessively high income tax burden on the sale of a patent (or the sale of a patentable invention). See *infra* notes 428-51 and accompanying text.

E. *Economic Problems Are Exacerbated by an Inefficient Producer*

As described above,⁴²⁰ a patent holder may have market power, which may cause economic inefficiencies.⁴²¹ If the patented product is made by an inefficient producer, the economic problems are exacerbated. Figure #17 shows a demand curve for a patented product (in which the patent holder has market power),⁴²² a supply curve (identified as S1-S1) assuming the product is produced by an efficient producer, and a supply curve (identified as S2-S2) assuming the product is produced by an inefficient producer.

Figure #17⁴²³ depicts a shift in the supply curve from the S1-S1 curve to the S2-S2 curve. As discussed above,⁴²⁴ a shift in the supply curve can be caused by many different factors.⁴²⁵ In Figure #17, the shift is caused by an increase in the costs of production. Figure #17 demonstrates that if it costs more to produce an item, at every price, the producer will produce a smaller quantity.⁴²⁶ In Figure #17, the quantity drops from Q1 to Q2. In addition, the leftward shift of the supply curve will cause the price of the product to increase. In Figure #17, the price increases from P1 to P2. Thus, the economic inefficiencies of the monopoly, oligopoly or monopolistic competition situation are exacerbated.

420. See *supra* notes 202-368 and accompanying text.

421. See *supra* notes 68-69 and accompanying text (describing economic efficiency).

422. The demand curve is downward-sloping because the market can be characterized as a monopoly, oligopoly or monopolistic competition situation. See *supra* notes 134-41 and accompanying text.

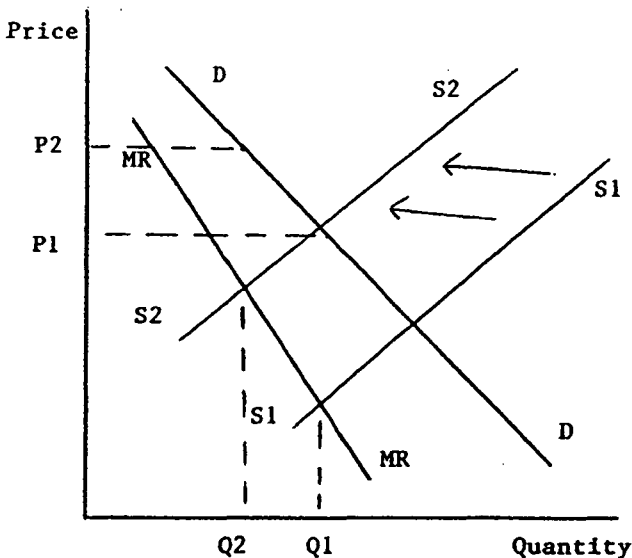
423. Figure #17 is based on Figure 4-8(ii) in LIPSEY, *supra* note 67, at 82.

424. See *supra* notes 86-90 and accompanying text.

425. A shift in the supply curve is caused by a change in any factor other than a change in the price of the good. LIPSEY, *supra* note 67, at 78. A change in quantity supplied caused by a change in the market price for the product is referred to as a move along the supply curve, rather than a shift of the supply curve. See SAMUELSON & NORDHAUS, *supra* note 65, at 61.

426. SAMUELSON & NORDHAUS, *supra* note 65, at 64 ("any leftward shift of the [supply] curve . . . raises prices, and by the law of downward-sloping demand, lowers quantity demanded"); see also LIPSEY, *supra* note 67, at 82 ("A fall in supply causes an increase in the equilibrium price and a decrease in the equilibrium quantity exchanged.")

FIGURE #17
 SHIFT IN THE SUPPLY CURVE CAUSED BY INEFFICIENT
 PRODUCTION (MONOPOLY, OLIGOPOLY, OR MONOPOLISTIC
 COMPETITION MARKET)



- D - D = Demand curve
 MR - MR = Marginal Revenue curve
 P1 = original price
 P2 = new price (with an inefficient producer)
 Q1 = original quantity
 Q2 = new quantity (with an inefficient producer)
 S1 - S1 = original supply curve
 S2 - S2 = new supply curve (with an inefficient producer)

The intuitive reasoning . . . is as follows:

. . . .

A reduction in supply creates a shortage at the initial equilibrium price that causes the price to be bid up. This increase in price reduces the quantity demanded, and the new equilibrium is at a higher price and a lower quantity exchanged.⁴²⁷

Thus, if patented products are manufactured, marketed and distributed by a firm which is inefficient at performing such functions (for example, a corporation with expertise in research but no expertise in manufacturing, marketing or distribution), the price of the product will be even higher, and the quantity consumed will be even smaller.

427. LIPSEY, *supra* note 67, at 83.

X. RECOMMENDATION: REDUCING THE EFFECTIVE INCOME TAX RATE ON A CORPORATE INVENTOR'S SALE OF A PATENT

This Article recommends that the effective income tax rate on the gain from the sale of a patent (or a patentable invention) by a corporate inventor be reduced to the tax rate applicable when an individual inventor sells a patent (or a patentable invention).

A. *Under Current Law, a Corporate Inventor Will Incur a Substantial Income Tax Liability on the Sale of a Patent.*

For income tax purposes, the gain on the sale of an asset equals the amount realized by the seller, minus the seller's tax basis in the property.⁴²⁸ The amount realized by the seller is any cash paid at closing along with the fair market value of any other property received (such as a promissory note).⁴²⁹

1. A CORPORATE INVENTOR USUALLY WILL HAVE NO TAX BASIS IN THE PATENT

Normally, when a taxpayer develops or purchases an asset that will generate revenue for many years in the future, the taxpayer will not be permitted to deduct the entire amount paid in the taxable year the asset is developed or purchased.⁴³⁰ Instead, the taxpayer will be required to treat the amount paid as a capital expenditure, and the amount spent will be deducted over the useful life of the asset (in the form of depreciation or amortization deductions).⁴³¹ The theory is that since the asset will generate revenue over many years, in order to accurately reflect net income, the related expenses should be deducted over the years that the asset will generate income.⁴³² This approach allocates expenses to the

428. I.R.C. § 1001(a).

429. *Id.* § 1001(b).

430. BORIS I. BITTKER & LAWRENCE LOKKEN, 1 FEDERAL TAXATION OF INCOME, ESTATES AND GIFTS ¶ 20.4.1, at 20-70 (3d ed. 1999) ("A cost that would otherwise be deductible under § 162 or § 212 cannot be deducted immediately if it is a capital expenditure. Very generally, a capital expenditure is a cost that will yield benefits in future years in the taxpayer's business or income-producing activities. Obvious examples are the costs of buildings and equipment"). I.R.C. § 263(a) ("No deduction shall be allowed for — any amount paid out for new buildings or for permanent improvements or betterments made to increase the value of any property or estate"). *But see* I.R.C. § 179 (basically permitting a taxpayer engaged in a trade or business to elect to deduct up to \$25,000 of business equipment acquired each year) (the amount has been increased to \$100,000 for property placed in service in tax years after 2002 as a result of the Jobs and Growth Tax Relief Reconciliation Act of 2003, Pub. L. No. 108-27, § 202(a)(1)); BITTKER & LOKKEN, *supra*, ¶ 23.9.1, at 32-127 (discussing I.R.C. § 179).

431. Depreciation and amortization deductions are claimed under I.R.C. §§ 167, 168.

432. One commentator has stated:

The capitalization principle also derives from the broader "matching" principle of accounting, which seeks to match, over time, expenditures with the income that the

taxable years in which the expenses help generate revenue, thereby "matching" expenses with the revenue created by the expenses.

However, an inventor receives a great tax benefit when it pays "research and experimental" expenses to develop an invention. Section 174(a) of the I.R.C. provides that a taxpayer that incurs research or experimental expenditures⁴³³ in the course of its trade or business will not be required to treat those expenses as capital expenditures, and instead, the inventor can claim an immediate income tax deduction for research or experimental expenditures.⁴³⁴ An inventor is even permitted to immediately deduct the cost of obtaining a patent (including attorney fees)⁴³⁵ even though the term of a patent ends twenty years from the date the patent application is filed.⁴³⁶ Thus, although a patent may generate revenue for up to 20 years, the inventor is permitted to deduct all research or experimentation expenses that contribute to obtaining the patent immediately as the expenses are paid.⁴³⁷

This is a tremendous tax advantage for inventors. In effect, I.R.C. § 174(a) allows inventors to "front-load" the deduction for research or experimental expenditures. This will reduce the inventor's income tax

expenditures "create." Thus, the purchase of rental property should not be debited to Expense, because the expenditure for the property is what creates the rental income to be received in future years. The matching idea then posits depreciation . . . as the appropriate means of allocating the purchase price of the rental property against future rental income by means of periodic debits to Depreciation Expense. In general, the accounting concept of "matching" mandates capitalization whenever a rational and systematic method can be devised for allocating the costs to future revenue and periods.

JOSEPH M. DODGE, *THE LOGIC OF TAX: FEDERAL INCOME TAX THEORY AND PRACTICE* 164 (1989).

433. The applicable regulations describe "research or experimental expenditures" as follows:

The term *research or experimental expenditures* . . . means expenditures incurred in connection with the taxpayer's trade or business which represent research and development costs in the experimental or laboratory sense. The term generally includes all such costs incident to the development or improvement of a product Expenditures represent research and development costs in the experimental or laboratory sense if they are for activities intended to discover information that would eliminate uncertainty concerning the development or improvement of a product. Uncertainty exists if the information available to the taxpayer does not establish the capability or method for developing or improving the product or the appropriate design of the product. Whether expenditures qualify as research or experimental expenditures depends on the nature of the activity to which the expenditures relate, not the nature of the product or improvement being developed or the level of technological advancement the product or improvement represents.

