

A PATENT MISPERCEPTION

by
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Antitrust and intellectual property laws promote innovation and competition. As long as the costs of promotion do not exceed the benefit to society, then the laws act in harmony. Discord arises when patent holders use public and private ordering to restrain competition, restrict downstream trade, prevent the development of competing products, and limit output by competitors. Using the Patent Act and the misperception of antitrust immunity to create a parallel and under-regulated legal system allows a small number of patent holders to coordinate their behavior to maximize profits and minimize competition. The Patent Act provides no shield to prosecution for antitrust violations—such is a patent misperception only. Harmony comes from balancing the costs of protection with the benefit to society. Innovation is best protected through the protection of intellectual property rights and the protection of competition.

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I. INTRODUCTION

A fundamental tension exists between antitrust law and patent law. The Patent Act promotes consumer welfare by rewarding those who disclose their inventions to the public with a limited right to restrain trade and restrict competition.¹ Patent holders have long perceived actions arising under the Patent Act to be immune from the Sherman Act,² which renders illegal any restraint on trade that “may suppress or even destroy competition.”³ The limited restraints on trade bestowed on patentees as a reward for public disclosure are not unlawful restraints that destroy competition, but rather incentives for competitors to innovate. Unlawful restraints on trade arise when parties improperly acquire and exercise market power to the detriment of consumers, whether the parties are patent holders or not.⁴ There is not, nor should there be, an exemption for actions arising under the Patent Act.

“The Sherman Act was designed to be a comprehensive charter of economic liberty aimed at preserving free and unfettered competition as the rule of trade.”⁵ The reliance on the Patent Act as a shield from antitrust liability has given patentees a powerful tool aiding in the creation of monopolies and violating the very essence of the Sherman Act. A patent is, in and of itself, not a monopoly.⁶ The Patent Act does not give patent holders a positive right to make, but rather a negative right of exclusion.⁷ This negative right does not grant immunity from the Sherman Act, and the negative right can be unlawfully extended through contracts to create a monopoly.⁸ Competition is bolstered by the harmonization of the Patent Act and the Sherman Act.

To better understand the distinction between the lawful restraint on trade that a patent grants its recipient and the unlawful extension of that right through contracts, a fictional railroad industry offers a useful analogy. Like the agricultural industry, the railroad industry was historically a highly concentrated field requiring industry members to work together. Our hypothetical railroad industry, back before railroads were as regulated by the government as they are today, assumes there

¹ 35 U.S.C. § 271 (2006).

² *See, e.g.,* Nobelpharma AB v. Implant Innovations, Inc., 141 F.3d 1059, 1067 (Fed. Cir. 1998) (discussing stripping “a patentee of its immunity from the antitrust laws”).

³ *Bd. of Trade v. United States*, 246 U.S. 231, 238 (1918).

⁴ *Standard Oil Co. v. United States*, 283 U.S. 163, 169 (1931) (“The limited monopolies granted to patent owners do not exempt them from the prohibitions of the Sherman Act . . .”).

⁵ *N. Pac. Ry. Co. v. United States*, 356 U.S. 1, 4 (1958).

⁶ *See, e.g.,* *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1367 (Fed. Cir. 1984).

⁷ *See, e.g.,* *Bio-Tech. Gen. Corp. v. Genentech, Inc.*, 80 F.3d 1553, 1559 (Fed. Cir. 1996).

⁸ *See, e.g.,* *Am. Hoist & Derrick Co.*, 725 F.2d at 1367.

were four major railroad competitors: the Pennsylvania Railroad, the Reading Railroad, the Short Line, and the Baltimore & Ohio Railroad (B&O).⁹ These four companies worked together for the benefit of all. Imagine, now, that one company, the Short Line, decided that it owned such a valuable piece of property in its track that it could create a new business model based on private ordering and insist on its terms of use. For instance, Short Line could enter into an agreement with Pennsylvania, whereby Pennsylvania agrees that in order to use Short Line's track, no other railroad, besides Short Line, could use Pennsylvania's track. At this point, B&O must enter into an agreement of its own with Short Line, or lose access to both Pennsylvania's track and Short Line's track. As consolidation of interests occurs, each major railroad company will quickly recognize the benefits to creating a system whereby no competitors can join the race. In other words, if the Pennsylvania Line, the Reading Line, the B&O Line, and the Short Line raise the barriers to entry high enough, through the use of private ordering, then these companies can set their own higher shipping rates, restrict competition, and prevent development of alternative forms of railroad transportation.

The Sherman Act "rests on the premise that the unrestrained interaction of competitive forces will yield the best allocation of our economic resources, the lowest prices, the highest quality and the greatest material progress, while at the same time providing an environment conducive to the preservation of our democratic political and social institutions."¹⁰ It remains clear today that consolidation and manipulation of the market does not benefit the consumer. Recognizing the public policies behind the Sherman Act and the Patent Act requires an understanding of the problems raised by the fictional railroad example. Replacing the subject matter with the actual agricultural biotechnology market for patented seeds, this Article argues that such consolidation and orchestration of the market violates the Sherman Act.

Like the railroad industry, the agricultural biotechnology industry¹¹ is highly concentrated.¹² Instead of track, the valuable property is

⁹ Aficionados of the board game, Monopoly, will recognize the four Railroad properties in the game. These railroad names are taken from the Monopoly Board game and are not meant to refer to actual railroad companies. The names are being used for purposes of illustration only. MONOPOLY (Hasbro 1935).

¹⁰ *N. Pac. Ry. Co.*, 356 U.S. at 4.

¹¹ William Wilson & Bruce Dahl, *Competition and Dynamics in Market Structure in Corn and Soybean Seed*, CPI ANTITRUST J., April 29, 2010, at 2, 4 ("Agbio[.]technology companies are, in part, research firms that invest money to create new products or platforms for crop production. In this process, they make important strategic choices. One is how much to spend on research; another is the scope of their research spending. There is a difference between expenditures to develop agrochemicals for crop protection versus investing in research to develop seeds and traits.").

genetically modified seed, a recent harbinger of change in the agricultural biotechnology market. Transgenic seed was first introduced in the 1990s. Developers of transgenic seed licensed the technology to other seed companies,¹³ but like the Short Line in our hypothetical example above, placed extensive limits on the licensee's use of the seed.¹⁴ The licenses prevent competitors from using the patented traits for research purposes, from selling the seed absent restrictions,¹⁵ and from price competition for transgenic seed.¹⁶

Patent holders have a limited right to restrict trade.¹⁷ Such restrictions "must be scrutinized to ascertain whether the restraints imposed are regulations reasonable under the circumstances, or whether their effect is to suppress or unduly restrict competition."¹⁸ The Patent Act does not shield patentees from charges of restraining trade, restricting output, or limiting the ability of competitors to research alternatives. A patent has a value—a patent infringer must pay the patent holder a reasonable royalty for infringement of the patent holder's rights.¹⁹ The patent bargain is betrayed when a patent holder extends the rights granted under the Patent Act through the use of contracts, and does so to gain a reward greater than the value of the patent. Harmony requires application of antitrust laws when the patent holder is extending its rights through private ordering to unlawfully restrain trade. Competition and innovation benefit society when the Sherman Act and the Patent Act enjoy a symbiotic existence. To be pro-patent does not mean to be anti-antitrust.²⁰ The promotion of the progress of science and

¹² One source lists the major agricultural biotechnology companies as: Syngenta, DuPont Pioneer, Monsanto, Dow, Bayer CropScience, and BASF. See *Industry Background*, SYNGENTA, <http://www.syngenta.com/global/corporate/SiteCollectionDocuments/pdf/publications/investor/industry-background.pdf>.

¹³ *McIntosh v. Monsanto Co.*, 462 F. Supp. 2d 1025, 1028 (E.D. Mo. 2006) ("Monsanto has licensed RRSB [Roundup Ready Soybean Seed] to more than 200 other seed companies.").

¹⁴ *Id.* ("[T]hese licenses require the users of RRSB to enter into a Grower License Agreement (GLA) with Monsanto.").

¹⁵ *Monsanto Co. v. Bowman*, No. 2010-1068, 2011 WL 4375669, at *2-3 (Fed. Cir. 2011) ("All sales to growers, whether from Monsanto or its licensed producers, are subject to a standard form limited use license, called the 'Monsanto Technology Agreement' or 'Monsanto Technology/Stewardship Agreement' . . .").

¹⁶ *McIntosh*, 462 F.Supp. 2d at 1028.

¹⁷ 35 U.S.C. § 271 (2006).

¹⁸ *Standard Oil Co. v. United States*, 283 U.S. 163, 169 (1931).

¹⁹ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) *modified, sub nom. Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295, 299 (2d Cir. 1971).

²⁰ "The dividing line between the bundle of rights that patents give their owners and the restraints on competition that the antitrust laws forbid has to be drawn even though it is still a work in progress." James B. Gambrell, *The Evolving Interplay of Patent Rights and Antitrust Restraints in the Federal Circuit*, 9 TEX. INTELL. PROP. L.J. 137, 157 (2001).

the useful arts dictates that competition be encouraged, and to that end, it is axiomatic that to be pro-patent is to be pro-antitrust.

II. THE PATENT BARGAIN

The antitrust and patent laws promote innovation and competition.²¹ The methods they use to do so are quite different, even though the goal of maximizing benefits to consumers and producers remains the same. Antitrust laws promote competition, working to ensure a free market economy, while patent laws reward innovation by allowing patent holders to limit competition.²² Competition and innovation thrive through the balancing of the application of antitrust and patent laws.

Competition as protected by the antitrust laws is one incentive for innovation. A better product may incentivize consumer preference. Better marketing of the same product may also incentivize consumer preference.²³ Another reward for innovation can be found through the patent system, created by Congress to promote the progress of science and the useful arts.²⁴ Patent law represents a bargain between the public and the patent holder, whereby the patent holder receives a limited right to restrain trade in return for disclosing the innovation to the public.²⁵

Innovation comes at a cost. When the benefit to society exceeds that cost, then innovation should be rewarded. Protection of innovation can be expensive and it is this environment that has led many to view intellectual property rights as a solution to market failure.²⁶ Intellectual property rights provide incentives for research and development.²⁷ The patent system has long been recognized as a legal instrument existing only “as an encouragement to men to pursue ideas which may produce

²¹ Zenith Elecs. Corp. v. Exzec, Inc., 182 F.3d 1340, 1352 (Fed. Cir. 1999).

²² Joseph Scott Miller, *Patent Ships Sail an Antitrust Sea*, 30 SEATTLE U. L. REV. 395, 396 (2007).

²³ For instance, the Beanie Baby craze was strongly driven by Ty’s marketing campaign of retiring Beanie Babies before interest in each one had waned. New products were introduced, but the marketing campaign incentivized the consumer interest in the overall line. Alyson Shontell, *Ty Warner: How to Create Mass Hysteria and Pocket \$2.4 Billion Dollars*, BUS. INSIDER (June 1, 2011), <http://www.businessinsider.com/how-to-create-a-ravenous-fad-and-pocket-6-billion-dollars-2011-5>.

²⁴ U.S. CONST. art. I, § 8, cl. 8.

²⁵ Patent law represents “a balance between the need to encourage innovation and the avoidance of monopolies which stifle competition without any concomitant advance in the ‘Progress of Science and useful Arts.’” *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989).

²⁶ Miller, *supra* note 22, at 398.

²⁷ Not all agree with this statement. James Bessen and Mike Meurer argue in their recent book that the patent system is broken and that the incentives to innovate must come from elsewhere. JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK* 6–8, 216–18 (2008).

utility.”²⁸ The patent laws do not reward a “natural right” but rather exist “for the benefit of society.”²⁹

It is not easy to obtain a patent, nor are the rights associated with a patent unlimited. The limited restrictions on competition granted to a patent holder are balanced out by these fundamental truths. If those limited rights are violated, then the transgressor must pay the patent holder a reasonable royalty.³⁰ The costs of protection have an assigned value—and it is only when the benefits to society exceed those costs that a patent should be enforced.

Not all innovations are patentable, and a patent is not the only reward for innovation. In developing technologies, innovation itself may drive the question of when the benefit to society is worth the restrictions on competition granted by a patent. When technology is not patentable, innovators may turn to contracts to protect their advances. In addition, when the reward of patent is not enough to incentivize innovation, then innovators may shun patents and turn to trade secrets to protect their advances.³¹ Such protections are subject to the antitrust laws, which ask the same fundamental questions as the patent system—what are the benefits to society and are they worth the cost of the protection?

Rewards promote innovation—whether those rewards are granted by the government or devised by the innovator. Competition promotes innovation, as does intellectual property protection. When neither provides sufficient incentive, innovation may find reward and protection through private ordering. The software industry provides one example of the innovation incentive provided by private ordering. When computer software was first developed, it was not necessarily patentable.³² As a result, innovators had to look outside the patent system for protection of a technology particularly difficult to reap rewards from, since software was expensive to develop and cheap to replicate. The software industry turned to contracts and relied on licenses to protect a set of rights that developed along with the technology.³³ As patent protection became available for software, developers sought patent protection but continued

²⁸ Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813), in 13 THE WRITINGS OF THOMAS JEFFERSON at 334 (Andrew A. Lipscomb & Albert Ellery Bergh eds., 1903).

²⁹ *Id.* at 335.

³⁰ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified, sub nom. Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295, 299 (2d Cir. 1971).

³¹ One famous example of a trade secret protected outside the patent system is the recipe for Coca-Cola. *See, e.g., Robert M.M. Seto, A Federal Judge's View of the Most Important Changes in Patent Law in Half-a-Century*, 11 U. FLA. J. TECH. L. & POL'Y 141, 153 (2006).

³² *Gottschalk v. Benson*, 409 U.S. 63, 64, 71–73 (1972).

³³ Daniel B. Ravicher, *Facilitating Collaborative Software Development: The Enforceability of Mass-Market Public Software Licenses*, 5 VA. J.L. & TECH. 11, ¶11 (2000), available at <http://www.vjolt.net/vol5/issue3/v5i3a11-Ravicher.html>.

to rely on contracts.³⁴ Licenses were needed to promote innovation, and were accepted by the users as part of the new technology.³⁵ Public and private legislation co-existed in the new industry where users had no preconceptions about their rights. The rewards were reasonable—as the benefit to society exceeded the costs of the protection.

Cultivating an understanding of the software industry is not normally associated with farming, yet major agriculture innovators have done just that in exploiting seed. Innovation in agribusiness is expensive.³⁶ To introduce an innovation into the seed market, a seed firm must first develop parent seed lines³⁷ that are the core of the company.³⁸ Seed firms have a number of seed lines that are heavily protected,³⁹ again, through contracts, trade secrets, and other forms of protection, and which heighten entry costs for new innovators.⁴⁰ Development of a new seed line can take years of research and extensive resources.⁴¹ The purpose of a seed is to propagate. Once purchased and planted, seed creates new seed that can be saved and reused.⁴² Like the original software innovators,

³⁴ *Id.* at ¶¶ 21, 22, 34.

³⁵ *Id.* at ¶ 30.

³⁶ Stephanie Simon, *Biotech Soybeans Plant Seed of Risky Revolution*, L.A. TIMES, July 1, 2001, at A19 (“Monsanto[] . . . spent at least \$80 million to develop biotech soy.”).

³⁷ Mark D. Janis, *Supplemental Forms of Intellectual Property Protection for Plants*, 6 MINN. J.L. SCI & TECH. 305, 305, 308 (2004) (“Trade secret protection has long been used in the seed industry. . . . [One example of] trade secret protection that is considered to be typical in the seed industry [is] trade secrets in the identity and genetics of the inbred parents of a commercially-distributed hybrid.”).