Treas. Reg. § 1.174-2(a)(1) (1980).

434. I.R.C. § 174(a). However, in the case of a C corporation subject to the alternative minimum tax, research or experimental expenses are amortized over 10 years. *See infra* note 439.

435. Treas. Reg. § 1.174-2(a)(2) (1980).

436. 35 U.S.C. § 154(a)(2) (2000).

437. *But see infra* note 439 (regarding Subchapter C corporations subject to the alternative minimum tax).

liability in the early years (when the research or experimental expenditures are incurred). Although depreciation deductions will not be available in future years (for the expenses that have already been deducted), it should be noted that the deferral of an income tax liability is a great benefit. As one commentator has stated, "A tax shelter is any technique that allows a person or company to eliminate, reduce or *delay* paying taxes on income A tax paid in the future costs less than one due today, and a 30-year deferral is the equivalent of not paying any tax."⁴³⁸ A taxpayer may elect to amortize research or experimental expenses over a period of not less than sixty months.⁴³⁹ However, based on the time value of money,⁴⁴⁰ it likely is advantageous for most corporations to immediately claim an income tax deduction for all research or experimental expenses.

For purposes of determining the gain on the sale of an asset, the "tax basis" of the property is deducted from the amount received.⁴⁴¹ The tax basis of an asset is the cost of the asset,⁴⁴² with adjustments.⁴⁴³ One of the adjustments is that the cost must be reduced for any amount deducted under I.R.C. § 174 as a research or experimental expense.⁴⁴⁴ Thus, an inventor likely will have a zero tax basis in its invention (because it will have deducted all of its expenses relating to the invention immediately under I.R.C. § 174).⁴⁴⁵ As a result, in most cases, the entire amount received from the sale of a patent will be a taxable gain subject to income tax.

438. David Cay Johnston, *A Shelter Can Be Simple, or Ornate*, N.Y. TIMES, July 13, 2003, at C1 (emphasis added).

439. I.R.C. § 174(b). It should be noted that if a corporation is subject to the alternative minimum tax, research or experimental expenses may not be deducted immediately, and instead must be amortized over 10 years. I.R.C. § 56(b)(2)(A) ("The amount allowable as a deduction under section . . . 174(a) in computing the regular tax for amounts paid or incurred after December 31, 1986, shall be capitalized and . . . shall be amortized ratably over the 10-year period beginning with the taxable year in which the expenditures were made [for alternative minimum tax purposes]"). Generally, a corporation will be subject to the alternative minimum tax if its annual gross receipts exceed \$7.5 million, I.R.C. § 55(e)(1)(A), and its alternative minimum tax liability would exceed its regular tax liability. *Id.* § 55(a).

440. Also, in most cases the corporation's effective tax rate will be the same every year. The corporate income tax rate on taxable income between \$75,000 and \$10 million is 34%; the rate on corporate taxable income over \$10 million is 35%. I.R.C. § 11(b)(1)(C) & (D).

441. *Id.* § 1001(a).

442. *Id.* § 1012.

443. *Id.* § 1016.

444. *See id.* § 1016(14) (relating to amounts amortized under I.R.C. § 174(b)).

445. One commentator has noted, "[I]n many cases . . . the taxpayer will have little or no basis in [the] patent. This is due to the expensing of most research and experimental expenditures under § 174." Falk, *supra* note 59, at A-20.

2. THE CORPORATE INVENTOR'S GAIN ON THE SALE OF A PATENT
WILL BE TAXED AT ORDINARY INCOME TAX RATES

In contrast to an individual,⁴⁴⁶ a corporation is subject to the same income tax rate on capital gains and ordinary income.⁴⁴⁷ As a result, a corporation will pay the same rate of income tax whether the gain is ordinary income or capital gain.⁴⁴⁸ The federal corporate income tax rates for 2003 are as follows:⁴⁴⁹

TAXABLE INCOME	TAX RATE
\$0 to \$50,000	15%
Over \$50,000 to \$75,000	25%
Over \$75,000 to \$10 million	34%
Over \$10 million	35%

In addition to the federal income tax, the gain may be subject to state corporate income tax. The rates charged by the different states vary greatly. Some states with particularly high corporate income tax rates are: Iowa 12%; North Dakota 10.5%; Pennsylvania 9.99%; and Minnesota 9.8%.⁴⁵⁰ The maximum corporate income tax rate for California is 8.84%.⁴⁵¹ Thus if a corporate inventor sells a patent in a high income tax state, the corporation may need to pay more than 40% of the total sales price in income tax in the year of sale. This tax may be avoided by not selling the patent. As a result, under current law, corporate inventors may be motivated to retain the patent (and exploit the invention itself) rather than selling the patent.

446. In the case of an individual, capital gains are taxed at lower income tax rates. For 2003, with respect to ordinary income, the maximum tax rate on individuals is 35%. See I.R.C. § 1(a) – (d), as amended by the Jobs and Growth Tax Relief Reconciliation Act of 2003, Pub. L. No. 108-27, § 105(a) (applicable for tax years beginning after December 31, 2002). This 35% rate will apply to: (i) married individuals filing joint returns, surviving spouses, heads of households, and unmarried individuals, with taxable income in excess of \$250,000; and (ii) married individuals filing separately with taxable income in excess of \$125,000. In contrast, net long-term capital gains generally will be taxed at a maximum rate of 15%. I.R.C. § 1(h), as amended by the Jobs and Growth Tax Relief Reconciliation Act of 2003, Pub. L. No. 108-27, § 301(a)(2)(A).

447. See I.R.C. § 1201(a) (imposing an “alternative” maximum tax on corporate net long-term capital gains of 35% — this provision has no impact since the maximum tax rate on corporations under I.R.C. § 11 is 35%). Prior to 1987, the alternative corporate tax rate on capital gains could have an impact. See BITTKER & LOKKEN, *supra* note 430, ¶ 42.2.5, at 46-17, 46-18.

448. However, the characterization of a gain for a corporation as ordinary income or capital gain is still relevant. *Id.* ¶ 46.3.2, at 46-20 (“A corporation’s capital losses are only deductible against capital gains. Unlike individuals, corporations are wholly prohibited from using capital losses to reduce ordinary income”).

449. I.R.C. § 11(b)(1).

450. State Tax Guide — All States (CCH), ¶ 10,040, at 2529.

451. *Id.*

3. "LOCK-IN" EFFECT OF A HIGH INCOME TAX ON A SALE

In the case of an individual, a primary reason for allowing a lower tax rate on long-term capital gains is to avoid the "lock-in" effect.⁴⁵² The lock-in effect can be illustrated by the case of an individual holding a highly appreciated publicly traded security.

EXAMPLE #4. Professor Joel has done extremely well in the stock market. He was able to buy-in early and secure a substantial stock position in Rhodes, Inc. many years ago for \$100,000. Today, Professor Joel's Rhodes shares are worth \$1 million. If the gain on the Professor's sale would be subject to tax as ordinary income, assuming the Professor is subject to the 35% federal income tax rate and a 5% State income tax rate, on a sale of the Rhodes stock, Professor Joel would need to pay income taxes of approximately \$360,000.⁴⁵³ As a result, after the sale for \$1 million, he would be left with only approximately \$640,000 after-tax. Professor Joel believes that Rhodes, Inc. has seen its best days, and all other things being equal he would prefer to sell the Rhodes stock and buy stock of Admiralty, Inc., which has a dynamic business plan. However, Professor Joel may feel that he is "locked-in" by the potential income tax that would be incurred on a sale of the Rhodes stock. Basically, the high tax means that the Professor will only sell the Rhodes stock if he is extremely confident about Admiralty, Inc. (and/or extremely pessimistic about Rhodes, Inc.). The Professor will not make the sale if he believes that he will ultimately end up with more money if he has \$1 million invested in Rhodes than if he has \$640,000 invested in Admiralty, Inc.

The "lock-in" effect is economically inefficient.⁴⁵⁴ Investors should move their money to the company that has the best potential for

452. Commentators have stated:

A high rate of tax on capital gains may impede economic efficiency by deterring the taxpayer from making economically desirable sales and reinvestments. . . .

A capital gain preference can be justified as an attempt to reduce this locking-in effect by mitigating the tax burden imposed on realized gains. The preference promotes economic efficiency by reducing the disincentive to investors of making those switches in investments that they would make in the absence of taxes.

ALAN GUNN & LARRY D. WARD, *FEDERAL INCOME TAXATION* 622 (3d ed. 1992). See DODGE, *supra* note 432, at 315 ("The realization principle . . . interferes with the mobility of capital . . . [t]his tendency of the tax system to 'lock-in' appreciating investments is aggravated by the [I.R.C.] § 1014 basis rule, which forgives unrealized appreciation at death").

453. The gain on the sale would be \$900,000. I.R.C. § 1001(a) (the amount realized of \$1 million minus his tax basis of \$100,000). At a 40% tax rate, the tax would be \$360,000 (which is 40% of \$900,000). This example ignores any federal deduction for the state income tax paid and ignores any state income tax deduction for the federal income tax paid.

454. See GUNN & WARD, *supra* note 452, at 622 ("the capital gain preference promotes economic efficiency by reducing the disincentive to investors of making those switches in investments that they would make in the absence of taxes").

economic growth. Otherwise, a new start-up company with great plans may not be able to obtain sufficient capital to implement its strategy. As a result, the economy will tend to stagnate, with capital trapped inside companies that have performed well in the past, but are not using their capital effectively today.

In light of the lock-in effect (and other policy objectives),⁴⁵⁵ generally individuals have been taxed at a lower income tax rate on net long-term capital gains.⁴⁵⁶ The lower rate improves economic growth because it allows capital to flow more freely.