³⁸ JORGE FERNANDEZ-CORNEJO, ECON. RESEARCH SERV., U.S. DEP’T. OF AGRIC., AGRIC. INFO. BULL. NO. 786, THE SEED INDUSTRY IN U.S. AGRICULTURE 28 (2004) (“Plant breeding constitutes the foundation of the modern seed industry in that it creates a unique and marketable product through the application of science. Plant breeders develop seeds embodying such improvements as high yields, resistance to disease and pests, or traits specific to regional agroclimatic conditions. A seed’s success in the market depends primarily on its improved traits, which embody the R&D effort.”).

³⁹ Michael T. Roberts, *National AgLaw Center Research Article*, J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred International, Inc.: *Its Meaning and Significance for the Agricultural Community*, 28 S. ILL. U. L.J. 91, 126 (2003) (“Until . . . the PTO reversed its stance on the issuance of utility patents for sexually reproducing plants, seed companies typically employed trade secrets to protect the parental line. Trade secret protection still serves as a valuable tool in protecting the interest of seed producers.” (footnote omitted)).

⁴⁰ FERNANDEZ-CORNEJO, *supra* note 38, at 28.

⁴¹ DANIEL CHARLES, LORDS OF THE HARVEST: BIOTECH, BIG MONEY, AND THE FUTURE OF FOOD, at xv (2001) (“Monsanto spent at least a billion dollars on research before it had a single genetically engineered plant to sell . . .”).

⁴² Traditionally, “the funds required to purchase seed are typically needed at the same time that farmers are likely to have a negative cash flow. And while the price of seed is a small percentage of the overall cost of production when compared with the cost of equipment, fuel, fertilisers, lime, herbicides and insecticides, certified seed is consistently more expensive than farmer-saved seed. As such, farmers who saved seed could generally reduce principal and interest that would otherwise be paid on farm loans. At the same time farmers can retain a certain degree of independence from

agricultural biotechnology companies were unable to rely on traditional public ordering to protect their investment. Farmers were accustomed to saving the seed that produced the highest yield in a given year and to replanting that seed.⁴³ Agricultural biotechnology companies were forced to look elsewhere to exploit seed and incentivize innovation.

In 1970, Congress enacted the Plant Variety Protection Act (PVPA) providing limited protection for plants through the issuance of Certificates of Protection (PVP certificates).⁴⁴ In 1985, the United States Patent and Trademark Office held “that plants were within the understood meaning of ‘manufacture’ or ‘composition of matter’ and therefore were within the subject matter of § 101.”⁴⁵ It was not until 2001 that the Supreme Court affirmed that seed was patentable subject matter.⁴⁶ Given these various regimes of protection and the gaps endemic therein, agricultural biotechnology turned to private ordering to regulate seed. Public law proved inefficient in its protection of agricultural intellectual property. Private ordering gave seed companies a way to

seed companies, which may or may not have seeds that specifically match the farmers’ biogeoclimatic requirements. This is as true for seed planted at the beginning of the growing season as for particular replanting demands following torrential rain, freezing conditions and frost, or other environmental destruction of seed and plants already in the ground. Having a ‘reserve army’ of seeds provides farmers with the option to replant immediately after these adverse weather conditions. Seed saving, then, provides a valuable, convenient and affordable insurance against most disruptions of the input supply chain. This is of particular relevance in the US today where less than 2 per cent of the population are engaged in farming and only a fraction of them save seed.” Michael Mascarenhas & Lawrence Busch, *Seeds of Change: Intellectual Property Rights, Genetically Modified Soybeans and Seed Saving in the United States*, 46 SOCIOLOGIA RURALIS 122, 124 (2006) (footnote omitted).

⁴³ This time-honored practice was recognized in the PVPA, which states that it does not: “infringe any right hereunder for a person to save seed produced by the person from seed obtained, or descended from seed obtained, by authority of the owner of the variety for seeding purposes and use such saved seed in the production of a crop for use on the farm of the person, or for sale as provided in this section. A bona fide sale for other than reproductive purposes, made in channels usual for such other purposes, of seed produced on a farm either from seed obtained by authority of the owner for seeding purposes or from seed produced by descent on such farm from seed obtained by authority of the owner for seeding purposes shall not constitute an infringement.” Plant Variety Protection Act Amendments of 1994, 7 U.S.C. § 2543 (2006).

⁴⁴ *Asgrow Seed Co. v. Winterboer*, 513 U.S. 179, 181 (1995) (“[The PVPA was passed] in order to provide developers of novel plant varieties with ‘adequate encouragement for research, and for marketing when appropriate, to yield for the public the benefits of new varieties.’ The PVPA extends patent-like protection to novel varieties of sexually reproduced plants (that is, plants grown from seed) which parallels the protection afforded asexually reproduced plant varieties (that is, varieties reproduced by propagation or grafting) under Chapter 15 of the Patent Act.” (citations omitted)).

⁴⁵ *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred Int’l, Inc.*, 534 U.S. 124, 131 (2001) (quoting *Ex parte Hibberd*, 227 U.S.P.Q. 443, 444 (B.P.A.I. 1985)).

⁴⁶ *Id.* at 127.

circumvent the limitations of public law, rendering agricultural intellectual property profitable.

In relying on private ordering to circumvent public laws, seed companies were following a trend that first become prevalent with the expansion of the software industry in the 1970s.⁴⁷ As with seed, software was expensive to originate and inexpensive to replicate, rendering inefficient any protection then available through the public laws. Unlike seed, however, software was something new, and software consumers had no preconceived rights that they brought with them to the purchase of software. As a result, software developers were readily able to create a new model for the purchase of software—software was not sold, but instead licensed, and private ordering was used to circumvent public laws.⁴⁸ As can be seen from such companies as Microsoft, this was done very successfully.

Agricultural biotechnology companies were in a unique and enviable position. They possessed valuable seeds, and a consumer base predisposed to purchase seeds. The consumer base, however, brought a preconceived set of rights and assumptions with them to the purchase of seed, posing marketing problems for the seed companies. These problems came to a head in 1998, when the protection developed by agricultural biotechnology companies was seen to exceed any benefit to the public from the innovation. In 1998, researchers patented a new genetic modification that rendered seed sterile after one planting.⁴⁹ Nicknamed the “terminator gene,”⁵⁰ public reaction was vehement and immediate. Offended by the very concept that agricultural biotechnology companies could change the fundamental nature of the seed, the media fanned the public’s fears with horror stories about what the implementation of such a modification would mean.⁵¹ The terminator gene had the potential to shift the balance between corporate agriculture

⁴⁷ Elizabeth I. Winston, *Why Sell What You Can License? Contracting Around Statutory Protection of Intellectual Property*, 14 GEO. MASON L. REV. 93, 100–04 (2006).

⁴⁸ *Id.* at 100–01.

⁴⁹ U.S. Patent No. 5,723,765 col.36 ll.22–60 (filed June 7, 1995). The patent titled “Control of Plant Gene Expression” was granted to co-inventors Delta and Pine Land Company and the United States Department of Agriculture.

⁵⁰ This nickname is a misnomer, as the modification is not actually a gene, but rather a process for programming a plant’s genetic code so that the seed is fertile for only one planting and future generations are sterile. CHARLES, *supra* note 41, at 218–19. According to Charles, the originator of the nickname was Pat Roy Mooney, of the Rural Advancement Foundation International (RAFI) and the name was originated in March 1998. *Id.*

⁵¹ “The idea of such a gene horrified advocates for farmers in poor countries, who count on being able to save seeds from one harvest to plant the next year. Organizations ranging from the powerful Rockefeller Foundation in New York to the gadfly Rural Advancement Foundation International in Winnipeg, Canada, had urged a moratorium on its development.” Andrea Knox, *A Seed Firm Kills Plan to Use Terminator Gene*, PHILA. INQUIRER, Oct. 10, 1999.

and the family farmer, and allow seed companies to control the price of seed and the market. Public reaction was so strong⁵²—and the practical implications of introducing the terminator gene into seed so difficult—that the terminator gene was never introduced.⁵³

The terminator gene reflects the balance that must be struck between the benefits to society of innovation and the harm society faces with any protection of that innovation. When the benefits exceed the harm, then the market dictates that innovation occur. The terminator gene illustrates how consumer preference can influence innovation and, perhaps, impede progress. Marketing, the press, and personal opinion shape consumer preference. When the cost, shaped as it may be by these factors, exceeds the benefit to society, then the balance must be re-evaluated.

The terminator gene was a failure.⁵⁴ Society recognized that the costs of protection exceeded the benefit of the innovation.⁵⁵ Yet, the concept, honed in the software industry, that control of the product did not have to be relinquished to the consumer, was a success. Industry leaders turned to contracts to protect their investment in innovation.⁵⁶ Private ordering was used to create an entirely new and eminently profitable model for the transfer of seed. The recognition in 2001 that seeds are patentable has bolstered the private ordering protection for seed. Secure

⁵² See, e.g., Marion K. Pinsdorf, *Doing Public Relations by the Numbers: Little Mac or Big Mac?*, 26 PUB. REL. REV. 261 (2000), available at 2000 WLNR 10197677 (“Monsanto [initially] dismissed criticism by environmental, church and consumer groups hoping to ride out the storm. . . . In the six months of 1999 the company earned \$476m, up 5% on 1998, and its income had grown by 28%. It had no intention of backing down on terminator technology. . . . Global disillusion and protests proved otherwise. U.S. corn exports dropped 96% in a year. One giant processor announced it would pay a premium for traditional soybeans. Deutsche, the largest European bank, recommended selling Monsanto’s stock. By September 1999 the stock lost 35% of its value, while the market as a whole rose 30%. . . . Finally, Shapiro understood and halted research into terminator technology. [An interview with him after the halt] showed ‘a pale, drawn man’ saying, ‘We forgot to listen.’” (footnotes omitted)).

⁵³ See Knox, *supra* note 51. (“Bowing to mounting pressure, Monsanto Co. last week pledged to call a halt to development of the so-called terminator gene.”) In addition to the public opinion implications, it turned out to be very difficult to propagate plants that would thrive and not self-propagate. As a result, the terminator gene was never released publicly in the United States.

⁵⁴ *Id.*

⁵⁵ See, e.g., Stephanie Strom, *Rockefeller Foundation Head to Quit*, N.Y. TIMES, December 9, 2003, at A22 (“[W]hat farmers do is keep their seed from one year to plant the next year, and so on,” Mr. Conway said. “The terminator gene would have destroyed one of the great benefits of the Green Revolution.” (quoting Gordon Conway, President of the Rockefeller Foundation)); John Vidal, *How Monsanto’s Mind Was Changed*, LONDON GUARDIAN (Oct. 8, 1999), <http://www.guardian.co.uk/science/1999/oct/09/gm.food> (“What the Terminator gene did, [Mr. Conway] said, was [to] effectively kill the process that let farmers sow their own seeds . . .”).

⁵⁶ See CHARLES, *supra* note 41 at 154–55, 178.

in the knowledge that patents give a patent holder a limited right to restrain trade, agricultural biotechnology companies have greatly expanded that misperception of antitrust immunity, creating a widespread model of agribusiness protected through a combination of public and private ordering. As strong a set of protections as accompanies the grant of a patent, those protections are eclipsed by the private ordering system used by agribusiness to structure all use of seed.

The traditional model of selling agricultural biotechnology products relied on public ordering for protection. Historically, once a patented product was sold, the doctrine of patent exhaustion prevented the patent owner from placing any post-sale limitations on its use, because the costs of protection must not exceed the benefit to society. In 1926, the Supreme Court established this doctrine, holding that “where a patentee makes the patented article and sells it, he can exercise no future control over what the purchaser may wish to do with the article after his purchase. It has passed beyond the scope of the patentee’s rights.”⁵⁷ The Federal Circuit has since held that the sale of a patented article can be conditioned, again reflecting the concept that the benefit to society may exceed the costs of protection in some circumstances.⁵⁸

Innovators found a way to increase their reward, and increase the costs of protection to society, while still meeting the letter of the law. The doctrine of patent exhaustion applies only to the sale of patented products and not licenses.⁵⁹ Through licenses, agricultural biotechnology companies circumvent the issue of what restrictions are within the field of use of the seed and place numerous restrictions on the party acquiring seed.⁶⁰ The patent holder is using the patent system to reap rewards greater than the benefit to society associated with the innovations.

The implementation of a system based on the extension of patents through private ordering has changed the agricultural economy and community. This system is not subject to the traditional checks and balances inherent in the patent and antitrust laws because of the misperception of antitrust immunity for patents. Agricultural biotechnology licenses do not seek to provide protection otherwise lacking, but to restrain trade and inhibit progress. Such private ordering would violate the antitrust laws if used to limit access to railroads, or unpatented articles. To allow it to go unchecked because the articles subject to private ordering are patented violates the fundamental patent

⁵⁷ *United States v. Gen. Elec. Co.*, 272 U.S. 476, 489 (1926).

⁵⁸ *Mallinckrodt, Inc. v. Medipart, Inc.*, 976 F.2d 700, 709 (Fed. Cir. 1992).

⁵⁹ *Quanta Computer, Inc. v. LG Elecs., Inc.*, 128 S. Ct. 2109, 2115–17 (2008).

⁶⁰ *Gen. Elec. Co.*, 272 U.S. at 489 (“Conveying less than title to the patent, or part of it, the patentee may grant a license to make, use and vend articles under the specifications of his patent for any royalty or upon any condition the performance of which is reasonably within the reward which the patentee by the grant of the patent is entitled to secure.”).

bargain, which promotes innovation by incentivizing research and development.⁶¹ When licenses are impairing innovation, the market is broken. The progress of science is to be rewarded, and the promotion of innovation encouraged. However, when the costs of protection exceed the benefit to society, then the patent bargain is betrayed. The patent misperception of antitrust immunity is allowing agricultural biotechnology to create a system of private law to expand on their patents and to illegally restrain trade. It is anti-antitrust to allow the abuse to continue.

III. WHO CONTROLS THE MARKET?

The agricultural industry no longer fluctuates and changes to reflect society's dietary and consumptive needs.⁶² Instead, the industry has become increasingly concentrated, resulting in the growth of non-indigenous crops⁶³ protected as the intellectual property they have become.⁶⁴ The impact of this stability, concentration, and extensive protection is an agriculture economy that is "so fragile that only a minute number of farmers and seed breeders have the knowledge and ability to select, maintain and improve seed."⁶⁵

The role of private ordering in creating this fragile ecosystem cannot be over-emphasized.⁶⁶ Private ordering allowed the industry to promote

⁶¹ See, e.g., Sean D. Murphy, *Biotechnology and International Law*, 42 HARV. INT'L L.J. 47, 61 (2001) ("[I]ntellectual property in genetically modified products must be protected in order to promote the costly research and development of such products.").

⁶² JACK RALPH KLOPPENBURG, JR., *FIRST THE SEED: THE POLITICAL ECONOMY OF PLANT BIOTECHNOLOGY, 1492-2000*, at 32 (2d ed. 2004) ("The rise of agribusiness has by no means gone unnoticed . . . 'input and product market stages have had traditional activities away from the farm enterprise' . . .") (citation omitted); *id.* at 57 ("[T]he farmer-breeders were eminently effective. By 1860, a host of crops was firmly established and formed the base for a variety of regional agricultural economies: a commercial feedgrain/livestock economy north of the Ohio River, with a wheat belt farther north, specialized dairy and vegetable production in the Northeast, tobacco, rice, cotton, and sugar cane in the South.") (citation omitted)).

⁶³ *Id.* at 49 ("[T]he crops that now dominate the agricultural economies of the advanced industrial nations are not, for the most part, indigenous species. They have been introduced from elsewhere, principally from what is now the Third World.").

⁶⁴ See John Burnett, *Small Farmers See Promise in Obama's Plans*, NAT'L PUB. RADIO (Aug. 20, 2009), <http://www.npr.org/templates/story/story.php?storyId=112035045> ("Since the 1980s, American agriculture has become increasingly concentrated. Today, less than 2 percent of farms account for half of all agricultural sales.").

⁶⁵ Mascarenhas & Busch, *supra* note 42, at 134.

⁶⁶ Kal Raustiala & Christopher Sprigman, *The Piracy Paradox: Innovation and Intellectual Property in Fashion Design*, 92 VA. L. REV. 1687, 1695 (2006) ("Economic theory suggests that firms operating in concentrated markets often need IP [intellectual property] protection less, especially when they possess non-IP forms of market power (preferred access to distributors, for example) that enable them to prevent free-riding and capture the benefits of their innovations.").

innovation in a “self-replicating invention”⁶⁷ despite the “lack of fit between plant innovation and traditional intellectual property regimes.”⁶⁸ Reward and protection were achieved through private ordering and the circumvention of public ordering.⁶⁹ Contracts have created a market where the definition of consumption itself has been changed, and where competition has been altered. When consolidation, patent law, and private ordering combine to create a market anticompetitive in nature and illegally restrain trade, this Article argues that society is harmed. To understand the impact of agricultural biotechnology licenses on society, a sample market is defined, the sample market composition is analyzed, and the distribution of market power is examined below.

A. *Market Definition*

To delineate a market requires the identification of the smallest possible market in which a supplier can raise its prices and maintain market share.⁷⁰ The market definition must be narrowly defined while including all acceptable substitutes within that market. Numerous markets can be identified in the agricultural biotechnology industry,⁷¹ but the smallest relevant market is a single crop. This Article will focus on the soybean market.⁷²

In 2010, farmers planted 78.9 million acres of soybean, “setting a new record high” for the largest planting of soybean in United States recorded history.⁷³ The market consists of a variety of suppliers of

⁶⁷ Mark D. Janis & Jay P. Kesan, *U.S. Plant Variety Protection: Sound and Fury . . . ?*, 39 HOUS. L. REV. 727, 730 (2002).

⁶⁸ *Id.*

⁶⁹ Jim Chen, *The Parable of the Seeds: Interpreting the Plant Variety Protection Act in Furtherance of Innovation Policy*, 81 NOTRE DAME L. REV. 105, 149 (2005).

⁷⁰ U.S. DEP’T OF JUST. & FED. TRADE COMM’N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY 9 (Apr. 6, 1995).

⁷¹ *Land Use, Value and Management: Major Uses of Land*, ECON. RES. SERV., U.S. DEP’T OF AGRIC. (Oct. 18, 2005), <http://www.ers.usda.gov/Briefing/LandUse/majorlandusechapter.htm> (“Four crops—corn for grain, soybeans, wheat, and hay—account for 80.2 percent of all crop acres harvested in 2002.”) The market could be expanded even further to include all principal crops defined by the United States Department of Agriculture as including “corn, sorghum, oats, barley, winter wheat, rye, durum wheat, other spring wheat, rice, soybeans, peanuts, sunflower, cotton, dry edible beans, potatoes, sugar beets, canola and proso millet, as well as harvested area for all hay, tobacco and sugar cane.” *USDA Expects Total Corn, Soybean Acres on Par with Last Year*, NAT’L AGRIC. STAT. SERV., U.S. DEP’T. OF AGRIC. (Mar. 31, 2009), http://www.nass.usda.gov/Newsroom/2009/03_31_2009.asp.

⁷² Seeds, including genetically modified soybeans, are “not homogenous products. The market for seeds is highly individualized depending upon geographic location, growing conditions, consumer preference and other factors.” *Sample v. Monsanto Co.*, 218 F.R.D. 644, 650–51 (E.D. Mo. 2003).

⁷³ *U.S. Farmers Plant Record-High Soybean Crop*, NAT’L AGRIC. STAT. SERV., U.S. DEP’T OF AGRIC. (June 30, 2010), http://www.nass.usda.gov/Newsroom/2010/06_30_2010.asp (“U.S.

genetically modified and non-genetically modified soybean seeds. The soybean market is not so narrow as to create a distorted view of market share—there are over 2000 varieties of soybean seed available to the American farmer.⁷⁴ At the same time, the market is small enough to allow for “identification of market participants and the measurement of market shares and market concentration.”⁷⁵

B. Market Composition

The largest market participant in the soybean market is Monsanto.⁷⁶ Monsanto’s main competitors include Bayer Crop Science, Dow AgroSciences, DuPont Pioneer, and Syngenta, each controlling less than 10 percent of the market.⁷⁷ Each of these agricultural biotechnology companies is the result of decades of consolidation⁷⁸ creating an oligarchy driven by the high costs of research and development and protected by high barriers to entry.⁷⁹

In the abstract, the soybean seed market comprises seeds from a variety of sources. Seeds can be modified through agricultural biotechnology to be resistant to herbicides, insects or both. In 2008, 92% of all soybean seed planted in the United States was genetically modified through agricultural biotechnology to be herbicide resistant.⁸⁰ Organic soybean seed comprised 0.2% of the United States soybean crop in

farmers planted 78.9 million acres of soybeans, exceeding last year’s planted area by 1.4 million acres, or 2 percent, and setting a new record high . . .”).

⁷⁴ *Observations on Competition in the U.S. Seed Industry*, MONSANTO, <http://www.monsanto.com/newsviews/Pages/monsanto-submission-doj.aspx#ic>.

⁷⁵ U.S. DEP’T OF JUST. & FED. TRADE COMM’N, HORIZONTAL MERGER GUIDELINES 7 (April 20, 2010).

⁷⁶ DIANA L. MOSS, THE AM. ANTITRUST INST., *TRANSGENIC SEED PLATFORMS: COMPETITION BETWEEN A ROCK AND A HARD PLACE?* 17 (Oct. 23, 2009), <http://www.antitrustinstitute.org/content/aai-white-paper-generic-competition-transgenic-soybeans> (“Monsanto accounts for the majority of field releases for corn and soybeans over the last decade, with shares ranging to almost 80 percent at their peak in 2002, hovering around 70 for much of the 2000s and drifting down somewhat after 2005.”).

⁷⁷ *Id.* (“The remaining players are relatively small (Syngenta, Pioneer, Dow, and Bayer) and each have shares of less than 10 percent for the bulk of the time period.”).

⁷⁸ David A. Domina & C. Robert Taylor, *The Debilitating Effects of Concentration Markets Affecting Agriculture*, 15 *DRAKE J. AGRIC. L.* 61, 79 (2010); Philip H. Howard, *Visualizing Consolidation in the Global Seed Industry: 1996–2008*, 1 *SUSTAINABILITY* 1266, 1270–71 (2009), available at <http://www.mdpi.com/2071-1050/1/4/1266/>.

⁷⁹ The barriers to entry have been elevated by the agricultural oligarchy, who rely on a variety of factors including intellectual property, capital investment, economies of scale, marketing, and entrenched distribution networks to protect their investments. See Howard, *supra* note 78, at 1270–71.

⁸⁰ *Acreage*, NAT’L AGRIC. STAT. SERV., U.S. DEP’T. OF AGRIC. 25 (June 30, 2008), available at <http://usda.mannlib.cornell.edu/usda/nass/Acre//2000s/2008/Acre-06-30-2008.pdf>.

2005.⁸¹ Seed can be conventionally bred to be herbicide resistant, can be heirloom seed, or can be non-certified organic, which would not count in the 0.2% organic seed share. The reality is that concentration has allowed for manipulation of the market for all seed, including non-genetically modified seed,⁸² which tends to be produced by smaller operations in increasingly thin markets.⁸³

Most farmers do not have access to thousands of varieties of soybean seed. Farmers have access to their local seed distributor and that distributor's selections. The varieties of soybean include organic seed, transgenic seed, and other forms of soybean seed. Many distributors are contractually obligated to carry only certain brands of seed, or are incentivized to sell a certain amount of different soybean seed varieties.⁸⁴ This is akin to car dealerships and controlled through contracts between the distributors and agricultural biotechnology corporations.⁸⁵ Again, akin to car dealerships, consumer preference plays a large role in the distribution of seed. If the farmers demand Monsanto seed, then the

⁸¹ CATHERINE GREEN ET AL., ECON. RES. SERV., U.S. DEP'T OF AGRIC., ECON. INFO. BULL. NO. 55, EMERGING ISSUES IN THE U.S. ORGANIC INDUSTRY 4 (June 2009).

⁸² See, e.g., Robert Langreth & Matthew Herper, *The Planet Versus Monsanto*, FORBES, Jan. 18, 2010, at 64, 67 ("Even some organic farmers are clamoring for genetically modified crops. Don J. Cameron grows both organic and conventional cotton on his farm in Helm, Calif. The organic fields cost \$500 per acre to weed by hand, versus only \$30 an acre for glyphosate-immune fields. Lately he can't even sell organic cotton because the stuff coming out of India, Syria and Uganda is so cheap. 'I feel the organic industry has painted itself in a corner saying that all genetically modified organisms are bad. Eventually they're going to have to allow it,' Cameron says.").

⁸³ Even in defending the market structure, economists acknowledge that the independent seed companies are at a significant disadvantage in the industry. See, e.g., Wilson & Dahl, *supra* note 11, at 6 ("Licensing is particularly critical to independent seed companies ('ISC's'). Indeed, without an aggressive broad-based licensing of patented products, these ISC's would have difficulty competing with GE [genetically engineered] traited varieties. Simply put, licensing gives agbiotechnology companies a mechanism to distribute their traits without the need to own 100 percent of their planned output, which would be excessively costly, risky, unnecessary, and strategically unwise. It is these licensing mechanisms that allow agbiotechnology firms to simultaneously protect their IP, and to pursue strategies of partial vertical integration for seed and trait distribution.").

⁸⁴ Tom Philpott, *SEC Investigates Monsanto's Roundup Biz*, MOTHER JONES, July 19, 2011, 3:00 AM, <http://motherjones.com/tom-philpott/2011/07/roundup-sec-investigates-monsanto>.

⁸⁵ Christopher Leonard, *Monsanto Stomps Down Budding Seed Competitors*, USA TODAY, Dec. 14, 2009, 10:51 AM, http://www.usatoday.com/money/industries/food/2009-12-14-monsanto-practices_N.htm ("One contract gave an independent seed company deep discounts if the company ensured that Monsanto's products would make up 70% of its total corn seed inventory. . . [T]he discounts were used to entice seed companies to carry Monsanto products when the technology was new and farmers hadn't yet used it.").

distributor who cannot sell Monsanto seed will lose money.⁸⁶ The terms of distribution nullify the theoretically numerous soybean varieties.

C. *Market Power*

Genetically modified, or transgenic, soybean seed dominates the soybean market.⁸⁷ The majority of transgenic soybean seed is Roundup Ready soybean seed.⁸⁸ Roundup Ready soybean seed contains the Roundup Ready gene (or trait) developed by Monsanto after decades of research and development.

In 1976 Monsanto introduced a new herbicide onto the market—glyphosate, branded as Roundup.⁸⁹ This herbicide quickly became Monsanto's leading product, because of its effectiveness at killing numerous plants and its ease of use.⁹⁰ That very effectiveness was the downfall of the product. Roundup could be used to clear a field before planting, but once a crop was planted, application of Roundup would kill the crop as well as any weeds.⁹¹ Agricultural biotechnology helped Monsanto develop crops that would tolerate glyphosate, and in turn, boost sales of Roundup.⁹² Twenty years later,

soybean farmers saw the first commercial release of a new soybean variety that would change agriculture. Using the science of biotechnology, researchers had isolated a trait in the genetic code of the soybean plant that offered resistance to the chemical herbicide glyphosate. Those first Roundup Ready soybeans ushered in a whole new era in production agriculture. For the first time soybean farmers had in-seed herbicide tolerance to Roundup,

⁸⁶ CHARLES, *supra* note 41, at 177 (“[One distributor was so concerned that it was] going to be shut out of the market” that it “banded together with twenty other small Minnesota seed dealers to form a joint venture called North Star Genetics. They hoped that the new company would be substantial enough to earn them a license for Roundup Ready soybeans.”).

⁸⁷ *Acreage*, *supra* note 80.

⁸⁸ Op-Ed., *Seeds of Antitrust Destruction*, WALL ST. J., Mar. 29, 2010, at A22 (“If the relevant ‘market’ is herbicide-resistant soybeans, then Monsanto has been a colossus since its first unit was sold. (Round-up Ready is literally the only product that’s been developed for this purpose.)”).

⁸⁹ David Mercer, *Roundup Resistant Weeds Pose Environmental Threat*, USA TODAY, June 21, 2010, 11:43 AM, http://www.usatoday.com/tech/science/environment/2010-06-21-roundup-weeds_N.htm (“When Monsanto introduced Roundup in 1976, ‘it was like the best thing since sliced bread,’ said Garry Niemeyer, who grows corn and soybeans near Auburn in central Illinois.”).

⁹⁰ Simon, *supra* note 36, at A18.

⁹¹ *Id.*

⁹² *Id.*

which had been used as a pre-plant burndown treatment on soybean acres since the 1970s.⁹³

Farmers could now use Roundup to clear fields before planting a new crop, and continue to use Roundup to kill weeds without harming the Roundup Ready soybean seeds.⁹⁴ Farmers who planted soybeans traditionally used a variety of herbicides during cultivation of their crop. Roundup Ready soybean seed changed that. When planting Roundup Ready soybean seeds, farmers could now use a broad spectrum herbicide after planting, not just as a pre-plant treatment. Furthermore, the only broad spectrum herbicide they could use on these fields is glyphosate, as Roundup Ready soybeans are only immune to glyphosate, and any other broad-spectrum herbicide will kill the plants as well as the weeds.⁹⁵ “The ability to spray Roundup over the top of a soybean field is considered the cornerstone of an effective weed management system in soybeans. . . . It’s a simple and efficient way to control hundreds of weeds.”⁹⁶ Sales of Roundup and Roundup Ready soybean seed increased dramatically.⁹⁷

Not all Roundup Ready soybean seed is sold by Monsanto.⁹⁸ The agricultural biotechnology industry relies on cross-licensing allowing for wide-spread distribution of traits, such as resistance to Roundup, through a variety of seeds, not all owned by any one company.⁹⁹ Diversification through cross-licensing allows agricultural biotechnology companies to protect their intellectual property, and to “pursue strategies of partial vertical integration for seed and trait distribution.”¹⁰⁰ This same licensing practice, however, undercuts the composition of the market, creating the fiction of competition. Monsanto developed Roundup Ready soybean seed and aggressively cross-licensed the seed to over 200 other seed companies.¹⁰¹ The “licenses require the users of RRSB [Roundup Ready Soybean Seed] to enter into a Grower License Agreement (GLA) with

⁹³ Jennifer M. Latzke, *Roundup Ready Soybean Trait Patent Nears Expiration in 2014*, HIGH PLAINS/MIDWEST AG J., Aug. 2, 2010, available at <http://www.hpj.com/archives/2010/aug10/aug2/0716SeedMACOAug2sr.cfm>.

⁹⁴ Mark Arax & Jeanne Brokaw, *No Way Around Roundup*, MOTHER JONES, Jan./Feb. 1997, at 40, 40.

⁹⁵ *Id.* (“Farmers using Roundup Ready seeds can only use Roundup, because any other broad-spectrum herbicide will kill their crops. So, with every Roundup Ready seed sale, Monsanto sells a season’s worth of its weed killer as well.”).

⁹⁶ Latzke, *supra* note 93 (quoting Jim Tobin, Vice President of Industry Affairs for Montanto).

⁹⁷ William Neuman, *A Growing Discontent: Rapid Rise in Seed Prices Draws Government Scrutiny*, N.Y. TIMES, March 12, 2010, at B1 (“Agriculture Department figures show that . . . [s]oybean prices went up 108 percent” since 2001. “By contrast, the Consumer Price Index rose only 20 percent in that period.”).

⁹⁸ Leonard, *supra* note 85.