In the case of a patent held by a corporate inventor, if the corporation will have to pay approximately 40% of the total sale proceeds in income tax, the corporate inventor may conclude that its economic value is “locked-in” — that the patent should not be sold, even if another firm could more effectively manufacture, market, and sell the patented product.

EXAMPLE #5. The Reverend Praiseworthy has been working on an “automatic pilot” feature for use in passenger automobiles. Because of the potential liability involved, the Reverend and his followers have formed Traveler’s Angel, Inc., which is taxed under Subchapter C of the Internal Revenue Code. Traveler’s Angel, Inc. is subject to the 35% federal income tax rate, and an 8% state income tax rate. After a miracle breakthrough, Traveler’s Angel, Inc. obtains a patent on the automatic pilot technology. The product will be called the “Path-Finder,” and the slogan will be, “It’s almost like getting there by faith alone!” While Traveler’s Angel, Inc. has discovered how to make the device work, substantial design, engineering, manufacturing, marketing and selling work will need to be done before the Path-Finder can be purchased by consumers. Neither Reverend Praiseworthy nor any of his followers have any expertise or experience in the type of design and engineering work that will need to be done, and they have no expertise or experience in manufacturing, marketing, or selling. Wrong Way Pioneers, Inc. offers Traveler’s Angel, Inc. \$10 million for the invention. However, if Traveler’s Angel, Inc. accepts the offer, it will need to pay 43%⁴⁵⁷ of the total sales proceeds for

455. See *id.* at 621-23 (other policy considerations include (i) that a lower tax rate is appropriate because the gain from a sale “bunches” the taxable income into one year even though the increase in value may have occurred over many years; (ii) the lower capital gain rate encourages capital formation; and (iii) a significant part of the gain on the sale may be caused by inflation, so the amount of the gain may not reflect a true increase in economic wealth).

456. For 2003, the maximum individual income tax rate is 35%, and the maximum long-term capital gain rate generally is 15%. See I.R.C. § 1(a)-(d) (35% rate); *id.* § 1(h)(1)(C) (15% rate).

457. This example ignores any state deduction that may be available for federal taxes paid, and ignores any federal deduction that may be available for state taxes paid.

income taxes,⁴⁵⁸ and will have only \$5.7 million remaining. Alternatively, Traveler's Angel, Inc. can retain the patent (worth \$10 million), and attempt to perform the necessary engineering, design, manufacturing, marketing, and selling work. Although Traveler's Angel, Inc. will be inefficient at these functions, and the Path-Finder will have to be sold at a higher price, Traveler's Angel, Inc. may conclude that their after-tax return will still be higher if they retain the patent and perform these functions inefficiently, than if they sell the patent and pay the tax.

B. *Contrast to Sales by Individuals, Partnerships, and Limited Liability Companies*

While corporations are not entitled to a reduced income tax rate on the sale of a long-term capital asset,⁴⁵⁹ individuals are subject to lower tax rates on net long-term capital gains. For individuals, the maximum federal income tax rate on ordinary income is 35% (for 2003).⁴⁶⁰ As a result of the Jobs and Growth Tax Relief Reconciliation Act of 2003, for sales made by individuals after May 6, 2003, the gain on the sale of a long-term capital asset will generally be subject to a maximum federal income tax rate of 15%.⁴⁶¹ For individuals in the top marginal income tax bracket (on ordinary income), this represents a 20% savings.

1. TAXATION OF AN INDIVIDUAL WHO SELLS A PATENT — 15% MAXIMUM TAX RATE

Prior to 1954, there were disputes regarding whether an individual's sale of a patent qualified for the lower long-term capital gain rates.⁴⁶² In 1954, Congress enacted I.R.C. § 1235, which allows an indi-

458. This example assumes that Traveler's Angel, Inc. deducted all research and experimental expenditures immediately when those amounts were paid. I.R.C. § 174(a).

459. See *supra* note 447 and accompanying text.

460. I.R.C. § 1(a)-(d).

461. *Id.* § 1(h)(1)(C), as amended by the Jobs and Growth Tax Relief Reconciliation Act of 2003, P. L. No. 108-27, § 301(a)(2)(A).

462. There were at least three reasons for these disputes. First, long-term capital gain treatment generally is not available for the sale of inventory sold in the regular course of a taxpayer's trade or business. Thus, disputes could arise over whether an inventor was in the "trade or business" of selling inventions. The House Report for the Revenue Act of 1950 would have eliminated patents from the definition of "capital assets" and thereby would have prevented the gain from the sale of a patent from being taxed at the favorable long-term capital gain rates. H.R. REP. NO. 2319, at 420-21 (1950); *reprinted in* 1950-2 C.B. 380, 420-21.

Second, it could be argued that the gain from the sale of a patent derives from the inventor's personal efforts, and as a result the gain should be taxed in the same way as wages. *Id.*

Third, prior to the enactment of section 1235, the IRS announced that it would consider a payment to be a royalty (taxable as ordinary income) "if [the] payment is measured by the production, sale or use of the property transferred or if it is payable periodically over a period generally coterminous with the transferee's use of the patent." See S. REP. NO. 1622, 83d Cong.,

vidual inventor to qualify for a lower income tax rate on the sale of a patent (or a patentable invention). I.R.C. § 1235(a) provides:

A transfer (other than by gift, inheritance, or devise) of property consisting of all substantial rights to a patent, or an undivided interest therein which includes a part of all such rights, by any *holder* shall be considered the sale or exchange of a capital asset held for more than 1 year, regardless of whether or not payments in consideration of such transfer are —

- (1) payable periodically over a period generally coterminous with the transferee's use of the patent, or
- (2) contingent on the productivity, use, or disposition of the property transferred.⁴⁶³

The term "holder" is defined as "any individual whose efforts created such property . . ."⁴⁶⁴ Since the term "holder" is specifically defined as an "individual," "[c]orporations, including S corporations, cannot qualify as holder under any circumstances,"⁴⁶⁵ and therefore cannot benefit from I.R.C. § 1235.

2. SALES BY PARTNERSHIPS AND LIMITED LIABILITY COMPANIES

Although I.R.C. § 1235(b) defines a "holder" as an "individual," the regulations indicate that individuals doing business as a partnership may benefit from I.R.C. § 1235.

Although a partnership cannot be a holder, each member of a partnership who is an individual may qualify as a holder as to his share of a patent owned by the partnership. For example, if an inventor who is a member of a partnership composed solely of individuals uses partnership property in the development of his invention with the understanding that the patent when issued will become partnership property, each of the inventor's partners during this period would qualify as a holder. If, in this example, the partnership were not composed solely of individuals, nevertheless, each of the individual partner's distributive share of income attributable to the transfer of all

2d Sess., at 438, 439; Falk, *supra* note 59, at B-301 (discussing Service Mimeograph 6409 (1950-1 C.B. 9)). Congress noted that several courts had concluded that the inventor's gain could be taxed as long-term capital gain even if the payments were measured by the success of the patent, and were payable over the remaining life of the patent. *Id.*

463. I.R.C. § 1235(a) (emphasis added).

464. *Id.* § 1235(b)(1). The term "holder" also includes "any other individual who has acquired his interest in such property in exchange for consideration in money or money's worth paid to such creator prior to actual reduction to practice . . . [other than the creator's employer, or a person who is related to the creator]".

465. Falk, *supra* note 59, at A-17; *but see* JAMES S. EUSTICE & JOEL D. KUNTZ, FEDERAL INCOME TAXATION OF S CORPORATIONS, ¶ 7.04[1], at 7-25 n.138 (arguing that S corporation shareholders should be able to qualify under I.R.C. § 1235, but citing no direct authority for that position).

substantial rights to the patent or an undivided interest therein, would be considered proceeds from the sale or exchange of a capital asset held for more than 1 year⁴⁶⁶

In addition, the IRS has ruled that if a limited liability company (LLC) which is taxed as a partnership sells a patent, the individual members of the LLC will qualify for the lower income tax rate as provided in I.R.C. § 1235.⁴⁶⁷

3. POLICY BEHIND I.R.C. § 1235

While I.R.C. § 1235 was enacted in 1954, a key battle over the ordinary income v. long-term capital gain issue was held in 1950. The House Report for the Revenue Act of 1950 proposed that an inventor selling a patent (or an author or artist selling a copyright) should be taxed at ordinary income rates on any gain from the sale of her creation.

When a person is in the profession of inventing, or writing books, or creating other artistic works, his income from the sale of the products of his work is taxed as ordinary income. This is true whether he receives royalties from the use of his products or sells them outright, since the products of his work are held by him "primarily for sale to customers in the ordinary course of his trade or business" and are, therefore, not treated as capital assets.

If an amateur receives royalties on his invention or book or other artistic work, [that income is taxed] as ordinary income, but if he holds his invention or book or other artistic work for 6 months [currently, under I.R.C. § 1222(3), long-term capital gain treatment is available only if the asset is held more than one year] and then sells it outright he can avail himself of a loophole which treats such a sale as the sale of a capital asset, not held primarily for sale to customers in the ordinary course of the taxpayer's trade or business. As a result the taxpayer receives long-term capital gain treatment on the product of his personal effort.

. . . .