⁹⁹ Wilson & Dahl, *supra* note 11, at 5.

¹⁰⁰ *Id.* at 6.

¹⁰¹ *McIntosh v. Monsanto Co.*, 462 F. Supp. 2d 1025, 1028 (E.D. Mo. 2006).

Monsanto. These licenses also require the licensee seed company to either collect a technology fee (set by Monsanto) from the user for each bag of RRSB or pay Monsanto a royalty (again set by Monsanto) for each bag sold.¹⁰² These fees allow Monsanto to set a minimum price for all Roundup Ready soybean seed, and eliminate the ability of competitors to undercut Monsanto's prices.¹⁰³

Since the introduction of Roundup Ready soybean seed, prices have increased dramatically in the soybean market.¹⁰⁴ This is driven by many factors, including the increased yield of the seed, the ease of farming with Roundup Ready soybean, and the simple fact that a new and better product can carry a new and better price tag.¹⁰⁵ However, "[c]onsumers pay more when a single company controls access to innovation,"¹⁰⁶ and this is reflected in Monsanto's 42% price increase in soybean seed from 2009–2010.¹⁰⁷ Monsanto's reach is long, and being denied access to Monsanto's technology places great limitations on its competitors.¹⁰⁸ This is particularly true given how few competitors there truly are.¹⁰⁹

¹⁰² *Id.*

¹⁰³ See Leonard, *supra* note 85.

¹⁰⁴ Neuman, *supra* note 97.

¹⁰⁵ *Observations on Competition in the U.S. Seed Industry*, MONSANTO, <http://www.monsanto.com/newsviews/Pages/monsanto-submission-doj.aspx#ic> ("On the farm, biotech seeds have been rapidly adopted, especially in the major row crops such as corn, soybeans and cotton, due to the significant benefits they provide to growers. These include improved weed and insect control, greater yield, convenience, environmental sustainability, and increased profits.").

¹⁰⁶ See COMMENTS OF DUPONT/PIONEER HI-BRED INTERNATIONAL REGARDING AGRICULTURE AND ANITRUST ENFORCEMENT ISSUES IN OUR 21ST CENTURY ECONOMY 7, available at <http://www.justice.gov/atr/public/workshops/ag2010/comments/254990.pdf> [hereinafter COMMENTS OF DUPONT/PIONEER HI-BRED INT'L].

¹⁰⁷ Miriam Metzinger, *Cramer's Mad Money - Monsanto's Menacing Monopoly*, SEEKING ALPHA (Aug. 14, 2009), <http://seekingalpha.com/article/156049-cramer-s-mad-money-monsanto-s-menacing-monopoly-8-13-09>; see also Jack Kaskey, *Monsanto to Charge as Much as 42% More for New Seeds (Update3)*, BLOOMBERG (Aug. 13, 2009), <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aLW8VZBkP3PA> ("Roundup Ready 2 Yield soybeans will cost farmers an average of \$74 an acre in 2010, and original Roundup Ready soybeans will cost \$52 an acre, St. Louis-based Monsanto said today in presentations on its Web site."); COMMENTS OF DUPONT/PIONEER HI-BRED INT'L, *supra* note 106, at 7 ("Recently, Monsanto announced that it would impose a 42 percent increase in the price of Roundup Ready 2 Yield compared to Roundup Ready, even though independent studies from the Universities of Illinois and Iowa, among others, have shown the top five Roundup Ready 2 Yield varieties yielded little more (1.2 percent), and in some instances less (-1.8 percent), than Roundup Ready varieties.").

¹⁰⁸ There are numerous reports in the news of settlements between Monsanto and competitors, evidencing the competitors' interest in complying with Monsanto's terms. See, e.g., *Syngenta, Monsanto Settle Crop Tech Dispute*, GLOBE & MAIL (Toronto), May 24, 2008, at B8 ("Syngenta said it will withdraw antitrust and infringement cases related to Monsanto's use of herbicide-tolerant and insect-protected corn technologies, and herbicide-tolerant soybean technology. In return, St. Louis-based Monsanto will license Syngenta's technology for making crops resistant to the

herbicide Dicamba. Syngenta will also license one of Monsanto's 'Roundup Ready' technologies for increasing soybean yield."); Jeffrey Tomich, *Monsanto to License Seed Trait to Rival Dow*, ST. LOUIS POST-DISPATCH, June 3, 2010, at A11 ("Monsanto Co. said Wednesday it agreed to license its Roundup Ready 2 Yield soybean trait to rival Dow AgroSciences LLC. Roundup Ready 2 Yield allows farmers to spray for weeds without harming crops. Dow will pay Monsanto royalties for use of the trait. Payment terms weren't disclosed. The agreement builds on other license agreements between the companies and allows Dow to combine, or stack, the Roundup Ready 2 Yield trait with other traits in Dow seeds."); Greg Burns, *Corn Belt Competition Heats Up*, CHI. TRIB., Mar. 18, 2010, at 23 ("The public pressure coincides with ugly litigation between St. Louis-based Monsanto and a longtime rival in the seed biz, DuPont's Pioneer Hi-Bred International Inc., which has had little choice but to license Roundup Ready for its corn and soybeans."); Dan Piller, *Old Seed Industry Squabble Lives on in the New Decade*, DES MOINES REG., Feb. 26, 2010, available at 2010 WLNR 4168000 ("Roundup's popularity has compelled rival seed companies, Pioneer included, to license the genetic trait for Roundup resistance in their seeds. Those agreements are confidential. But allegations have abounded that Monsanto has leveraged the use of the Roundup Ready license to control or block access by other seed companies to other technologies and markets."); *DuPont, BASF Settle Patent Suits: Companies Sued over Herbicide-Tolerant Crops*, ST. LOUIS POST-DISPATCH, Jan. 14, 2010, at A11 ("DuPont Co., the third-biggest U.S. chemical maker, and larger rival BASF SE settled lawsuits with each other over U.S. patents for technology to create herbicide-tolerant crops. BASF, the world's largest chemical maker and DuPont agreed to cross-license the disputed patents and dismiss claims filed in June, the companies said Wednesday."); Dan Piller, *Pioneer, Dow Agree to Share Seed Traits*, DES MOINES REG., Nov. 14, 2009, at B10 ("Pioneer Hi-Bred of Johnston and Dow AgroSciences said they will cross-license herbicide-tolerance traits that will be used in soybeans sold under Pioneer's Optimum GAT and Dow's Mycogen and other brands. The agreement licenses Dow's herbicide-tolerance traits to Pioneer, while Pioneer will license to Dow its Optimum GAT traits."); Danielle Vickery, *DuPont Reaches Agreement with Bayer to License Herbicide Safener*, NEWS J. (Wilmington, Del.), June 26, 2009 ("DuPont Co. and Bayer CropScience announced agreements Thursday to cross-license insect control and herbicide safeners, which settles several ongoing legal and patent disputes between the two companies."); *Monsanto and Syngenta Settle GM Seed Disputes; Share Technologies*, CHEM. BUS. NEWSBASE, June 2, 2008 ("Monsanto and Syngenta have consented to resolve their legal battle in relation to their own genetically modified (GM) corn and soybean operations. The lawsuits include patent, antitrust, and commercial cases between the two firms and their subsidiaries, including an antitrust case that was due to be heard in court in Jun [sic] 2008. The two firms have also consented to cross-license some of their GM technologies, which will expand possible commercial availability of Monsanto's second generation Roundup Ready2Yield (RR2Yield) soybean technology. Syngenta will get a royalty-bearing licence to Monsanto's RR2Yield soybean, and more beneficial marketing terms in relation to Monsanto's Bt-11 trait for corn borer management in Europe. Also, Monsanto will get a royalty-bearing licence to Syngenta's enabling dicamba herbicide tolerance technology."); Michelle Bryner, *Dow and Monsanto Settle Patent Disputes*, CHEM. WEEK, Jan. 25, 2006, at 7 ("Dow AgroSciences and Monsanto say they have agreed to settle legal disputes regarding certain *Bacillus thuringiensis* (Bt) gene technologies used to impart insect-resistance in corn, cotton, and soybeans. In addition, the companies have agreed to cross-license crop biotechnology rights and products on a nonexclusive basis. 'The agreement allows both Monsanto and Dow to focus on our farmer customers instead of spending time unnecessarily in the courtroom over disputes that have been going on for over a decade,' Monsanto says. Under the deal,

The market share of genetically modified soybean seed has increased phenomenally since its introduction, resulting in extraordinary profits for Monsanto.¹¹⁰ Again, in 1996, transgenic seed accounted for 0% of the market.¹¹¹ In 2008, transgenic seed was planted on over 92% of all soybean acreage.¹¹² Farmers, distributors and consumers are not sensitive to the pricing scheme set forth by Monsanto, insulated as they are by cross-licensing from a true competitive market.¹¹³ In order to acquire Roundup Ready soybean seed, farmers have to agree to Monsanto's terms—whether Monsanto or DuPont or Syngenta brands the seed.¹¹⁴

Monsanto has used its patent rights to maintain control of the market by limiting the output of soybean seeds. Farmer-licensees of Roundup Ready soybean seed must agree to limitations on its use—including using the seed for more than a single growing season,¹¹⁵ and

Dow obtains a commercial license to certain Monsanto biotechnology seed traits for corn and soybeans. Dow also receives royalty-bearing rights to combine its own traits with Monsanto's to create 'stacked' varieties of cotton and corn seeds, such as corn sporting Monsanto's glyphosate-tolerant Roundup Ready trait plus Dow's insect-resistant Herculex trait."); *Monsanto, Aventis Settle Legal Spat*, CHEM. WEEK, Apr. 4, 2001 ("Monsanto will allow Aventis [acquired by Bayer in 2001] to license Monsanto's Roundup Ready and Bollgard technologies in Aventis's FiberMax cotton varieties in the U.S. Aventis, meanwhile, will license its insect-resistance management patents, which relate to using certain combinations of *Bacillus thuringiensis* genes to control susceptible insects, to Monsanto. Aventis and Monsanto say they also will cross-license to each other all of their other existing cotton transformation patents.").

¹⁰⁹ Leonard, *supra* note 85.

¹¹⁰ *Acreage, supra* note 80; *Observations on Competition in the U.S. Seed Industry, supra* note 105.

¹¹¹ *Highlights Throughout the Years*, MONSANTO, <http://www.monsanto.com/weedmanagement/Pages/highlights-throughout-the-years.aspx>.

¹¹² *Acreage, supra* note 80.

¹¹³ U.S. DEP'T OF JUST. & FED. TRADE COMM'N, *supra* note 70, at 28; Elizabeth I. Winston, *What if Seeds Were Not Patentable?*, 2008 MICH. ST. L. REV. 321, 330 (2008).

¹¹⁴ See, e.g., the 2010 RPM Brand Seed and Technology Agreement, *available at* <http://www.doeblers.com/08/2010%20RPM%20Growers%20Agreement.pdf> (The grower agrees: "To use the Seed and Technologies only for planting a commercial crop only in a single season; To not supply any of this Seed to any other person or entity for planting, and not to save any crop produced from this Seed for replanting, or supply saved seed to anyone for replanting; To not use this Seed or its progeny or provide it to anyone for crop breeding, seed production, research (other than to make agronomic comparison and conduct yield testing) or market profiling If the Grower intentionally breaches this Agreement, in addition to other penalties, the Grower's rights under this Agreement will terminate immediately and the Grower forfeits any right to obtain a license to the Seed and Technologies in the future. If this Agreement is terminated, you will no longer have a right under this Agreement to purchase Seed containing the subject Technologies.").

¹¹⁵ There is an argument to be made that this in fact increases the output of seed, since farmers must now acquire new seed every year, so more soybean seed must be on the market. However, the output of commercially available seed for planting, which is the market composition, in fact may stabilize or decrease since the farmer-licensees are no longer producing seed for planting purposes, and Monsanto

from “saving and replanting any of the crop grown from the Roundup Ready soybean for planting, or transferring the seed for replanting.”¹¹⁶ Competitor-licensees must agree to production limits on any seed containing the Roundup Ready trait.¹¹⁷ Competitor-licensees are also restricted in what research and development they can do with seed containing the Roundup Ready trait.¹¹⁸ Monsanto thus limits the development of alternatives in the herbicide-resistant soybean seed market.

Monsanto’s innovations have changed the soybean market. The terms used in the Roundup Ready licenses grant Monsanto market power. “To date, Monsanto has had virtually no competition to its RoundupReady soybean”¹¹⁹ It is not Monsanto’s patent that grants Monsanto market power, but rather Monsanto’s licenses that allow it to maintain prices above competitive levels and output of seed below competitive levels for a significant period of time.¹²⁰ The licenses allow Monsanto to set a minimum price for Roundup Ready seed, through the technology fees,¹²¹ and to restrict output through the production limits found in the agreements, giving Monsanto control of the genetic trait soybean market.¹²² Through effective use of private ordering, Monsanto controls the soybean market, setting elevated prices and unlawfully restricting competition.

IV. FARMER-LICENSEES

Innovation and competition in the seed market were revolutionized by the development of the terminator gene. In an effort to protect their investment, agricultural innovators revolutionized the seed industry—not

controls, through their licenses, the overall production of Roundup Ready soybean seed by agricultural biotechnology companies.

¹¹⁶ See Letter from Christian Mullgardt on behalf of Monsanto (Oct. 19, 2006) [hereinafter Mullgardt Letter](on file with author) (“All brands of Roundup Ready soybean seed are sold subject to limitations on use, including the limitation to only use the seed for a *single* growing season. The limited license expressly prohibits growers from saving and replanting any of the crop grown from the Roundup Ready soybean for planting, or transferring the seed for replanting.”).

¹¹⁷ *McIntosh v. Monsanto Co.*, 462 F. Supp. 2d 1025, 1029 (E.D. Mo. 2006).

¹¹⁸ As discussed in Part V below, this may be within their right as a patent holder to do so.

¹¹⁹ *GM Crops in the USA: Competition for RoundupReady Soybeans*, GMO COMPASS (January 28, 2009), http://www.gmo-compass.org/eng/news/412.usa_competition_roundupready_soybeans.html.

¹²⁰ U.S. DEP’T OF JUST. & FED. TRADE COMM’N, *supra* note 70, at 4 (“Market power is the ability profitably to maintain prices above, or output below, competitive levels for a significant period of time.”).

¹²¹ See Robert Tripp, *Transgenic Cotton: Assessing Economic Performance in the Field*, in TECHNOLOGY AND AGRICULTURAL DEVELOPMENT 72, 80 (Robert Tripp ed., 2009).

¹²² *Observations on Competition in the U.S. Seed Industry*, *supra* note 105, at 9.

by introducing a better product, but by introducing a new way of doing business. The terminator gene was developed as a way to maximize the reward inherent in the initial sale of a seed. Ultimately, modifying the seed to limit its propagation cycles was not practical—so instead, companies looked for other ways to reap the same reward—the reward of maintaining control over seed. For the first time, agricultural biotechnology companies realized that they did not have to relinquish control over their product.¹²³

Taking a cue from the software industry, and looking at the reasons behind the development of the terminator gene, agricultural biotechnology companies understood that they were charting new ground.¹²⁴ Unlike the software industry, farmers had been buying seed from distributors, who in turn bought it from agricultural biotechnology companies, for generations. Farmers brought with them pre-existing concepts of the sets of rights that came with acquiring seed. Farmers were used to the idea of using seed as they saw fit. Under traditional farming practices, a farmer typically saved seed from the highest yield crop to plant some acreage of that crop the next year, and then purchased new seed to plant the remaining acreage.¹²⁵

Innovation in agriculture is expensive and time-consuming. The terminator gene was one way to increase the reward associated with seed. Standard farming practices imbued farmers with a pre-existing set of rights, including the right to use seed as they saw fit. These rights limited the reward associated with the expensive development of new seedlines. Traditional forms of protection were inadequate to provide sufficient reward for the costs of innovation. The internal machinations of the development of seed lines are often protected as trade secrets through private ordering.¹²⁶ Once a seedline is developed, it must be

¹²³ *Monsanto Co. v. Good*, No. Civ.A.01-5678 FLW, 2004 WL 1664013, at *2 (D. N.J. July 23, 2003) (A farmer licensing seed from Monsanto in 2001 agreed to the following conditions: “This seed carries a limited license under U.S. patent . . . 5,352,605 . . . solely to produce a single commercial crop in one and only one season. This license does not extend to the seed from such crop or the progeny thereof by propagation or seed multiplication. The use of such seed or the progeny thereof for propagation or seed multiplication . . . is strictly prohibited.”) (alteration in original) (citation omitted)).

¹²⁴ CHARLES, *supra* note 41, at 109–10 (“Biotechnology, [the Vice-President of Research for Monsanto’s agricultural division] predicted, was destined to transform agriculture. Monsanto held in its hands the kind of opportunity that came along perhaps once in a generation. It had a chance to dominate an industry in the making, much as Microsoft with a small head start and a few strategic decisions had come to dominate the personal computer business.”).

¹²⁵ Mascarenhas & Busch, *supra* note 42, at 122.

¹²⁶ Trade secret protection extends to the identification of the seed in the fields themselves. Various forms of trade secret protection include: “the use of bag-licenses, a parent test program, cytoplasmic male sterile lines, visual sorting, isozyme testing and grow outs, and third party inspections.” Bruce Vrana, *Case Summary of Advanata*

propagated—which is both the reason for the existence of seed and the Achilles heel of agribusiness.¹²⁷ Agricultural biotechnology is difficult to protect, because when many varieties of seed replicate they can create a perfect copy of that which was so expensive to develop in the first place.

Absent an effective means of protection, and given the costs of expensive research and development, companies wanted to ensure a significant return on their investment. The return could be achieved in one of two ways—the price of seed could be increased dramatically at the initial point of sale, or farmers could pay for the research and development over time (i.e., the costs could be capitalized).¹²⁸ If the costs of the seed increased dramatically, market demand might drop, and farmers would rely on the seed they had purchased in previous years to replant their fields until the market responded.¹²⁹ The terminator gene gave agricultural biotechnology companies the idea of terminating farmers' rights to the seed after one year—not having the seed terminate its propagation cycle, but instead removing the ability of the farmers to take advantage of that cycle.¹³⁰ This would also allow for capitalization of the costs of the transgenic trait—farmers could pay an annual fee for new seed (the same price for the soybean seed that they have always paid). In addition, farmers could be charged a “technology fee” for the transgenic

USA, Inc. v. Pioneer Hi-Bred Int'l, AM. INTN'L PROP. LAW ASS'N 2 (Oct. 27, 2004), http://www.aipla.org/committees/committee_pages/Trade_Secret_Law/Pages/default.aspx (follow “Trade Secret Law Articles” hyperlink; then follow “Summary Judgement Ruling W Dist Wisconsin 10-27-2004” hyperlink).

¹²⁷ See COMMENTS OF DUPONT/PIONEER HI-BRED INT'L, *supra* note 106, at 9 (“Independents have special, and usually personal, relationships with the farmers they serve. Many farmers consult with Independents in deciding which traited seeds to plant. Because of the many variables involved in attempting to ensure a successful planting and harvest, Independents frequently elect to concentrate on a limited geographical area. They are often the leading seed suppliers in their area of operation. Farmers, therefore, typically rely on their Independents for products with desired traits, rather than buying their seed from the larger, national companies that also develop traits and germplasm. . . . Farmers tend to adopt new seed varieties gradually, and ordinarily they will only switch products after seeing proof that seeds will grow well in local conditions.”).

¹²⁸ CHARLES, *supra* note 41, at 152 (“‘We felt that the sticker shock [of genetically modified seed] would be staggering,’ says Delta Pine’s Roger Malkin. ‘If we simply went from 30 dollars a bag to 120 dollars a bag, the farmers would get mad at us.’”).

¹²⁹ See, e.g., *Asgrow Seed Co. v. Winterboer*, 989 F.2d 478, 480 n.2 (Fed. Cir. 1993) (Newman, J., dissenting from denial of rehearing en banc) (“According to *amicus curiae* Jacob Hartz Seed Co., a single bushel of soybean seed will produce between 25 and 45 bushels of soybeans. If only half of the crop is sold as seed in successive years, in three years this would allow the farmer to place on the market between 2,037 and 11,655 bushels of seed. The *amicus* American Seed Trade Association calculated that a single soybean seed, after three crops, would produce 27,000 seeds.”).

¹³⁰ *Id.*

trait as part of the annual licensing agreement for the soybean seed.¹³¹ Thus was born the idea for a “terminator license,” a license that would maximize the reward to the agricultural biotechnology company and wrest seed sovereignty from the farmer.¹³²

In 1996, Monsanto introduced Roundup Ready soybean seed to the market.¹³³ Seeking market advantage, Monsanto looked not only to innovating and controlling the crop, Roundup Ready soybean seed, but also to all aspects of the market, including the herbicide applied,

¹³¹ 2006 Monsanto Technology/Stewardship Agreement (Limited Use License), available at <http://web.archive.org/web/20060517195645/http://www.dahlcoseeds.com/images/forms/2006techagreement.pdf> (“This Monsanto Technology/Stewardship Agreement is entered into between you (Grower) and Monsanto Company (Monsanto) and consists of the terms on this page and on the reverse side of this page. This Monsanto Technology/Stewardship Agreement grants Grower a limited license to use Roundup Ready® soybeans, YieldGard® Corn Borer corn, YieldGard® Rootworm corn, YieldGard® Rootworm with Roundup Ready® Corn 2, YieldGard® Plus corn, YieldGard® Plus with Roundup Ready® Corn 2, Roundup Ready® Corn 2, YieldGard® Corn Borer with Roundup Ready® Corn 2, Roundup Ready® cotton, Bollgard® cotton, Bollgard® with Roundup Ready® Cotton, Bollgard II® cotton, Bollgard II® with Roundup Ready® Cotton, Roundup Ready® Flex Cotton, Bollgard II® with Roundup Ready Flex Cotton, Roundup Ready® sugarbeets, Roundup Ready® Canola, and Roundup Ready® Alfalfa (Monsanto Technologies). This Agreement also contains Grower’s stewardship responsibilities and requirements associated with the Monsanto Technologies.” The Monsanto Technology/Stewardship Agreement requires the Grower agree: “To use Seed containing Monsanto Technologies solely for planting a single commercial crop. Not to save any crop produced from Seed for planting and not to supply Seed produced from Seed to anyone for planting other than to a Monsanto licensed seed company. Not to transfer any Seed containing patented Monsanto Technologies to any other person or entity for planting. To plant Seed for Seed production, if and only if, Grower has entered into a valid, written Seed production agreement with a Seed company that is licensed by Monsanto to produce Seed. Grower must either physically deliver to that licensed Seed company or must sell or use as commodity grain all of the Seed produced pursuant to a Seed production agreement. Grower shall NOT plant any Seed Grower has produced or use or to allow others to use Seed containing patented Monsanto Technologies for crop breeding, research, or generation of herbicide registration data To acquire Seed containing these Monsanto Technologies only from a seed company with technology license(s) from Monsanto or from a licensed company’s authorized dealer. To pay all technology fees due to Monsanto that are a part of, associated with or collected with the Seed purchase price or that are invoiced for the seed. Upon written request, to allow Monsanto to review the Farm Service Agency crop reporting information on any land farmed by Grower including Summary Acreage History Report, Form 578 and corresponding aerial photographs, Risk Management Agency claim documentation, and dealer/retailer invoices for seed and chemical transactions. To allow Monsanto to examine and copy any records and receipts that could be relevant to Grower’s performance of this Agreement.”); *see also* Tripp, *supra* note 121, at 80.

¹³² 2006 Monsanto Technology/Stewardship Agreement, *supra* note 131.

¹³³ *Highlights Throughout the Years*, *supra* note 111.

Roundup, and the positions of other agricultural biotechnology companies. Through licenses, Monsanto required growers of Roundup Ready seed to use only Roundup branded products.¹³⁴ At that time the Technology/Stewardship Agreement (the license farmers signed to acquire seed) limited growers to the use of Roundup; generic versions of glyphosate were available—however, the Environmental Protection Agency (EPA) had not certified any generic version for use on crops.¹³⁵ Monsanto had no reason to limit farmers' choice of herbicides as Roundup was the only broad spectrum herbicide on the market that would work on Roundup Ready soybean seed.¹³⁶ Despite this, Monsanto still chose to link “the purchase of seed to the purchase of Roundup through grower license agreements, grower incentive agreements, and seed partner license agreements” allowing Monsanto to link the profit from the patented article, Roundup Ready seed, to the unpatented article, Roundup.¹³⁷

When the EPA approved generic glyphosate made by Monsanto's competitors for use on crops, Monsanto modified its license¹³⁸ to avoid the appearance of illegal tying.¹³⁹ The original Technology Agreement

¹³⁴ *Monsanto Co. v. Scruggs (Scruggs I)*, 342 F. Supp. 2d 568, 576 (N.D. Miss. 2004) (“The pertinent portion of the 1996 technology agreement reads: ‘The Grower further agrees that if the Grower uses any glyphosate . . . containing herbicide in connection with the soybean crop produced from this seed, the herbicide will be a ROUNDUP® BRANDED HERBICIDE (or other Monsanto authorized glyphosate-containing herbicide) labeled for use on ROUNDUP READY® soybeans. No other glyphosate containing herbicide may be used with this patent-protected seed.’ The 1997 and 1998 agreements provided: ‘If a herbicide containing the same active ingredient as Roundup Ultra herbicide (or one with a similar mode of action) is used over the top of Roundup Ready crops, you agree to use only Roundup branded herbicide.’”) (alteration in original) (citations omitted)).

¹³⁵ *Monsanto Co. v. Scruggs (Scruggs II)*, 459 F.3d 1328, 1341 (Fed. Cir. 2006) (“EPA’s regulations prohibited growers from using competing glyphosate herbicides for over-the-top application.”).

¹³⁶ *Id.* (“[E]ven if growers elected to use such herbicides for over-the-top application, they would not be legally free to use competing brands.”).

¹³⁷ *Id.* at 1333.

¹³⁸ *Id.* at 1341 (“The record shows that Monsanto’s competitors sought and obtained regulatory approval and that when they did, Monsanto modified its contracts accordingly.”).

¹³⁹ *Scruggs I*, 342 F. Supp. 2d at 577–78 (“The Scruggses also find fault with the Roundup Rewards program Monsanto offers to farmers. They assert that this program too constitutes an illegal tying scheme between Roundup Ready seed and Roundup herbicide. This claim is easily disposed of. Defendants cannot demonstrate the coercion necessary to a tie-in. Growers who participate in the incentive program receive additional, voluntary benefits if they elect Roundup agricultural herbicides as the only systemic, non-selective herbicide to be used for burndown or in-crop applications on crops containing Monsanto traits. The program is entirely optional; customers who participate do so because they benefit from the incentives, not because Monsanto compels them to do so. Since the sale of Roundup Ready seed is

conditioned the license of the patented Roundup Ready seed on the purchase of the unpatented Roundup, but since there was no glyphosate competition, there was no restraint on trade, and hence no tying violation.¹⁴⁰ Once competitors entered into the glyphosate market, requiring licensees of patented Roundup Ready seed to purchase unpatented Roundup would be an illegal restraint on trade. Monsanto modified their license agreement to incentivize farmers to use only Roundup on their Roundup Ready crops.¹⁴¹ For example, in one early license agreement, Monsanto offered farmers a “Bottom-Line Booster Guarantee.” Under the terms of this guarantee, “[t]he Roundup Ready soybean system has three major components: Replace tillage with a preplant burndown using Roundup Ultra® or Roundup UltraMAX™ herbicide, Buy Roundup Ready soybean seed from any authorized dealer, and Spray Roundup brand herbicide over the top for proven crop safety.”¹⁴² If farmers followed this system, purchased the unpatented Roundup and used only the unpatented Roundup on their crops, and the crops failed to “provide equal or better net income than the traditional system . . . Monsanto [would] pay each qualified grower up to \$10,000.”¹⁴³

Under the Roundup Rewards¹⁴⁴ program, only “[l]abeled Roundup brand agricultural herbicides” must be used for all in-crop applications on any Monsanto trait crop on a grower’s farm.¹⁴⁵ Monsanto specifically

not conditioned upon the purchase of Roundup herbicide, there is no tying arrangement. ‘It is only when the buyer’s freedom to choose a given product is restricted that the tying doctrine comes into play: so long as the buyer is free to take either product by itself there is no tying problem.’”) (quoting *Ungar v. Dunkin’ Donuts of Am., Inc.*, 531 F.2d 1211, 1226 (3d Cir. 1976) (internal quotation marks omitted)).

¹⁴⁰ *Scruggs II*, 459 F.3d at 1341 (“In this case, Monsanto does not argue that it should escape a finding of patent misuse because its contract provisions protected the public or furthered EPA policy; rather, Monsanto’s argument is that its contract provisions lacked any anticompetitive effect because EPA’s regulations prohibited growers from using competing glyphosate herbicides for over-the-top application. Therefore, even if growers elected to use such herbicides for over-the-top application, they would not be legally free to use competing brands. As the trial court noted, the record supports Monsanto’s argument; *Scruggs* has not pointed to any evidence to the contrary. The record shows that Monsanto’s competitors sought and obtained regulatory approval and that when they did, Monsanto modified its contracts accordingly.”).

¹⁴¹ *Scruggs I*, 342 F. Supp. 2d at 577–78.

¹⁴² *Monsanto Guarantees Roundup Ready System Will Improve Soybean Production*, PRO FARMER (July 31, 2000), available at <http://www.gene.ch/genet/2000/Aug/msg00011.html>.

¹⁴³ *Id.*

¹⁴⁴ Roundup Rewards 2011 Summary & Requirements, available at <https://www.rounduprewards.com/SiteCollectionDocuments/bw.pdf>. This program covers farmers who plant Roundup-Ready seed, and was formerly known as the Bottom-Line Booster Guarantee.

¹⁴⁵ *Id.*

states that “use of residual products such as Extreme®, Backdraft®, [and] Sequence® . . . that may utilize a reduced rate of glyphosate on Monsanto Trait acres disqualifies you from the Roundup Rewards programs.”¹⁴⁶ The Roundup Rewards program requires that the farmer use Roundup Ready seed, use Roundup herbicide, and make all acquisitions at a Monsanto authorized retailer.¹⁴⁷ If the farmer does all this and the crop fails, then the farmer may be eligible to receive “the price paid by the grower for the quantity of such product involved, or, at the election of Monsanto or any seller, the replacement of such quantity.”¹⁴⁸ In addition, the program offers “risk protection” whereby farmers who participate in the program may be eligible for a reduced price on herbicide if the farmer has to treat the crops more often than promised by Monsanto.¹⁴⁹

In order to maximize its reward, Monsanto chose not to sell its seed at all. “If the seeds were sold, the patent would be exhausted, and the buyer could then do whatever he/she wanted with the product.”¹⁵⁰ Instead, by using the terminator license model, Monsanto can control the farmer’s use of the seed, even after the farmer has acquired the seed, circumventing the restrictions inherent in protection through public ordering.¹⁵¹ As the Federal Circuit said, “[t]he doctrine of patent exhaustion is inapplicable in this case. There was no unrestricted sale

¹⁴⁶ *Id.*

¹⁴⁷ *Id.*

¹⁴⁸ *Id.*

¹⁴⁹ Andrea Johnson, *Roundup Rewards Program Focuses Attention on Soybeans for 2009*, FARM & RANCH GUIDE (December 31, 2008), http://www.farmandranchguide.com/news/crop/roundup-rewards-program-focuses-attention-on-soybeans-for/article_2ede0609-7bbe-5ff5-8bc5-80a43419df08.html.