Section 290(a) of your committee's bill provides that when any person sells an invention or a book or other artistic work which is the product of his personal effort his income from the sale is taxed as ordinary income.⁴⁶⁸

In response to the 1950 House Bill, the Senate proposed a revised Bill under which the gain from a sale of a patent could continue to be taxed as a capital gain.⁴⁶⁹ During the Conference Committee debate

466. Treas. Reg. § 1.1235-2(d)(2) (1980).

467. Priv. Ltr. Rul. 2001-35-015 (May 31, 2001); see Falk, *supra* note 59, at A-18 (discussing the IRS letter ruling).

468. H.R. REP. NO. 219, at 420-21 (1950), *reprinted in* 1950-2 C.B. 380, 420-21.

469. S. REP. NO. 81-2375 (1950), *reprinted in* 1950-2 C.B. 483, 484, 543-44.

(which eventually adopted the Senate approach),⁴⁷⁰ the following testimony was given which focused on the inventive activities of individuals (but not on the inventive activities of corporations):

Our patent system is responsible, to a large degree, for the tremendous and rapid growth of the industrial phase of our economy. Although the individual inventor has never been properly rewarded for his advanced thinking, vision, and personal efforts, he deserves the major part of the credit for this great progress. His type of thinking should be encouraged rather than discouraged

. . . .

The inventor flourishes and brings forth fruit when he feels that he is being nurtured in an atmosphere of freedom and a soil rich in opportunity. ○

The experts who wrote this provision call it plugging up a loophole. Permitting an inventor to get some reward for his invention is not my idea of a loophole. As for "plugging up," it will certainly effectively plug up the inventor's desire to create new and better things for our people to enjoy. . . .

. . . .

If patents produce their proportionate share [of tax revenue], it will amount to a couple of hundred thousand dollar [sic]. For this comparatively picayune sum we would discourage our individual inventor by putting a ceiling over his opportunities, thus inhibiting his desire to create by depriving him of the major part of the reward, which is already pitifully small. So the end result will be to deny the economy of this Nation many inventions potentially worth millions of dollars, to say nothing of the loss of patent stimuli to our industrial development.⁴⁷¹

The legislative history of the 1954 tax act provides that section 1235 was enacted "to provide an incentive to inventors to contribute to the welfare of the Nation."⁴⁷² Thus, while Congress chose to grant favorable tax treatment to individuals on the sale of a patent because inventions stimulate economic growth,⁴⁷³ similar relief was not extended to corporate inventors.

470. H.R. REP. NO. 81-3124 (1950), *reprinted in* 1950-2 C.B. 580, 585 (amendments 77 & 78).

471. Hearings on H.R. 8920 Before the Senate Comm. on Fin.: An Act to Reduce Excise Taxes and for Other Purposes, at 601-05 (1950) (Statement of C.E. Earle, Secretary-Treasurer of the Council for Independent Business and President of Beco Manufacturing Company) (emphasis added); *see also* Madelyn Shoheu Cantor, *Tax Policy: Copyrights and Patents*, 31 VILL. L. REV. 931, 980-81 (1986).

472. S. REP. NO. 1622, 83d Cong., 2d Sess, 439 (1954), *reprinted in* Falk, *supra* note 59, at B-301.

473. The authors and artists entitled to copyrights were not granted favorable treatment on a sale. A copyright is excluded from the definition of a "capital asset," I.R.C. § 1221(a)(3), so the gain on a sale of a copyright will be taxed at ordinary income tax rates.

4. HORIZONTAL EQUITY

A fundamental principle of taxation is that taxpayers in similar situations should be taxed in a similar fashion.⁴⁷⁴ This principle is frequently referred to as “horizontal equity.” It could be argued that I.R.C. § 1235 creates a distinction between similarly situated taxpayers — corporate inventors and individual inventors. The clearest example would involve a Subchapter S corporation⁴⁷⁵ with individuals as shareholders. If the S corporation sells a patent, the gain will be taxed at ordinary income tax rates.⁴⁷⁶ In contrast, if a limited liability company taxed as a partnership sells a patent, the individual members of the LLC will be eligible to be taxed at the lower long-term capital gain rates under I.R.C. § 1235(a).⁴⁷⁷

EXAMPLE #6. The Reverend Praiseworthy and his siblings (Sister Wholesome, Sister Prudence, and Brother Fortitude) plan to develop another sensational invention — a Remote Control for the Path-Finder. (See Example #5 for a description of the Path-Finder.) With the Remote Control, the user can punch in his or her current location, and the car will drive itself to your current location. A possible commercial name for the remote control is the “Personal Valet which Never Gets a Tip.” Since there may be substantial liabilities involved during research and testing, the group visits attorney Tax Clueless. The group follows Clueless’ recommendation to form a Subchapter S corporation. After developing the Remote Control and obtaining the patent, the S corporation sells the patent for \$10 million. If a 40% marginal individual income tax rate (federal and State combined) applies, the individual members of the group will collectively pay \$4 million in tax. If they had formed an LLC (taxed as a partnership) instead of an S corporation, the income tax would have been approximately \$2 million.⁴⁷⁸

474. DODGE, *supra* note 432, at 88 (“horizontal equity: persons in the same position should bear the same tax burden”); JOSEPH H. PECHMAN, *FEDERAL TAX POLICY* 5 (4th ed. 1983) (horizontal equity aims to “distribute the cost of government fairly . . . among people in approximately the same economic circumstances . . .”).

475. The taxation of a Subchapter S corporation is primarily governed by I.R.C. §§ 1361-1379. In general, a Subchapter S corporation does not pay a corporate level tax, but instead the net income of the Subchapter S corporation flows through and is taxed to the shareholders. See generally EUSTICE & KUNTZ, *supra* note 465, ¶ 7.01 - ¶ 7.13.

476. As discussed above, a corporation cannot be a holder under I.R.C. § 1235. See *supra* notes 449-50 and accompanying text. The gain would be recorded at the S corporation level, but the S corporation generally would not pay a corporate level tax. Instead, the gain will “flow-through” to the shareholders of the S corporation and will be taxed to the shareholders at ordinary income tax rates. See generally *supra* note 475.

477. See Treas. Reg. § 1.1235-2(d)(2) (1980); Priv. Ltr. Rul. 2001-35-015 (May 31, 2001).

478. As discussed above, the individual members of an LLC can be taxed at the favorable long-term capital gain rates applicable to individuals on the gain from the LLC’s sale of the patents. See *supra* note 467 and accompanying text. In the example, the LLC has a gain of \$2

Based on the principle of horizontal equity, it could be argued that all inventors, including corporations, should pay a similar rate of tax on the sale of a patent.

C. Proposal — A Deduction or Exclusion to Reduce a Corporate Inventor's Federal Income Tax Rate on the Sale of a Patent for a Fixed Purchase Price

As discussed below, if a corporate inventor sells a patent to a firm that would be more efficient at manufacturing, marketing, and selling the patented product, the price of the patented product will be lower, and the quantity that consumers will acquire will be greater.⁴⁷⁹ Thus, the economic inefficiencies associated with a monopoly, oligopoly, or monopolistic competition situation would be reduced. A corporate inventor will be more likely to sell a patent to an efficient producer if the tax rate on the gain from a sale is lower. The tax rate could be lowered either by (i) creating a new deduction; or (ii) providing for an exclusion from gross income.

1. CORPORATIONS PAY THE SAME TAX RATE ON ORDINARY INCOME AND LONG-TERM CAPITAL GAIN

As described above, a corporation pays the same rate of federal income tax whether a gain is ordinary income or long-term capital gain.⁴⁸⁰ As a result, there will be no tax benefit for corporations if section 1235 is merely amended to include corporations within the definition of holders.

2. PRECEDENT FOR A DEDUCTION TO REDUCE THE EFFECTIVE TAX RATE ON A SALE

Prior to the Tax Reform Act of 1986, I.R.C. § 1202 created a deduction that effectively reduced the tax rate on long-term capital gains for individuals. Section 1202(a) provided, "If for any taxable year a taxpayer other than a corporation has a net capital gain, 60 percent of the amount of the net capital gain shall be a deduction from gross income." The application of former Section 1202(a) can be illustrated with the following example:

EXAMPLE #7. Texas Hank struck it rich as a result of purchasing

million which "passes through" and is taxed to the individual members. In the example, the total gain of \$10 million multiplied by a 20% tax rate (15% federal long-term capital gain rate, and 5% state tax rate), results in an income tax liability of approximately \$2 million. This example ignores the potential federal tax deduction for state taxes paid, and ignores the potential state tax deduction for federal taxes paid.

479. See *infra* notes 502-03 and accompanying text.

480. See I.R.C. § 1201(a).

stock of ABC Oil Co. Hank purchased the stock in June of 1984 for \$100, and sold it in December of 1985 for \$10,100. In 1985, Hank was subject to the highest marginal rate of federal income tax on ordinary income, which was 50% (Texas has no state income tax).⁴⁸¹ Hank's gain on the sale was \$10,000.⁴⁸² Thanks to I.R.C. § 1202, Hank claimed a tax deduction for 60 percent of the amount of the gain, and as a result only \$4,000 of the gain was subject to federal income tax. At a 50 percent marginal income tax rate, Hank paid \$2,000 of federal income tax on the gain. As a result, Hank paid a 20 percent tax on the gain.⁴⁸³

In order to reduce a corporate inventor's effective tax rate on the sale of a patent to match the long-term capital gain tax rate generally applicable to an individual (which is 15%), the corporate inventor would need to be able to claim a deduction equal to approximately 57% of the gain from the sale of the patent.

EXAMPLE #8. Sister Wholesome (a sibling of Reverend Praiseworthy) has formed a corporation that has developed a great new invention. The corporation has no tax basis in the invention,⁴⁸⁴ and sells the invention for \$100,000, payable in a lump sum. Under current law, the federal income tax on the sale will be \$35,000 (assuming a 35% federal income tax rate).⁴⁸⁵ If the corporation were allowed a federal income tax deduction equal to 57% of the gain, the federal income tax on the sale would be \$15,050.⁴⁸⁶ If Sister Wholesome had developed and sold the invention as an individual, the federal income tax on the sale would be \$15,000 (based on the 15% federal long-term capital gain tax rate).⁴⁸⁷ Thus, a 57% deduction would create horizontal equity — the tax liability on a sale of the patent would be approximately the same whether the sale is by an individual inventor or a corporate inventor.