¹⁵⁰ Diane E. Hoffman & Lawrence Sung, *Future Public Policy and Ethical Issues Facing the Agricultural and Microbial Genomics Sectors of the Biotechnology Industry*, 24 BIOTECH. L. REP. 10, 21 (2005). “[S]eeds are not sold but licensed. If the seeds were sold, the patent would be exhausted, and the buyer could then do whatever he/she wanted with the product. This practice has created policy issues in a number of states where there have been efforts to outlaw such licenses. These prohibitory efforts appear to be based on concerns that the new large life science companies are changing the way business has been done and a fear that the licensing process will affect traditional business dealings.” *Id.* at 21–22.

¹⁵¹ *See, e.g., Scruggs II*, 459 F.3d 1328, at 1336 (Fed. Cir. 2006) (“The doctrine of patent exhaustion is inapplicable in this case. There was no unrestricted sale because the use of the seeds by seed growers was conditioned on obtaining a license from Monsanto. Furthermore, ‘the “first sale” doctrine of exhaustion of the patent right is not implicated, as the new seeds grown from the original batch had never been sold.’ Without the actual sale of the second generation seed to Scruggs, there can be no patent exhaustion. The fact that a patented technology can replicate itself does not give a purchaser the right to use replicated copies of the technology. Applying the first sale doctrine to subsequent generations of self-replicating technology would eviscerate the rights of the patent holder.”) (quoting in part *Monsanto Co. v. McFarling*, 302 F.3d 1291, 1299 (Fed. Cir. 2002)).

because the use of the seeds by seed growers was conditioned on obtaining a license from Monsanto.”¹⁵²

Monsanto’s practices were quickly copied by other members of the agricultural biotechnology industry, who used private ordering to retain complete control over their seed—including its price and its output, because of the unique nature of agriculture. The terminator license was changing the industry. Methods of implementing this license vary tremendously: the farmer may have to present a card indicating that the farmer is an authorized customer of the seed company,¹⁵³ the farmer may be required to sign a Technology Agreement, or other similar document, or the farmer may be subject to the conditions of a “seed wrap”¹⁵⁴ license, a “Grower Guide”¹⁵⁵ or a “bag tag.”¹⁵⁶ The result is always the same—by licensing seed, the agricultural innovator retains control over the seed’s propagation cycle. The farmer licenses higher quality seed than the farmer was able to purchase previously; however, the farmer receives fewer rights to that seed. Seed companies thus have the ability to limit seed’s propagation cycle to one growing season—not through the self-termination of the terminator gene, but rather through the external modification of the farmer’s rights imposed by seed companies through terminator licenses. “I untied the purple mesh bag of seed potatoes that Monsanto had sent and opened up the Grower Guide tied around its neck. . . . The guide put me in mind not so much of planting potatoes as booting up a new software release.”¹⁵⁷

¹⁵² *Id.*

¹⁵³ Monsanto has one such program whereby distributors agree to “make sure farmers who buy seed containing Monsanto’s genes have signed the Monsanto technology agreement. It’s not a task [distributors] enjoy. Every time a farmer wants to buy some bags of Roundup Ready soybeans, [the distributor] has to ask the farmer if he’s brought along his Monsanto card, which is how Monsanto keeps track of its customers.” CHARLES, *supra* note 41, at 178.

¹⁵⁴ Dan L. Burk, *Legal Constraint of Genetic Use Restriction Technologies*, 6 MINN. J. L. SCI. & TECH. 335, 354 (2004).

¹⁵⁵ Michael Pollan, *Playing God in the Garden*, N.Y. TIMES, Oct. 25, 1998, § 6 (Magazine), at 44.

¹⁵⁶ The author spoke with salespeople at Jimmy Sanders’ Seed Shop in Ecru, Mississippi who informed the author that there was not a single seed sold there that did not come with such restrictions; *see also* Hoffman & Sung, *supra* note 150, at 21 (“Every bag of GM seed is now accompanied by bag-tag and seed wrap licenses.”).

¹⁵⁷ Pollan, *supra* note 155 (“By ‘opening and using this product,’ the card stated, I was now ‘licensed’ to grow these potatoes, but only for a single generation; the crop I would water and tend and harvest was mine, yet also not mine. That is, the potatoes I will harvest come August are mine to eat or sell, but their genes remain the intellectual property of Monsanto, protected under numerous United States patents, including Nos. 5,196,525, 5,164,316, 5,322,938 and 5,352,605. Were I to save even one of them to plant next year—something I’ve routinely done with potatoes in the past—I would be breaking Federal law. The small print in the Grower Guide also

As Michael Pollan states so eloquently, the licenses are complicated, thorough, and used throughout the industry.¹⁵⁸ In order to maintain ownership of agricultural biotechnology, the propagation process is closely monitored through private and public ordering.¹⁵⁹ Agricultural biotechnology companies enter into agreements with select farms to maintain secrecy surrounding the propagation of the parent seed, and to allow the agricultural biotechnology intellectual property owner access to its fields.¹⁶⁰ The seeds are licensed to the farms, ensuring that ownership stays with the agricultural biotechnology companies, and allowing numerous restrictions to be placed on the farmers—including forbidding “the use of signage in fields, and [requiring the use of] coded labels on its seed bags.”¹⁶¹ Farmers never own many of the seeds that they are tending.¹⁶²

After the seed has been developed and propagated, private ordering allows the agricultural biotechnology companies to retain title to the seed, marketing the seed without releasing ownership rights. The farmer does not acquire the seed directly from the developer; instead, the developer uses an intermediary who operates as a distribution channel

brought the news that my potato plants were themselves a pesticide, registered with the Environmental Protection Agency.”).

¹⁵⁸ *Id.*

¹⁵⁹ FERNANDEZ-CORNEJO, *supra* note 38, at 28 (“Breeders provide contract growers the foundation seed (parent seed stock produced from the original seed developed by plant breeders) to produce either more foundation seed for continued R&D purposes, or registered seed for large-scale production purposes. Registered seed is contracted out in a similar manner to produce certified seed, sold to farmers conforming to standards of genetic purity and quality established by State agencies. . . . The production of both registered and certified seed through contract growers is closely managed by seed firms to ensure that the desirable plant characteristics are carried through to subsequent generations, and to prevent open pollination, disease or pest infestation, or other types of problems that could affect product quality. Contract growers are carefully selected by seed firms and are provided with technical assistance or supervision. Seed firms closely control all stages, from seedbed preparation and planting densities to the timing of input application.”).

¹⁶⁰ *Pioneer Hi-Bred Int’l. v. Holden Foundation Seeds, Inc.*, 35 F.3d 1226, 1236 (8th Cir. 1994) (“Pioneer takes several measures to preserve the secrecy of its inbreds. Growers operate under contracts which prohibit disclosure of the seed. Fields have no labels indicating what seed is being grown, and all seed bags are coded to avoid identification. Pioneer removes male inbred lines and commingles them with other corn, thereby frustrating those seeking to obtain the inbred seed.” (footnote omitted)).

¹⁶¹ Janis, *supra* note 37, at 309 (citing *Pioneer Hi-Bred Int’l.*, 35 F.3d at 1236).

¹⁶² *Pioneer Hi-Bred Int’l, Inc. v. Ottawa Plant Food, Inc.*, 283 F. Supp. 2d 1018, 1024 (N.D. Iowa 2003) (“Pioneer sells its seed through a ‘dual’ distribution system, using licensed sales representatives—who never take title to the seed, and are licensed to sell it only to actual end users, i.e., farmers, who plant the seed—and licensed dealers—who do take title to the seed, and are licensed to resell it only to other authorized dealers or end users.”).

only, never taking ownership of the seed.¹⁶³ Regulated by private ordering, the distribution channels require the distributors to agree that they will not license any seed to farmers who do not comply with the developer's demands or even that distributors not distribute competitor's products.¹⁶⁴ The farmer may have to present a card indicating that she is an authorized customer of the seed company,¹⁶⁵ the farmer may be required to sign a Technology Agreement,¹⁶⁶ or other similar document,¹⁶⁷ or the farmer may be subject to the conditions of a "seed

¹⁶³ See COMMENTS OF DUPONT/PIONEER HI-BRED INT'L, *supra* note 106, at 8 ("Once the finished seed is produced, the product is marketed to growers. In some regions of the country, such as the South, finished seed is generally distributed through retail outlets that also sell agricultural chemicals and a wide variety of other agricultural goods and services. In other regions of the country, small local Independents may sell finished seed directly to farmers, while regional or national seed companies may sell finished seed through independent farmer-dealer networks, as well as through retail outlets. Other agricultural products and services—including seed 'treatments,' crop advisory services, grain purchasing, and credit—are often provided by many of the same companies involved in the production and distribution of seed.").

¹⁶⁴ CHARLES, *supra* note 41, at 178 (Distributors agree "to limit . . . sales of genetically engineered seed purchased from any other company . . ."); *id.* at 203 ("[I]f a seed company wanted to sell Roundup Ready soybeans, Monsanto required it to renounce any competing products, such as LibertyLink genes furnished by AgrEvo.").

¹⁶⁵ See, e.g., MONSANTO, 2007 TECHNOLOGY USE GUIDE 41, available at <http://www.ncsu.edu/ott/plantbreeding/2007MonsantoGuide.pdf> ("This agreement allows growers to purchase all current and new Roundup Ready technologies. Growers who sign agreements receive a Technology Card and Monsanto Technology I.D. number.").

¹⁶⁶ CHARLES, *supra* note 41, at 178 ("Every time a farmer wants to buy some bags of Roundup Ready soybeans, [the local seed distributor] has to ask the farmer if he's brought along his Monsanto card, which is how Monsanto keeps track of its customers. If the farmer doesn't have one, [the distributor] has to spend ten minutes explaining the terms under which Monsanto licenses its genes to farmers. 'A lot of time, [the distributor] ends up with resentful farmers.'").

¹⁶⁷ See BRIAN D. WRIGHT, DIV. OF AGRIC. & NAT. RESOURCES, UNIV. OF CAL., PUB. NO. 8186, PLANT GENETIC ENGINEERING AND INTELLECTUAL PROPERTY PROTECTION 2 (2006) ("The terms of commercial transactions in seeds or other plant genetic material can include protection of the inventions embodied in the material by explicit licenses signed by[:] buyers (breeders or farmers) that restrict resale or use of the material in breeding or for production of seed for replanting[:] bag label contracts (like 'shrink-wrap' contracts for software) that restrict the use of the materials by farmers and others[:] Material Transfer Agreements (MTAs), which contractually define the rights and obligations of recipients with respect to these materials[:] 'Technology Use Agreements,' contracts restricting the use of plant genetic material by farmers. For example, such an agreement could restrict sowing of seeds to a specified area of land. It might also allow the provider of the seeds to test the farmer's crops for several years in the future, to check that the farmer does not violate the terms of relevant licenses or other contracts.").

wrap” or “bag tag” license.¹⁶⁸ The distributors also agree to not distribute these protected varieties of seed to end users whom the seed firms have blacklisted.¹⁶⁹ Bonuses may be offered to a distributor who sells a certain amount of unregulated product manufactured by the same seed firm, or the distributor may be barred from carrying competing brands of seed if it wishes to continue to be licensed to distribute certain agricultural biotechnology company products.¹⁷⁰

Title to the seed remains with the developer, even after the farmer has possession of this highly protected seed, due to private ordering along every step of the extraordinary chain of distribution. Before the farmer can plant privately protected varieties of seed, he or she must agree to all of the terms of the agricultural biotechnology companies, which includes, first and foremost, that title to the seed will never transfer to the farmer.¹⁷¹ Other restrictions may include allowing the seed firm to come onto the farmer’s land at any time and test the seed, including years after the seed was first planted, prohibiting the farmer

¹⁶⁸ Salespeople at Jimmy Sanders’ Seed Shop in Ecu, Mississippi stated that there was not a single seed sold there that did not come with such restrictions; *see also* Hoffman & Sung, *supra* note 150, at 21 (“Every bag of GM seed is now accompanied by bag-tag and seed wrap licenses. As a result, the seeds are not sold but licensed. If the seeds were sold, the patent would be exhausted, and the buyer could then do whatever he/she wanted with the product. This practice has created policy issues in a number of states where there have been efforts to outlaw such licenses. These prohibitory efforts appear to be based on concerns that the new large life science companies are changing the way business has been done and a fear that the licensing process will affect traditional business dealings.”); Burk, *supra* note 154, at 354.

¹⁶⁹ *See, e.g.*, Mullgardt Letter, *supra* note 116, (“Please be advised that until this matter is resolved, Monsanto does not authorize you or any other individual or entity by, through, or with whom you farm to use any seed containing Monsanto’s patented biotechnology”); Robert Schubert, *Monsanto Still Suing Nelsons, Other Growers*, CROPCHOICE.COM (May 21, 2001), <http://www.cropchoice.com/leadstryfd10.html?recid=326> (“Thompson Coburn, the St. Louis law firm representing the company, sent a letter to at least 23 seed distributors in North Dakota and Minnesota in which it instructs them to avoid selling Monsanto’s products to the Nelsons.”).

¹⁷⁰ CHARLES, *supra* note 41, at 178 (“Monsanto’s ‘Value Club’ . . . is designed to lock seed companies into selling seeds with Monsanto’s genes and no one else’s.”).

¹⁷¹ CTR. FOR FOOD SAFETY, *MONSANTO VS. U.S. FARMERS 10* (2005) (“While statistics on the availability of conventional seed are difficult to find, anecdotal evidence seems to suggest that Monsanto’s varieties of genetically engineered seeds have effectively pushed other seed varieties off the market. Indiana soybean farmer Troy Roush says, ‘You can’t even purchase them in this market. They’re not available.’ A farmer from Arkansas concurs: ‘It’s getting harder and harder to find conventional [soybean] seed.’ A Texas cotton farmer similarly reports: ‘Just about the only cottonseed you can get these days is [genetically engineered]. Same thing with the corn varieties. There’s not too many seeds available that are not genetically altered in some way.’” (alteration in original) (footnotes omitted)).

from saving and replanting any seed grown from the initial seed,¹⁷² from transferring any of the acquired seed, or from performing research on any of the seed.¹⁷³ The farmer has acquired the seed, and can use it only to grow one crop, one time, under the terminator license. The seed may not self-sterilize after one propagation, but the end user's rights dissolve at the end of that same single propagation season.¹⁷⁴

The consequences of enforcing the terminator license are drastic, opening the door for further exploitation by patent owners of consumers through overly restrictive licenses.¹⁷⁵ These licenses extend control of licensed seed beyond the bargain entered into with the farmer and beyond any restrictions imposable on the purchasers of a patented product. The Federal Circuit has stated that finding "the viability of a restriction . . . depend[s] on how the transaction is structured [and should be] denigrated as 'formalistic line drawing.'"¹⁷⁶ Before the terminator license is enforced, an analysis must be done of the policy behind the patent exhaustion doctrine and whether it would encourage enforcement of this license. The Federal Circuit has never attempted an analysis of whether the terminator license falls within the field of use of the patent or not. By stating that the doctrine of patent exhaustion does

¹⁷² Mullgardt Letter, *supra* note 116 ("All brands of Roundup Ready soybean seed are sold subject to limitations on use, including the limitation to only use the seed for a *single* growing season. The limited license expressly prohibits growers from saving and replanting any of the crop grown from the Roundup Ready soybean for planting, or transferring the seed for replanting.").