481. State Tax Guide — All States (CCH), ¶ 15-100, at 3513-10.

482. The taxable gain is the amount realized on the sale (\$10,100) minus Hank's tax basis in the stock (\$100). I.R.C. § 1001(a).

483. The tax of \$2,000, divided by the \$10,000 gain, is 20%.

484. The corporation has no tax basis in the invention because it deducted all of its research or experimental expenses under I.R.C. § 174(a)(1). See *supra* notes 430-45 and accompanying text.

485. The federal corporate income tax rate on taxable income from \$75,000 to \$10 million is 34%; the rate for taxable income over \$10 million is 35%. I.R.C. § 11(b)(1)(C) & (D). This example ignores any deduction that may be available for state income taxes paid on the gain.

486. The gain on the sale is \$100,000. I.R.C. § 1001(a). The proposed deduction would be \$57,000 [$\$100,000 \times 57\% = \$57,000$]. At a 35% rate, the tax on the remaining \$43,000 would be \$15,050 [$\$43,000 \times 35\% = \$15,050$].

487. Under I.R.C. § 1235(a), an individual inventor's gain on the sale of a patent will be taxed as a long-term capital gain. At a 15% rate, the tax liability would be \$15,000. See *supra* note 63 (regarding the 15% rate for 2003).

3. ENACTING AN EXCLUSION, RATHER THAN A DEDUCTION

An alternative to enacting a new deduction would be to exclude from gross income part of a corporate inventor's gain from the sale of an invention. The amount of the exclusion would be the same as the amount of the deduction proposed above, namely 57%.

EXAMPLE #9. Professor Joel has formed a new corporation, which develops a great new invention. The corporation has no tax basis in the invention,⁴⁸⁸ and sells the invention for \$100,000. Under current law the federal income tax on the sale by the corporation will be \$35,000 (assuming a 35% federal income tax rate).⁴⁸⁹ If the corporation were allowed to exclude 57% of the gain from taxable income, the federal income tax on the gain from the sale would be \$15,050.⁴⁹⁰ If Professor Joel had developed and sold the invention as an individual, the income tax on the sale would be \$15,000 (based on the 15% federal long-term capital gain tax rate).⁴⁹¹

An example of an "exclusion" from gross income can be found in current I.R.C. § 1202, which allows an exclusion for part of the gain from the sale of certain small business stock.

4. ONLY SALES FOR A FIXED PURCHASE PRICE WOULD QUALIFY FOR THE NEW DEDUCTION (OR EXCLUSION)

Prior to the enactment of I.R.C. § 1235, the courts and the IRS considered whether a transfer of a patent (or a patentable invention) in return for a promise to make payments based upon the transferee's use of the property was really a sale or a license.⁴⁹² If the arrangement was characterized as a sale, the inventor might be eligible to use the lower long-term capital gain rates.⁴⁹³ In contrast, if the transaction was not a sale (and instead was a license), then all amounts received would be

488. The corporation deducted all of its research or experimental expenses under I.R.C. § 174(a).

489. This example ignores any deduction that may be available for state income taxes paid on the gain.

490. The gain on the sale would be \$100,000 [$\$100,000 - \$0 = \$100,000$]. I.R.C. § 1001(a). If 57% of the gain is excluded, only \$43,000 would be subject to federal income tax. The federal income tax liability on the sale would be \$15,050 [$\$43,000 \times 35\% = \$15,050$].

491. Under I.R.C. § 1235(a), the gain on the sale of a patent by an individual inventor would be taxed as a long-term capital gain. At a 15% rate, the tax liability would be \$15,000. *See supra* note 63 (regarding the 15% rate).

492. Falk, *supra* note 59, at A-27. I.R.C. § 1235 eliminates this distinction for purposes of characterizing the gain — as long as all or substantially all rights to the patent are transferred (and the other requirements are satisfied), the gain will be taxed at long-term capital gain rates.

493. Prior to the enactment of I.R.C. § 1235, the inventor would need to prove that the invention was a capital asset which had been held for the necessary period of time (generally, one year).

taxable as royalties subject to ordinary income tax rates.⁴⁹⁴ After several courts had rejected the IRS's attempt to characterize payments based on the use or productivity of the invention as royalties,⁴⁹⁵ the IRS issued an administrative pronouncement⁴⁹⁶ providing that if payments are measured by the production, sale or use of the property transferred (or if the payments are for a period of time that is coterminous with the transferee's use of the patent), such payments will be considered royalties taxable as ordinary income.⁴⁹⁷ The IRS administrative pronouncement was effectively reversed by the enactment of I.R.C. § 1235(a) in 1954.⁴⁹⁸

The new deduction (or exclusion) proposed in this Article would only be available if the sale price of the invention is not contingent on the "productivity or use" of the invention, because of the potential economic consequences. As discussed earlier, the marginal cost of a producer does not include fixed costs,⁴⁹⁹ and the price and quantity are determined (or impacted) by the intersection of the marginal cost curve and the marginal revenue curve.⁵⁰⁰ If a patent is sold to an efficient producer, but the efficient producer is required to pay a higher purchase price for the invention for every unit sold (in other words, a royalty based on use or productivity), this increased payment for the invention would become part of the efficient producer's *marginal* cost (because it would be incurred as a result of selling an additional unit). An increase in marginal cost will cause the supply curve to shift to the left,⁵⁰¹ leading to a higher price and a smaller quantity. This was illustrated in Figure

494. See I.R.C. § 61(a)(6) ("Except as otherwise provided . . . gross income means all income from whatever source derived, including (but not limited to) the following items: . . . Royalties . . .").

495. See Falk, *supra* note 59, at A-26 (citing *Comm'r v. Hopkinson*, 126 F.2d 406 (2d Cir. 1942); *Carroll Pressure Roller Corp. v. Comm'r*, 28 T.C. 1288 (1957); *Coplan v. Comm'r*, 28 T.C. 1189 (1957); *Marco v. Comm'r*, 25 T.C. 544 (1955); *Myers v. Comm'r*, 6 T.C. 258 (1946)).

496. Mimeograph 6490, 1950-1 C.B. 9.

497. *Id.*; see also S. REP. NO. 1622, 83d Cong., 2d Sess. 439 (1954) (*quoted in* Falk, *supra* note 59, at A-20).

498. I.R.C. § 1235(a) provides that:

A transfer . . . of property consisting of all substantial rights to a patent, . . . shall be considered the sale or exchange of a capital asset held for more than 1 year, regardless of *whether or not* payments in consideration of such transfer are — (1) payable periodically over a period generally coterminous with the transferee's use of the patent, or (2) *contingent on the productivity, use or disposition* of the property transferred.

I.R.C. § 1235(a) (emphasis added)

499. See *supra* note 95 and accompanying text.

500. See *supra* notes 95-100 and accompanying text.

501. See *supra* note 91 and accompanying text. When the producer's marginal cost increases, the producer supplies a smaller quantity at each price — thus, causing a leftward shift of the supply curve.

#17, *supra*. Thus, a sale of a patent with the purchase price contingent on the use or productivity of the invention might increase the economic inefficiencies associated with the patent — specifically, one would need to compare the royalty rate per unit with the savings to manufacture, market and sell each unit; if the royalty rate is higher, the licensee would have a higher marginal cost.

In contrast, if the invention is sold for a fixed purchase price (even if it payable over time), that purchase price will be a fixed cost and should not impact marginal cost, and therefore should not impact the price charged or the quantity supplied. As a result, the deduction (or exclusion) proposed in this Article would only be available when the purchase price would not be contingent on the use or productivity of the invention.

D. *Impact of Proposal*

If adopted, the proposal could have at least three positive consequences — improving economic efficiency, encouraging innovation by allowing the R&D corporation to focus on its core business, and making more capital available to the R&D corporation for research.

1. SHIFTING THE SUPPLY CURVE TO THE RIGHT TO IMPROVE ECONOMIC EFFICIENCY

As discussed earlier,⁵⁰² a decrease in production costs (specifically, a decline in the producer's marginal cost) will cause a rightward shift of the supply curve. For a variety of reasons, the corporate inventor that obtains a patent may not be able to manufacture, market, and sell the patented product efficiently. For example, the corporate inventor may specialize in research and have no experience or expertise in performing the other necessary business functions. If the corporate inventor sells the patent to a more efficient producer, the marginal cost of supplying the patented product will decrease, which will result in a rightward shift of the supply curve.

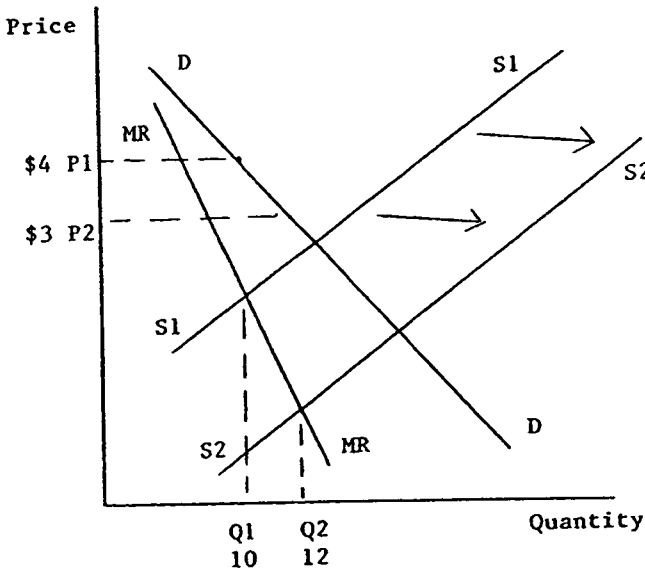
In order to maximize profit, the producer will produce the quantity indicated by the intersection of the marginal cost curve and the marginal revenue curve.⁵⁰³ Due to the rightward shift of the supply curve (in other words, the decrease in marginal cost), the intersection of marginal revenue and marginal cost will now occur at a higher quantity. This is reflected in Figure #18. Before the shift in the supply curve, the quantity produced was 10 (indicted in Figure #18 as Q1). When the supply

502. See *supra* notes 86-90 and accompanying text.

503. See *supra* notes 95-101 and accompanying text.

curve shifts (to S_2 - S_2), the quantity produced increases to 12 (indicated in Figure #18 as Q_2). In addition, the price decreases from \$4 to \$3 (indicated in Figure #18 as the shift from P_1 to P_2). Thus, a rightward shift of the supply curve improves economic efficiency.

FIGURE #18
A RIGHTWARD SHIFT OF THE SUPPLY CURVE CAUSED BY A SALE OF THE PATENT TO A MORE EFFICIENT PRODUCER



- D - D = Demand curve
 MR - MR = Marginal Revenue curve
 P1 = original price
 P2 = new price (with an efficient producer)
 Q1 = original quantity
 Q2 = new quantity (with an efficient producer)
 S1 - S1 = original supply curve
 S2 - S2 = new supply curve (with an efficient producer)

2. POTENTIAL FOR INCREASED CAPITAL TO THE INVENTIVE CORPORATION

A sale to an efficient producer may provide the corporate inventor with additional capital that can be used for new research and development for two reasons. First, after the corporate inventor pays the income tax on the gain from the sale of the patent (or patentable invention),⁵⁰⁴

504. Under the proposal, the deduction or exclusion would be available on the sale of a patent,

the corporate inventor can plow the after-tax proceeds from the sale into new research and development. If the purchase price is payable in installments over time, that capital will only become available to the corporate inventor as it is paid (unless the corporate inventor sells the installment note). Second, if the corporate inventor had not sold the patent (or patentable invention) and instead attempted to exploit the invention itself, the corporate inventor might need to spend substantial capital to perform the various business functions necessary (manufacturing, marketing, selling, etc.). One commentator has stated, "Even in the case of an innovation patented in fully commercial form — as is the case with many relatively trivial patents — the firm must make significant investments to simply distribute and market the invention [M]arketing is a major cost in innovation. . . ." ⁵⁰⁵

By selling the invention to an efficient producer, the corporate inventor will not need to incur those additional expenses, and instead can continue to focus on research and development.

3. ALLOWING A CORPORATE INVENTOR THE FLEXIBILITY TO FOCUS PRIMARILY ON RESEARCH AND DEVELOPMENT

The corporation with a great new invention has at least three choices — it can sell the invention; it can retain the invention and manufacture, market and sell the patented product itself; or it can license the invention to another firm that will manufacture, market and sell the

or upon the sale of a patentable invention (even if no patent application has been prepared or filed before the sale). Favorable tax treatment is available under I.R.C. § 1235(a) even if no patent application has been prepared, as long as the invention is patentable. I.R.C. § 1235 does not define the term "patent," but the applicable regulations provide:

The term patent means a patent granted under the provisions of title 35 of the United States Code, or any foreign patent granting rights generally similar to those under a United States patent. *It is not necessary that the patent or patent application for the invention be in existence* if the requirements of section 1235 are otherwise met.

Treas. Reg. § 1.1235-2(a) (as amended in 1980) (emphasis added). The legislative history provides,

The section does not apply to a property right in an invention differing from the monopoly rights evidenced by a patent. However, since the inventor possesses an exclusive inchoate right to obtain a patent, he may transfer his interest, whatever it may be, in any subsequently issued patent before its issuance and before as well as after he has made application for such patent.

Report of the Senate Comm. on Fin. to Accompany H.R. 8300, S. REP. NO. 83-1622, 83d Cong., 2d Sess., at 439 (1954), *reprinted in* 1954 U.S.C.C.A.N. 4621, 5082. *See also* William A. Drennan, *A Method of Analysis for the Unlikely Asked to Perform the Amazing: Determining "Patentability" Without a Patent Application Under Section 1235*, 22 VA. TAX REV. 443, 453-55 (2003).

505. Kitch, *supra* note 52, at 277; *See also* Kitch, *supra* note 48, at 1731 (In the case of pioneer-patents — patents with broad claims issued in a new field — "in order to achieve commercialization, much more work remains to be done before a commercial product can be placed on the market").

invention. If the corporation retains the invention (and does not license the invention), it can avoid the income tax from a sale, but it will need to exploit the invention itself — performing a variety of functions other than research and development.⁵⁰⁶ The corporation will need to become involved in manufacturing, marketing, selling, and other business functions. In that case, the corporate inventor becomes a jack-of-all-trades.⁵⁰⁷ Alternatively, the corporation can sell the invention, and focus its efforts on new research and development activities. If the effective tax rate on a sale of the patent is reduced, a sale could be attractive to those corporations that wish to specialize in research and development. The corporate inventor's research activities may be more productive (because of economies of scale) if the corporate inventor specializes, than if it attempts to be a jack-of-all-trades.⁵⁰⁸ One commentator has stated:

It is clear that the ability of the owners of intellectual property rights to transfer these rights in whole or in part to others is an important feature of the system. The rights can easily arise in the hands of persons or firms who are not in the best position to exploit them. In order to involve others in the full exploitation of the economic potential of the right, the owners must be able to enter into a wide range of arrangements with other firms.⁵⁰⁹

As discussed in detail below, another option is for the corporate inventor to retain the patent and license an efficient producer to manufacture, market and sell the patented product.⁵¹⁰

E. *Response to Some Potential Objections to the Proposal*

1. LOSS IN TAX REVENUE — PROVIDING INVENTORS WITH ANOTHER TAX BENEFIT

It may be argued that inventors already receive several tax benefits which over-stimulate inventive activity. As discussed above, inventors can immediately deduct all their research or experimental expenses.⁵¹¹ Also, inventors that increase their research or experimental expenses can be entitled to a tax credit.⁵¹² In addition to these tax benefits, as dis-

506. See *supra* note 398 and accompanying text.

507. See *supra* notes 402-03 and accompanying text.

508. *Id.*

509. Kitch, *supra* note 48, at 1740.

510. See *infra* notes 506-16 and accompanying text.

511. I.R.C. § 174(a). See *supra* notes 433-37 and accompanying text.

512. I.R.C. § 41. For a discussion of the research credit, see generally Falk, *supra* note 63, at A-5 & A-6 ("A significant change was made for years after 1989 relating to the interplay of [I.R.C.] § 174 and [I.R.C.] § 41. For years after 1989, the credit under [I.R.C.] § 41 reduces the [I.R.C.] § 174 deduction for qualified research costs and basic research payments") (citing I.R.C.

cussed above, in a monopoly, oligopoly, or monopolistic competition situation, the producer enjoys an excess profit (by eliminating consumers' surplus).⁵¹³ In response, it is sometimes proposed that government should "tax away" the monopolist's excess profit.⁵¹⁴ The proposal set forth in this Article will reduce a corporate inventor's tax burden on the sale of an invention, so that less tax will be collected by the IRS on a sale. Thus, it may be argued that the proposal in this Article will reduce the total tax revenue received by the U.S. government, and will provide another tax subsidy to the corporate inventors.

In regard to the total tax revenue received by the U.S. government, it could be argued that this proposal might actually increase the income tax revenues raised on the sale of patents. As discussed above in connection with the "lock-in" effect,⁵¹⁵ in light of the high income tax rate facing a corporate inventor on the sale of a patent, there may be fewer sales than if the tax rate were more reasonable. Thus, lowering the tax rate may increase the number of sales, and increase the total tax revenue raised on invention sales (even though less tax may be paid on each sale). In addition, since the sale of the invention to an efficient producer will increase the quantity that consumers purchase,⁵¹⁶ more tax revenue may be raised from the sale of those additional products. In regard to whether the proposal in this Article will provide an excessive subsidy to corporate inventors, the U.S. government certainly could adopt other measures to impose "fixed costs" on a patent holder.⁵¹⁷

2. CORPORATIONS AND THE DIVISION OF LABOR THEORY

It might be argued that while the division of labor is well-documented in the case of individual workers,⁵¹⁸ the benefits of specialization by a corporation are not as clear. As discussed above, different corporations take different approaches in regard to specialization.⁵¹⁹ Many corporations find it beneficial to vertically integrate, expanding into a variety of business functions all related to one product.⁵²⁰ This can be beneficial in controlling risks and avoiding transaction costs.

In contrast, other corporations prefer to perform one function with respect to a variety of products. This allows the corporation to achieve

§ 280C(c)); Paul W. Oosterhuis & John S. Stanton, *Research and Development Expenditures*, 42-3d TAX MGM'T (BNA) (1987).

513. See *supra* note 159 and accompanying text.

514. SAMUELSON, *supra* note 1, at 498.

515. See *supra* note 452 and accompanying text.

516. See *supra* notes 502-03 and accompanying text.

517. SAMUELSON, *supra* note 1 (regarding the imposition of a flat tax).

518. See *supra* notes 387-90 and accompanying text.

519. See *supra* notes 391-419 and accompanying text.

520. See *supra* notes 406-11 and accompanying text.

greater economies of scale. By specializing in its key function, the corporation may improve efficiency. In addition, this business model allows the corporation to avoid “placing all its eggs in one basket.” In contrast to the vertically integrated business, which will be in serious trouble if sales of its one product decline, the specialized firm may supply products or resources for a variety of products in different industries. This proposal will provide a corporate inventor with greater flexibility in deciding its degree of specialization (or vertical integration).