¹⁷³ *Monsanto Co. v. Ralph*, 382 F.3d 1374, 1377 (Fed. Cir. 2004) (A farmer signed a contract with Monsanto agreeing to the following clauses: "To use the seed containing Monsanto gene technologies for planting a commercial crop only in a single season. To not supply any of this seed to any other person or entity for planting, and to not save any crop produced from this seed for replanting, or supply saved seed to anyone for replanting. To not use this seed or provide it to anyone for crop breeding, research, generation of herbicide registration data or seed production.").

¹⁷⁴ See 2003 Monsanto Technology/Stewardship Agreement (Limited Use License), available at <http://www.cropchoice.com/Mon2003contractofadhesion.pdf> ("If Grower violates the terms of this Agreement, in addition to other remedies, Grower's rights pursuant to this Agreement will terminate immediately, and Grower and any entity owned or controlled by Grower forfeits any right to obtain an Agreement in the future.").

¹⁷⁵ For numerous examples of such overly restrictive licenses, see Winston, *supra* note 47, at 96–97.

¹⁷⁶ *Mallinckrodt, Inc. v. Medipart, Inc.*, 976 F.2d 700, 705 (Fed. Cir. 1992) (quoting *Continental T. V., Inc. v. GTE Sylvania Inc.*, 433 U.S. 36, 59 (1977)); *id.* ("[T]he Court explaining, in overruling *United States v. Arnold, Schwinn & Co.*, 388 U.S. 365 (1967), that the legality of attempts by a manufacturer to regulate resale does not turn on whether the reseller had purchased the merchandise or was merely acting as an agent of the manufacturer. The Court having disapproved reliance on formalistic distinctions of no economic consequence in antitrust analysis, we discern no reason to preserve formalistic distinctions of no economic consequence, simply because the goods are patented." (footnotes omitted) (citations omitted)).

not apply to licenses, the Federal Circuit is relying on a formalistic distinction of no economic consequence, and harming the grower in the process.

If a farmer wishes to plant a non-genetically modified seed, or even worse, was banned from planting any genetically modified seed, that farmer cannot simply go to their local seed store and purchase a different seed—no matter how many varieties are theoretically available.¹⁷⁷ A farmer who has planted genetically modified seed, even once, finds his options limited for future plantings of seeds. If the next year's non-genetically modified crop contains any of the genes licensed under the previous year's technology agreement, the farmer may be in violation of the license. Some licenses require the farmer to allow the land to lie fallow for at least one season after planting a genetically modified seed, while others restrict farmers' rights in various ways, including giving the agricultural biotechnology companies the ability to test a farmer's crop for several years after the initial planting of the genetically modified seed.¹⁷⁸

V. COMPETITOR-LICENSEES

Terminator licenses have changed the agricultural biotechnology industry in ways as of yet not fully recognized. Agricultural biotechnology companies redefined the market and removed the family farm from the bargaining table in an astonishingly short time, creating a market broad in penetration and narrow in competition. The business practices of a few companies co-exist to raise the barriers to entry in the highly concentrated, high-intellectual-property agricultural biotechnology industry.

The concentration of the agricultural biotechnology industry has led to parallel business methods being adopted by each of the major agricultural biotechnology firms. One example of such parallel constructivism is the dominant practice of cross-licensing technology

¹⁷⁷ *Monsanto and DuPont Heat up Rivalry over Seeds*, N.Y. TIMES, Aug. 20, 2009, <http://www.nytimes.com/2009/08/20/business/global/20seeds.html> (“We’re hearing lots of complaints from farmers about huge price increases and that non-G.M.O. seed availability no longer exists,” said Bill Wenzel, national director of the Farmer to Farmer Campaign on Genetic Engineering.”).

¹⁷⁸ *See, e.g.*, Janet Patton, *In Search of Seed Pirates*, GRAND FORKS HERALD, Nov. 30, 1998 (“Monsanto Co. is tracking down seed pirates and making sure farmers know about it. The agribusiness giant recently sent letters to customers detailing efforts to crack down on the offenders, who save seeds from patented crops to plant the next year. In Kentucky, Monsanto has conducted 29 investigations. At least two resulted in royalty settlements—\$35,000 from a Henderson County man and \$25,000 from a McCracken County grower.”).

between the members of the agricultural biotechnology oligarchy.¹⁷⁹ These licenses raise entry barriers and impose numerous restrictions on the competitor licensees. In an industry dominated by consumer preference, competitor licensees may be inclined to agree to less than favorable terms in order to access in-demand traits.

The terminator license impacts the farmer, prevents saved seed, and limits research into new varieties of seed and alternative forms of weed control.¹⁸⁰ Private ordering allows companies to prevent competitors from saving seed and from researching alternatives to transgenic seed.¹⁸¹ For instance, Monsanto sued DuPont after it bred soybean seed containing both Roundup Ready traits, licensed from Monsanto, and Optimum GAT traits, DuPont's glyphosate-resistant trait.¹⁸² According to the license that DuPont entered into with Monsanto, DuPont did not have the right to combine or "stack" traits, and could use its glyphosate-resistant "traits only in seed products containing no other glyphosate-tolerant traits."¹⁸³

It is clear that private ordering has elevated barriers to entry in the highly concentrated field of agricultural biotechnology through many different tactics, including "joint venture agreements that restrict the licensing of one partner's technology outside the agreement, thus impeding rivals' access to that technology for the purposes of developing competing products."¹⁸⁴ Competitors accept this language because, again, the nature of the industry requires competitors to cross-license in order to access prime seed lines and distribution relationships. This level of concentration heightens the risk of anticompetitive coordination—particularly when the barriers to entry are so high.¹⁸⁵

Further elevating the entry barriers, built into licensing arrangements with distributors are significant and limiting financial

¹⁷⁹ Mark Moore, *New Chapter in Biotech*, FARM INDUS. NEWS (Nov. 1, 2007), http://farministrynews.com/seed/farming_new_chapter_biotech/ (discussing cross-licensing agreements between Dow AgroSciences (Syngenta) and Monsanto, and Syngenta and Pioneer).

¹⁸⁰ See, e.g., *Monsanto Co. v. E.I. DuPont De Nemours & Co.*, No. 4:09-cv-00686 ERW, 2010 WL 234951, at *1, *4, *13 (E.D. Mo. Jan. 15, 2010).

¹⁸¹ *Id.* at *1.

¹⁸² *Id.*

¹⁸³ *Id.* at *1, *6.

¹⁸⁴ MOSS, *supra* note 76, at 24–25 (discussing *Monsanto Co. vs. E.I. DuPont de Nemours and Co.*: "In its counterclaim regarding the recent agreement between Monsanto and Dow to create a stacked, 8-gene corn seed, DuPont alleges that Dow is prohibited from permitting Pioneer to sub-license its Herculex insect resistant trait to ISCs."); see also Defendants' Amended Answer and Counterclaims at 39, *Monsanto Co. v. E.I. DuPont de Nemours and Co.*, No. 4:09-cv-00686 ERW (E.D. Mo. July 10, 2009).

¹⁸⁵ U.S. DEP'T OF JUST. & FED. TRADE COMM'N, *supra* note 70, at 19 ("The risk of anticompetitive coordination is increased when the relevant markets are concentrated and difficult to enter.").

incentives.¹⁸⁶ As discussed above, seed, once produced, must make its way to the farmer from the agricultural biotechnology company. Distribution networks find that if they wish to sell licensed soybean seed, they must agree to “bundling agreements that financially penalize seed companies for selling less than a minimum percentage of seed containing Monsanto traits.”¹⁸⁷ Distribution contracts reward the local seed distributor for “selling more genetically engineered seed [and place limits on the distributor’s] sales of genetically engineered seed purchased from any other company.”¹⁸⁸ In addition, one such license “stipulated that dealers could only receive rebates—which often constitute a substantial portion of a dealer’s profits—if their sales of Roundup were at least 80 percent of their total sales of all brands of glyphosate.”¹⁸⁹ Each of these agreements allows the agricultural biotechnology industry to strengthen its vertical control on the market and elevate barriers to entry.

Evidence of the high barriers to entry can be found in every stage of agribusiness. To license seed, innovators must maintain relations with seed distributors.¹⁹⁰ Goods “not sold in anonymous open markets, but rather involv[ing] direct transactions” allow “those firms wishing to enforce a tacit understanding [to] target . . . specific suppliers” and to maintain their prices and business models that way.¹⁹¹ Seed is such a good. The concentration in the seed industry has allowed agricultural biotechnology companies to standardize their relationships with distributors, resulting in constraining terms being adopted by distributors

¹⁸⁶ CHARLES, *supra* note 41, at 177 (“Seed companies rushed Roundup Ready seed onto the market, in some cases before they had bred the Roundup resistance gene into varieties that suited their particular weather conditions or that resisted common diseases. ‘There were some real dogs released during those first years,’ says Walter Fehr, a soybean breeder at Iowa State University. ‘Even calling them dogs is a compliment.’ And still farmers bought them.”).

¹⁸⁷ MOSS, *supra* note 76, at 24.

¹⁸⁸ CHARLES, *supra* note 41, at 178.

¹⁸⁹ Matt Jenkins, *A History and Overview of Monsanto’s Biotech Madness*, ORGANIC CONSUMERS ASS’N (June 27, 2007), http://www.organicconsumers.org/articles/article_6024.cfm.

¹⁹⁰ See COMMENTS OF DUPONT/PIONEER HI-BRED INT’L, *supra* note 106, at 9 (“[T]he rate of adoption of new traits and seeds can occur slowly. Farmers tend to adopt new seed varieties gradually, and ordinarily they will only switch products after seeing proof that seeds will grow well in local conditions. Even if a trait developer could replicate the [independent seed company’s] customer relationships, it faces the difficult prospect of convincing customers to quickly change to new traits and seed varieties based on different germplasm. . . . [M]any farmers perceive that they will receive the most benefit by remaining with the same seed supplier and brand from year to year.”).

¹⁹¹ PETER C. CARSTENSEN, HORIZONTAL MERGER GUIDELINES: THE OMITTED DIMENSION OF BUYER POWER: COMMENTS SUBMITTED TO THE FTC AND DOJ, at 7 (2010), *available at* <http://www.ftc.gov/os/comments/horizontalmergerguides/545095-00057.pdf>.

across corporate lines.¹⁹² Distributors who deviate from the norms set by agricultural biotechnology innovators find they deviate from the collective conduct, and may find themselves out of business.¹⁹³

The impact of the terminator license has been far-reaching in its restriction of trade. The business model operating in the high-intellectual-property and high-concentration field of agricultural biotechnology is anticompetitive. The business model has increased the prices of the seed,¹⁹⁴ reduced competition in the relevant market for other technology, and raised barriers to entry resulting in a thin market.¹⁹⁵ The use of the terminator license ultimately restricts the downstream market, limiting both overall output of soybean seed, and the development of new or improved soybean seed.

The agricultural biotechnology industry uses license agreements that “prevent seed companies from combining different characteristics in a single seed (often referred to as ‘stacking’) These restrictions deny farmers the choice of the best seeds to suit their needs.”¹⁹⁶ Seeking to keep the entry barriers high, the agricultural biotechnology industry uses these restrictions to expand its control over the competition, and to impact products that are still in the development stage.¹⁹⁷ If a competitor

¹⁹² See, e.g., Editorial, *Antitrust Scrutiny Can Benefit Public*, LINCOLN J. STAR, Mar. 21, 2010, 11:45 PM, http://journalstar.com/news/opinion/editorial/article_b7246544-3488-11df-a793-001cc4c002e0.html (“Competitor DuPont is among those accusing Monsanto of anti-competitive actions, such as offering rebates to distributors to exclude seeds from rival companies.”).

¹⁹³ Hoover’s In-Depth Company Records, Central Garden & Pet Company (May 13, 2010), available at 2010 WLNR 9894058. In an analogous scenario, the history of Central Garden and Pet Company, a distributor of Roundup herbicide reports discusses arrangements with distributors: “In 1994 the company’s largest supplier, Solaris (then a unit of Monsanto and maker of Ortho and Roundup products), decided to bypass Central as its distributor and sell products directly. Solaris products accounted for nearly 40% of the company’s sales, and revenues dipped in 1995. However, that year Solaris decided that self-distribution was too difficult and made Central its exclusive distributor. Total sales increased about 65% in 1996. . . . As a result of no longer being the distributor of Scotts products, Central closed 13 of its distribution centers in 2001. Central announced the next year that it would restate its financial results for 1998 through 2002. The company said the changes would improve fiscal 2001 net results by \$2 million, but decrease net results by \$1.7 million in 2000, \$0.3 million in 1999, and \$0.1 million in 1998. Also that year Mars’ Kal Kan Division and Arch Chemicals stopped using Central as a distributor.” *Id.*

¹⁹⁴ Neuman, *supra* note 97 (“Agriculture Department figures show that . . . [s]oybean prices went up 108 percent [since 2001]. . . . By contrast, the Consumer Price Index rose only 20 percent in that period.”).

¹⁹⁵ Monsanto’s trait has been licensed to over 200 companies. See *McIntosh v. Monsanto Co.*, 462 F. Supp. 2d 1025, 1028 (E.D. Mo. 2006).

¹⁹⁶ See COMMENTS OF DUPONT/PIONEER HI-BRED INT’L, *supra* note 106, at 5.

¹⁹⁷ U.S. DEP’T OF JUST. & FED. TRADE COMM’N, *supra* note 70, at 10 (“A licensing arrangement may have competitive effects on innovation that cannot be adequately

wishes to develop a trait that an agricultural biotechnology innovator believes would benefit its sales and bottom-line, then the competitor is licensed to do so, but if the competitor wishes to compete, then the licensor denies access to licensed seed even for research purposes.

The market is highly concentrated, and competition is thin. Private ordering allows the industry to maintain its strength while diminishing incentives for innovation and limiting alternatives for consumers. Beginning with the concept of the terminator license, restriction of rights associated with seed has continued. Independent seed companies struggle to enter the market.¹⁹⁸ If an independent seed company does obtain a license to valuable intellectual property, they may find themselves subject to contractual obligations allowing the licensor to

terminate an ISC's [Independent Seed Company's] trait license, thereby requiring the ISC to destroy its inventory of seeds containing [licensed] traits upon a change in ownership. Because the ISC's lack of inventory would render the company worthless to a competitor . . . such provisions make it difficult for rivals to acquire ISCs and obtain economically valuable germplasm for introgressing traits to breed out new competing varieties.¹⁹⁹

Each of these practices may be pro-competitive in its own right, but the combination and enforcement is the result of anti-competitive intent. The agricultural biotechnology industry has created its own legal system through the use of contracts to expand its intellectual property rights. Farmers' abilities to grow non-licensed seed, competitors' abilities to research and develop alternatives to licensed seed, and even distributors' rights to carry non-licensed seed are controlled by the industry, and not through public ordering. Private law is not a right given to patentees. The agricultural biotechnology industry's agreements increase the royalties charged and the manufacturing costs of the soybean seed, restrict competition, and impose restraints above those necessarily arising out of a cross-licensing agreement.²⁰⁰

VI. BETRAYING THE PATENT BARGAIN

A patent is a bargain whereby the government gives a limited right to restrain trade and society benefits from increased innovation. The costs

addressed through the analysis of goods or technology markets. For example, the arrangement may affect the development of goods that do not yet exist.”)

¹⁹⁸ Leonard, *supra* note 85 (“One contract gave an independent seed company deep discounts if the company ensured that Monsanto’s products would make up 70% of its total corn seed inventory. . . . [T]he discounts were used to entice seed companies to carry Monsanto products when the technology was new and farmers hadn’t yet used it.”).

¹⁹⁹ MOSS, *supra* note 76, at 24.