3. WHY DOESN'T LICENSING ADDRESS THESE CONCERNS?

Another objection may be that a corporate inventor could simply license the invention to an efficient producer.⁵²¹ A license is normally an agreement to pay royalties based on the sales of the patented product. For example, royalties may be based on a percentage of gross revenue from sales, or on a fixed dollar amount per unit sold. Licensing can allow the corporate inventor to specialize on research and development, and can allow the patented product to be manufactured, marketed, and sold by an efficient producer. Also, licensing allows the corporate inventor to avoid devoting substantial amounts of capital to perform other business functions.

Although a licensee may be able to manufacture, market, and sell more efficiently than the inventor, a licensee may or may not have a lower marginal cost of production than the inventor. The marginal cost is crucial, because as discussed above, if the producer or producers in a pure monopoly, an oligopoly, or monopolistic competitive market have a lower marginal cost of production, they will produce a greater quantity and will sell at a lower price.⁵²² If they have a higher marginal cost of production, the quantity produced and consumed will be smaller and the price charged will be higher. Since economic efficiency is improved by increasing production and increasing consumer satisfaction, greater economic efficiency is obtained if the marginal cost is lower. This was reflected in Figure #18 above. In Figure #18, the supply curve shifted to the right (from S1-S1 to S2-S2), causing quantity to increase from 10 units to 12 units, and causing price to drop from \$4 to \$3.

In order to demonstrate the importance of marginal cost, Figure #19 below assumes the same marginal revenue for three situations (shown in

521. See 35 U.S.C. § 261 (2000) (“Subject to the provisions of this title, patents shall have the attributes of personal property The applicant, patentee, or his assigns or legal representatives may in like manner grant and convey an exclusive right under his application for patent, or patents, to the whole or any specified part of the United States”); Eisenberg, *supra* note 109, at 1021-22 (“Patent holders need not exploit their exclusive rights themselves, but may sell or license them to others in exchange for royalties . . .”).

522. See *supra* notes 502-03 and accompanying text.

column (2) of Figure #19), but with different marginal costs. In Situation #1, the inventor retains the patent and manufactures, markets, and sells the patented product. Because any producer will continue to produce as long as its marginal revenue from making and selling another unit exceeds its cost of producing that one unit, in Situation #1 the inventor will produce a quantity of $3x$.⁵²³ In Situation #2 the inventor licenses the patent to an efficient producer, but the efficient producer is required to pay a royalty on every unit sold. In Situation #2, it is assumed that at each quantity, the efficient licensee can produce the product for \$10 less per unit than the inventor, but is required to pay a royalty of \$15 per unit. Thus, in Situation #2, the licensee's marginal cost is \$5 higher at each quantity.⁵²⁴ Although the efficient producer can manufacture, market, and sell the patent at a lower cost than the inventor, when the cost of the royalty is added to the licensee's marginal cost, in this example the licensee's marginal cost is higher. As any producer will produce the quantity indicated by the intersection of the marginal revenue and marginal cost curves,⁵²⁵ the efficient licensee in Situation #2 will only produce $2x$ ⁵²⁶ (whereas the inventor would have produced $3x$). Also, the efficient licensee will charge a higher price per unit because of the resulting shortage — simply stated, the inventor will need to charge a lower price to sell $3x$ than the licensee will need to charge to sell $2x$.⁵²⁷

In Situation #3, the inventor sells the patent to an efficient producer for a fixed sum. The purchase price of the patent is not included in marginal cost because the purchase price for the patent does not change regardless of how many units the purchaser manufactures and sells. In Situation #3 it is assumed that the purchaser can produce the product \$10 per unit cheaper than the inventor. Because the purchaser is a more efficient producer than the inventor (by \$10 per unit), the purchaser's

523. In Figure #19, it will cost the inventor \$95 to increase production from $2x$ to $3x$ (see column (3) in Figure #19), and the inventor will receive an extra \$98 in revenue (see column (2) in Figure #19) by increasing sales from $2x$ to $3x$. Thus, the profit maximizing inventor will increase production from $2x$ to $3x$. However, if the inventor increases production from $3x$ to $4x$, it will cost the inventor \$100, and the inventor will only receive an additional \$97 in revenue. Thus, the profit-maximizing inventor will increase production from $2x$ to $3x$, but will not increase production from $3x$ to $4x$ (because marginal cost exceeds marginal revenue).

524. Compare column (3) and column (4) in Figure #19.

525. See *supra* notes 95-99 and accompanying text.

526. The efficient licensee will only produce $2x$, and will not increase production to $3x$, because its cost of increasing production from $2x$ to $3x$ will be \$100 (see column (4) in Figure #19), and the efficient licensee will only receive additional revenue of \$98 (see column (2) in Figure #19) as a result of selling $3x$ rather than $2x$.

527. As discussed above, this is because the demand curve is downward sloping. See *supra* notes 134-35 (monopoly), 182 (oligopoly), 195 (monopolistic corporation), and accompanying text.

marginal cost is lower than the inventor's marginal cost would have been.⁵²⁸ As a result the efficient purchaser will produce and sell $4x$ ⁵²⁹ — in contrast to the efficient licensee who would only produce $2x$, and the inventor who would only produce $3x$. In order to sell $4x$, the efficient purchaser will sell at a lower cost than either the inventor or the licensee would have charged (because the inventor would only need to sell $3x$, and the licensee would only need to sell $2x$).⁵³⁰

FIGURE #19
MARGINAL COST AND MARGINAL REVENUE IN THREE SITUATIONS
(THE INVENTOR, THE EFFICIENT LICENSEE, AND THE
EFFICIENT PURCHASER)

(1) Quantity	(2) Marginal Revenue	(3) <i>Situation #1</i> Marginal Cost* (Inventor)	(4) <i>Situation #2</i> Marginal Cost (Licensee) (3) +\$5	(5) <i>Situation #3</i> Marginal Cost (Purchaser) (3) - \$10
1x	100	85	90	75
2x	99	90	95	80
3x	98	95	100	85
4x	97	100	105	90
5x	96	110	115	100
6x	95	125	130	115
7x	94	150	155	140

* The marginal cost figures reflect the "Law of Diminishing Returns," that was discussed earlier. *See supra* notes 79-80 and accompanying text. As columns (3), (4), and (5) each indicate, as production increases, at some point, it becomes more and more expensive to produce each unit.

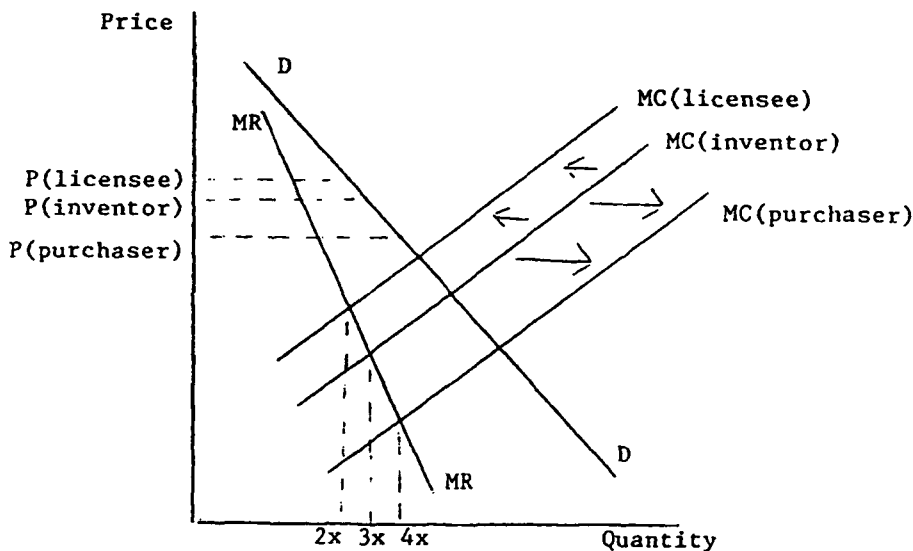
The demand curve (D – D), marginal revenue curve (MR – MR), and the three marginal cost curves can be plotted as follows:

528. Compare column (3) and column (5) in Figure #19.

529. The efficient purchaser will be willing to increase production from $3x$ to $4x$ because its cost of increasing production from $3x$ to $4x$ will be \$90 (see column (5) in Figure #19), and the efficient producer will receive additional revenue of \$97 (see column (2) of Figure #19) as a result of selling $4x$ rather than $3x$.

530. As discussed above, price is determined by the intersection of the demand curve and the marginal cost curve. *See supra* notes 149-50 and accompanying text. If the demand curve is constant and marginal costs decrease (a rightward shift of the supply curve), the price drops. *See supra* notes 502-03 and accompanying text.

FIGURE #20
DEMAND CURVE, MARGINAL REVENUE CURVE, AND
MARGINAL COST CURVE IN THREE SITUATIONS



- D - D = Demand Curve
 MC (inventor) = Marginal Cost Curve for the Inventor
 MC (licensee) = Marginal Cost Curve for the Efficient Licensee
 MC (purchaser) = Marginal Cost Curve for the Efficient Purchaser
 MR = Marginal Revenue Curve

Thus, depending on the particular facts of the situation, licensing may actually increase the producer's marginal cost, thereby increasing the price of the patented product, and further restricting the supply. As a result, licensing can increase the economic inefficiencies associated with a patent.⁵³¹

4. IMPACT ON ESTABLISHED INDUSTRIES

Another issue is whether this proposal would have any impact on established industries. It might be argued that in established industries (such as the pharmaceutical industry), the corporate inventors have already gained experience and expertise in a variety of business functions. As a result, the corporate inventors in an established industry may be efficient producers, and no other entity could produce the patented product at a lower marginal cost.

531. It should be noted that if the cost savings per unit exceeds the royalty per unit, the efficient licensee would have a lower marginal cost than the inventor, and would produce more, and sell at a lower price, than the inventor.

If the marginal cost of the corporate inventor is lower than the marginal cost that any other producer could achieve, then a sale of the invention would not reduce marginal cost, and would not reduce price or increase quantity. However, even if corporate inventors in an industry have experience in various business functions, it does not necessarily follow that they can produce at the lowest marginal cost. For example, generic drug manufacturers have captured a significant share of the drug market even though the brand-name drug companies had great experience in various business functions.⁵³² Presumably the generic drug companies captured a significant share of the market for drugs (for which the patents had expired) by producing at a lower marginal cost (which allowed the generic drug companies to decrease price and increase supply). This is not totally surprising because, as discussed above, brand-name pharmaceutical companies perform a variety of business functions (such as research, development, testing, engineering, manufacturing, marketing, distribution, selling, etc.).⁵³³ In contrast, a generic drug manufacturer performs fewer functions. Thus, the generic drug manufacturer is more of a specialist, while the brand-name drug company is more of a jack-of-all-trades.

In addition, this proposal could impact new corporations and new industries that will develop to meet consumer desires that cannot even be identified at this time. In new industries, allowing corporate inventors to sell their patents at a reasonable tax cost to efficient producers can avoid the economic inefficiencies associated with a research and development corporation attempting to expand into other business functions that they cannot perform efficiently.⁵³⁴

XI. CONCLUSION

The patent system (or another type of incentive system) is needed to encourage invention.⁵³⁵ In the words of the U.S. Constitution, patents “promote the progress of Science and the Useful Arts.”⁵³⁶ Inventions stimulate economic growth and improve the quality of life.⁵³⁷

A patent grants the inventor the power to prevent others from making, using, or selling the patented product.⁵³⁸ In effect, a patent can create a barrier that prevents potential competitors from entering the

532. See McNeil, *supra* note 321 (quoting William F. Hadad, “a generics maker who helped create the cheaper off-brand industry in the United States in the 1980’s”).

533. See *supra* note 398 and accompanying text.

534. STIGLITZ, *supra* note 393 (regarding the learning curve).

535. See *supra* notes 102-09 and accompanying text.

536. U.S. CONST. Art. 1, § 8, cl. 8.

537. See *supra* notes 2-8 and accompanying text.

538. 35 U.S.C. § 271 (2000).

market for the patented product unless the potential competitor can “design around” the patent — create a product that performs the same function without infringing the patent. Without competition, various economic inefficiencies arise.

While a patent grants a pure monopoly in the market for the patented product, that may not be the relevant market.⁵³⁹ The relevant market is the market for products that satisfies the particular consumer need or desire. There may be other producers who sell products that a consumer could substitute for the patented product — in that case, the relevant market would be the market for all products that satisfy the particular consumer need or desire. In that market, the patent holder and all other producers who sell products that meet that need or desire will compete.

Nevertheless, even when there are some producers who sell substitute goods (and the market is better characterized as an oligopoly or a monopolistic competition situation rather than a pure monopoly), the producers in the relevant market will face a downward-sloping demand curve, will set price above marginal cost, and will produce a smaller quantity than in a competitive market.⁵⁴⁰

An economic system is efficient if it maximizes production and optimizes consumer satisfaction. A monopoly, oligopoly, or monopolistic competition situation is an economically inefficient arrangement because the price is higher, and the quantity is smaller, than in a competitive market — production is not maximized, and consumer satisfaction is not optimized.

Whether patents tend to create monopolies, oligopolies, monopolistic competition situations, or provide the patent holder with no market power, is an empirical question.⁵⁴¹ In most cases, a patent will not provide the patent holder with any market power.⁵⁴² However, patents that can be sold for a significant price may provide the patent holder with market power.⁵⁴³

539. See *supra* notes 170-75 and accompanying text.

540. See *supra* notes 176-90 and accompanying text (regarding an oligopoly); *supra* notes 191-98 and accompanying text (regarding monopolistic competition). The price will be higher than in a competitive market, and the quantity consumed will be less than in a competitive market.

541. See Kitch, *supra* note 48, at 1731 (“Whether a particular [patent] . . . confers an economic monopoly is an empirical question”).

542. Most patents likely do not result in a commercially viable product or process. See *supra* note 52 and accompanying text.

543. There may be circumstances in which the patent has economic value because its holder may be able to use the patented product or process to create a further invention that will have commercial applications. In that case the current invention would not provide the current patent holder with market power in the market for a particular product, because the current patent does not directly result in a new product.

Empirical information on market power is difficult to obtain,⁵⁴⁴ but two events provided substantial information indicating the degree of market power in two particular markets. When President Clinton issued Executive Order 13155 (May 10, 2000)⁵⁴⁵ regarding anti-AIDS drugs for sub-Saharan African countries, a great deal of information was reported regarding the sale of the three-drug cocktail therapy. While the market for anti-AIDS drugs likely is an oligopoly rather than a pure monopoly (because there are multiple producers), the reports indicate that the brand-name drug companies are able to charge approximately thirty times their marginal cost of production.⁵⁴⁶ Similarly, in connection with the anthrax threat, reports indicated that Bayer was charging U.S. consumers a price that likely was ten times higher than the price that would be charged in a competitive market.⁵⁴⁷ In addition, the magnitude of the damages awarded in patent infringement cases supports the view that a patent holder can exercise substantial market power. These results are consistent with the economic principles discussed in this Article — a patent may create a monopoly, oligopoly, or monopolistic competition situation, in which case the patent holder faces a downward-sloping demand curve, will charge a price in excess of marginal cost, and will produce fewer products (than in a competitive market). As a result, fewer consumers will be able to obtain the product (than in a competitive market).

In order to improve economic efficiency, this Article recommends reducing a corporate inventor's income tax liability on the sale of a patent for a fixed price. This may encourage corporate inventors to sell their patents to efficient producers. According to economic principles, if the purchaser of the patent is more efficient, the supply curve will shift to the right, causing a decrease in price and an increase in quantity supplied. This will result in greater economic efficiency — higher production and greater consumer satisfaction. While a sale to an efficient producer at a fixed price can improve economic efficiency, a license to an efficient producer may create greater economic inefficiencies.⁵⁴⁸

Under current law, corporate inventors are not encouraged to sell a patent. If a corporate inventor sells a patent, it may need to promptly

544. See *supra* note 54 and accompanying text.

545. 65 Fed. Reg. 30521 (May 10, 2000).

546. See *supra* notes 315-25 and accompanying text (indicating that the price charged to U.S. consumers can be \$15,000 to \$17,000 per year, while generic manufacturers in foreign countries may charge as little as \$245).

547. See *supra* notes 274-87 and accompanying text (Bayer charged U.S. consumer \$4.67 per tablet for Cipro, while U.S. generic manufacturers estimated that they would charge 40 cents per tablet).

548. See *supra* notes 521-31 and accompanying text.

pay more than 40% of the total sales proceeds as income taxes, and may have less than 60% of the total sales proceeds left. As a result, a corporation with a great invention may be effectively compelled, for tax reasons, to expand into a variety of other functions (such as manufacturing, marketing, and selling) in order to exploit the invention, even if the corporate inventor has no expertise or experience in these other business functions. The recommendation in this Article may provide corporate inventors with the opportunity to sell the patent (or patentable invention), obtain the purchase price, and then use that purchase price to finance new research and development. This proposal may permit a research and development corporation to focus on its "core business." As a result, this recommendation may spur greater invention, while reducing the economic inefficiencies associated with patents.

At age 22, the famous inventor Thomas Alva Edison developed a major improvement on a "ticker" machine, which was a "private telegraph network which gave bankers and stockbrokers the latest share and gold prices from Wall Street."⁵⁴⁹ At that point, young Mr. Edison had two choices: (i) he could sell the improved "ticker" invention and use the sale proceeds to engage in new research; or (ii) he could keep the improved ticker invention, form a corporation or partnership, and enter the business of manufacturing, marketing, and selling improved tickers. Edison sold the ticker innovation for \$40,000 (an enormous sum of money in 1869),⁵⁵⁰ created the Menlo Park research complex, and became one of the most prolific inventors of all times.⁵⁵¹ Edison's later inventions included the light bulb, the phonograph, motion pictures, and many other useful inventions that have been a great benefit to society.⁵⁵² Perhaps if the tax rate on the sale of a patent had been too high in 1869,⁵⁵³ Mr. Edison's only important invention would have been an improved ticker machine.

549. LARSEN, *supra* note 7, at 73.

550. *Id.*

551. *Id.* at 72 ("He was no doubt the greatest . . . of the professional inventors; when he died in 1931, at the age of [84], he had taken out altogether 2,500 patents, American and foreign").

552. *Id.* However, not all of Edison's inventions were a success.

Edison's first invention was a "Voting Apparatus" for the House of Representatives, with "Yes" and "No" buttons for each Member and an automatic counting device. He was told that this was a most undesirable invention, for "the most effective weapon of a Parliamentary minority in preventing the passage of a bad Bill is the challenging of the vote," which would be impossible with a reliable apparatus.

Id. at 169-70.

553. The Sixteenth Amendment authorizing the imposition of an income tax was not adopted until 1913. U.S. CONST. amend. XVI ("The Congress shall have power to lay and collect taxes on income, from whatever source derived, without apportionment among the several states, and without regard to any census or enumeration").