²⁰⁰ See, e.g., COMMENTS OF DUPONT/PIONEER HI-BRED INT’L, *supra* note 106, at 7, 14, 17, 20.

of the protection are outweighed by the benefit to society. Extending the patent system to create a separate set of rights, and a set of rules applicable only because a patent is part of the set of rights, abuses the system. The Sherman Antitrust Act²⁰¹ renders illegal any restraint on trade that “may suppress or even destroy competition.”²⁰² Such restraints require: “(1) An agreement among two or more persons or distinct business entities; (2) which is intended to harm or unreasonably restrain competition; and (3) which actually causes injury to competition.”²⁰³

A. *Agreement*

The first element, the presence of an agreement, is “different from and antecedent to the question whether it unreasonably restrains trade.”²⁰⁴ A tacit agreement, resulting in the elevation of an already high barrier in a highly concentrated, high-intellectual-property field should be enough to allow us to ask whether this behavior injures the competition through restraint of trade. It can be difficult, however, in a highly concentrated industry to distinguish between tacit agreements and oligopolistic interdependence. Any “extra ingredient of centralized orchestration of policy . . . [can] carry parallel action over the line into the forbidden zone of implied contract and combination.”²⁰⁵ These “extra ingredients” or “plus factors” include:

- The existence of a rational motive for defendants to act in concert.
- Actions contrary to each defendant’s self-interest unless pursued as part of a collective plan.
- . . .
- Evidence that the defendants had the opportunity to communicate or actually did so.
- Industry characteristics (product homogeneity, frequent transactions, readily observed price adjustments, high entry barriers, and high concentration) that are conducive to successful coordination.
- Industry performance data, such as extraordinary profits, that suggest successful coordination.
- The absence of a plausible, legitimate business rationale for suspicious conduct (such as certain communications with

²⁰¹ 15 U.S.C. § 1 (2006).

²⁰² *Bd. of Trade of Chicago v. United States*, 246 U.S. 231, 238 (1918).

²⁰³ *Reid Bros. Logging Co. v. Ketchikan Pulp Co.*, 699 F.2d 1292, 1296 (9th Cir. 1983).

²⁰⁴ *Am. Needle, Inc. v. Nat.l Football League*, 130 S. Ct. 2201, 2206 (2010).

²⁰⁵ William E. Kovacic, *Antitrust Policy and Horizontal Collusion in the 21st Century*, 9 LOY. CONSUMER L. REP. 97, 102 (1997) (quoting LOUIS B. SCHWARTZ ET AL., *FREE ENTERPRISE AND ECONOMIC ORGANIZATION: ANTITRUST* 439 (6th ed. 1983)).

rivals), or the presentation of contrived rationales for certain conduct.²⁰⁶

Each of these factors is present in the private ordering scenario orchestrated by the agricultural biotechnology industry. In a highly concentrated field with high barriers to entry, failure to act in concert raises those barriers even further and can prevent participation, let alone competition. If only one company were to protect its intellectual property this way, other companies would refuse to cross-license the necessary intellectual property, and the costs of marketing, selling, and producing seed would become prohibitive for the non-cooperative player. Given the high concentration in the market and the number of transactions between the six main players, this further promotes the idea that what is good for one company is good for all, regardless of the harm to the consumer. Profits have outstripped production costs in recent years, and yet there has been presented no legitimate business rationale for the fundamental shift in the model from a publicly ordered one in the 90s to an almost exclusively privately legislated business model a decade later.

Evidence of those tacit agreements can be found in a thorough look at one example. Monsanto touts its eagerness to cross-license its traits in the first place. If it was “not for the early decision to broadly license its patented genetic traits technologies, Monsanto would control large, totally closed platforms in transgenic seed that could be challenged only by the unlikely emergence of rival platforms.”²⁰⁷ Monsanto’s decision to license its traits early on, however, was driven by the recognition that “no single agricultural biotechnology firm . . . produce[d] a full suite of their own traits suitable for stacking” and that in order to access the traits of the market leaders in the cotton and corn industries, Monsanto had to license its soybean traits.²⁰⁸ Through such licensing, Monsanto has positioned itself as the gatekeeper for genetically modified soybean seed, allowing the anticompetitive impact of these agreements to outweigh any benefits the consumer might expect to see from such a broad licensing scheme.²⁰⁹

The terminator gene resulted in innovation in business methods in the agricultural biotechnology industry. The extensive cross-licensing structure of the system and the vertical integration elevated entry barriers. The combination is the result of cooperation between the industry leaders and has caused the costs of protection to exceed the benefits to society. The patent system has been abused, and the agricultural biotechnology industry has relied on the misperception of antitrust immunity to wrest seed sovereignty from the farmer.

²⁰⁶ *Id.* at 102–03.

²⁰⁷ MOSS, *supra* note 76, at 13.

²⁰⁸ *Id.* at 12.

²⁰⁹ *Id.* at 20.

*B. Trade Restraints**1. Output Restrictions*

Output restrictions are an area of tension between the Patent Act and the Sherman Act. Use of contracts to limit competitors' production through "output restrictions" is a per se violation of the Sherman Act. Patent holders have the right to refuse to license their innovation to anyone at all, to grant exclusive licenses, to grant non-exclusive licenses, or to dedicate their patent to the public. The Patent Act and the Sherman Act collide when a patent holder licenses to a competitor subject to restrictions, including a limitation on production of technology containing the patented innovation.

Using private ordering, the agricultural biotechnology industry has relied on restrictions of this nature to limit competition. Again, using Monsanto as an example, Monsanto licensed to a competitor, Aventis, the "right to use the gene . . . subject to certain restrictions—including a limitation on production—on the use of its patent."²¹⁰ In another example, during the development of Roundup Ready soybean seed,²¹¹ Monsanto was in licensing negotiations with DuPont and Syngenta, seeking to maintain the agricultural biotechnology oligarchy and Monsanto's advantage. The license for NK Brand Roundup Ready soybean seed, Syngenta seedline, states:

The purchase of NK Brand soybeans with the Roundup Ready trait includes a limited license under Monsanto Company patents 4,940,835; 5,188,642; 5,352,605; 5,530,196; 5,633,435; 5,717,084; 5,728,924; and 5,804,425 to produce a single commercial crop. This license does not extend to the seed from such a crop or the progeny thereof for propagation or seed multiplication. The use of such seed or the progeny thereof for propagation or seed multiplication or for the production or development of a different variety of seed which would be covered by the above listed patents is strictly prohibited.²¹²

Each of these restrictions seeks to increase the costs to society of protecting the innovation while decreasing the benefit. Determining

²¹⁰ *McIntosh v. Monsanto Co.*, 462 F. Supp. 2d 1025, 1029 (E.D. Mo. 2006).

²¹¹ *Monsanto Co. v. E.I. DuPont De Nemours & Co.*, No. 4:09-cv-00686 ERW, 2010 WL 234951, at *1 & n.1 (E.D. Mo. Jan. 15, 2010) ("Monsanto's Roundup Ready® ('RR') soybean and corn traits, known by their respective technical names 40-3-2 and NK603, which Monsanto developed upon discovering the CP4 gene, a gene that makes plants resistant to glyphosate, a common herbicide. Monsanto holds United States Patent No. U.S. RE 39,247E ('the #247 Patent'), which covers the 40-3-2 and NK603 traits along with other glyphosate-resistant traits based on the CP4 gene. . . . Put another way, 'Roundup Ready®' refers to Monsanto's glyphosate-tolerant trait technology generally, in the sense that the resulting seed products are 'ready' for the use of Monsanto's Roundup® glyphosate herbicide, while 40-3-2 and NK603 refer to the specific Roundup Ready® soybean and corn trait technologies, respectively.")

²¹² *Touchdown Total*, SYNGENTA (2011), <http://www.syngentacropprotection.com/prodrender/index.aspx?prodid=911>.

whether the numerous restrictions contained within the terminator license violate the antitrust laws requires answering whether such restrictions are, “reasonably within the patent grant, or whether the patentee has ventured beyond the patent grant and into behavior having an anticompetitive effect not justifiable under the rule of reason.”²¹³ The anticompetitive effect of these licenses grants innovators a reward greater than the benefit to society of the innovation.

Output restrictions can be found in arrangements with competitors and farmers. As private ordering is used by the agricultural biotechnology industry, restrictions have been implemented containing exclusivity provisions, no replant provisions, and no research provisions. Requiring farmers to “use only seed containing . . . biotechnology for planting a single crop”; preventing farmers from transferring seed that they have not used and will not use; and other restrictions within the terminator license are not within the patent grant. A restriction on post-sale use must be justifiable under the rule of reason. It is formulaic to not place the same limitations on a post-license use.

Patent rights give patent holders the right to exclude others from making or using the invention, but “[i]f a licensing arrangement may adversely affect competition to develop new or improved goods or processes, the Agencies will analyze such an impact either as a separate competitive effect in relevant goods or technology markets, or as a competitive effect in a separate innovation market.”²¹⁴ To examine the anticompetitive effects of the terminator license²¹⁵ we must ask whether it gives the patent holder “an incentive and ability collectively to reduce investment in, or otherwise to retard the pace or scope of, research and development efforts.”²¹⁶ When the costs of protection exceed the benefit to society, then the protection is being used in an anticompetitive fashion “to control or block access . . . to other technologies and markets.”²¹⁷

2. Price Elevation

The patent bargain is broken in the agricultural biotechnology industry. Industry members are using the patent system to shield private ordering from charges of antitrust violation. Using the patent system to elevate price is an abuse of the system, and should be regulated as an unlawful extension of the patent system. In developing the terminator

²¹³ *Mallinckrodt, Inc. v. Medipart, Inc.*, 976 F.2d 700, 708 (Fed. Cir. 1992).

²¹⁴ U.S. DEP’T OF JUST. & FED. TRADE COMM’N, *supra* note 70, at 10.

²¹⁵ *Id.* at 18 (“When a licensing arrangement affects parties in a horizontal relationship, a restraint in that arrangement may increase the risk of coordinated pricing, output restrictions, or the acquisition or maintenance of market power. Harm to competition also may occur if the arrangement poses a significant risk of retarding or restricting the development of new or improved goods or processes.”).

²¹⁶ *Id.* at 13.

²¹⁷ Dan Piller, *Old Seed Industry Squabble Lives on in the New Decade*, DES MOINES REG., Feb. 26, 2010, available at 2010 WLNR 4168000.

gene, the agricultural biotechnology industry realized that reward was not yet being maximized for innovation. That thought led to the realization that:

[p]erhaps farmers could pay a separate ‘technology fee’ to Monsanto, in effect buying the new genes in a separate transaction from the seed purchase. Indeed, perhaps Monsanto could license its patented genes directly to each farmer! The arrangement would make Monsanto the sole supplier of these genes to every farmer, allowing Monsanto to set and maintain a standard price for its genes. Even more important, Monsanto could use that license to enforce a ban on farmers using part of their Roundup Ready harvest as seed for the following year.²¹⁸

If the word gene was replaced above with the word “railroad”—a scheme would be described whereby the Short Line (from the hypothetical in the introduction) would use contracts to make the Short Line the sole supplier of railroads to every customer, allowing the Short Line to set and maintain a standard price for its railroads. Why should there be a difference under the antitrust laws if the product is patented?

The patent laws do grant patent holders a limited right to restrain trade. Patent holders may refuse to license their technology to any party they choose. When patent holders use private ordering to replace patent rights and seek to reap rewards far in excess of the benefit to society, they are abusing the system. The terminator license is anticompetitive; it ensures that the agricultural biotechnology innovators control every licensed seed, regardless of the brand of the seed.²¹⁹ By controlling the seed, the agricultural biotechnology innovators control the technology fee for each and every licensed seed, and can set the minimum price for all such seed. Private ordering prevents the saving of the progeny of the licensed seed for future planting, and places strict limitations on the use of the seed for research and development. Technology fees on licensed seed can be raised without significant impact on market share—since by raising the royalty rates, the agricultural biotechnology innovators control the price of licensed seed, regardless of the brand.²²⁰ Agricultural biotechnology innovators can further limit the development of competing seed lines through these licensing terms.

The very lack of competition in the market can be shown by one example, whereby one innovator, Monsanto, brags that DuPont, a competitor in the soybean market, built its soybean business “on a license provided by

²¹⁸ CHARLES, *supra* note 41, at 152.

²¹⁹ See *supra* note 108 and accompanying text.

²²⁰ Jeffrey Tomich, *Warnings Omit Monsanto, but Meaning Is Clear: Antitrust Official Draws Applause for Monopoly Comments at Workshop*, ST. LOUIS POST-DISPATCH, Mar. 13, 2010, at A1 (“[F]armers can purchase soybean seed from hundreds of different producers, but almost all of it contains Monsanto’s gene.”).

Monsanto to the Roundup Ready® technology.”²²¹ Monsanto requires all licensees to restrict downstream trade in the seed.²²² DuPont sells soybean seed under the brand Pioneer, and recently Monsanto sued DuPont, “one of [Monsanto’s] top competitors and a valued licensee of [Monsanto’s] seed trait technologies” for patent infringement.²²³ The agreement licensed Monsanto’s Roundup Ready technology to DuPont “for use in Pioneer’s seeds. At that time, DuPont agreed they would not stack [Monsanto’s] glyphosate-tolerant product, Roundup Ready, with any other type of glyphosate tolerance trait” including Pioneer’s own technology, Optimum GAT.²²⁴ “Pursuant to the Soybean License Agreement, Monsanto granted Pioneer a limited, non-exclusive, royalty-bearing license to Monsanto’s Roundup Ready® soybean technology.”²²⁵

This is only possible because the very advances that increase the desirability of the seed also give the seed a unique genetic fingerprint. A cartel is sustainable only as long as its members do not undersell each other. Breach of contract and threat of suit for patent infringement are powerful weapons in the effort to maintain the pricing cartel; however, the genetic fingerprint delivers the knockout punch. Genetic testing can reveal the parentage of genetically modified seed, allowing cartel members to quickly and accurately determine where the seed came from, and whether a farmer, a distributor, a ginner, or a competitor has undercut the agricultural biotechnology corporation that developed the seed in the first place. The licenses that govern the seed take away the right of a farmer to object to such testing, often for years after the farmer first licenses seed.

C. Impact

A patent is a reward for innovation and it should be strictly limited in its application. The reward granted should not outstrip the benefit to society. As long as the patent holder is using the limited right to restrain trade as an incentive to increase research and development, then the system is working. When the patent holder is using patent rights to seek

²²¹ *DuPont’s Campaign to Mask its Failures*, MONSANTO, <http://www.monsanto.com/newsviews/Pages/dupont-masking-failures.aspx>.

²²² Monsanto is careful to avoid a direct output restriction in its license. A limitation on production is included in some licenses, but that limitation is directly linked to its patented product. This may be an unlawful extension of the patent rights in violation of the antitrust laws. *See infra* pp. 331–33.

²²³ *DuPont Lawsuit*, MONSANTO, <http://www.monsanto.com/newsviews/Pages/dupont-lawsuit.aspx>.

²²⁴ *Id.*

²²⁵ Complaint at 4, *Monsanto Co. v. E.I. DuPont De Nemours & Co.*, No. 4:09-cv-00686 ERW (E.D. Mo. May 4, 2011); *see also* *Monsanto Co. v. Bowman*, No. 2010-1068, 2011 WL 4375669, at *2 (Fed. Cir. 2011) (“All sales to growers, whether from Monsanto or its licensed producers, are subject to a standard form limited use license.”).

greater reward than necessary to incentivize further research and development, then the patent system is being exploited and injury is incurred.

The patent bargain weighs the costs of protection against the benefit to society, and when the system works—if the benefits exceed the costs—then a patent holder receives a limited right to restrain trade. The agricultural biotechnology industry is betraying this bargain through use of licenses to increase the costs of protection to society, while decreasing the benefit. A patent is worth no more than the award given for violation of the patent rights—a reasonable royalty.²²⁶ When licenses are used to manipulate the market to grant a patent holder a greater reward, then the licenses abuse the patent system, and they should be examined from an anticompetitive perspective.

The patent bargain promotes innovation by incentivizing research and development.²²⁷ Agricultural biotechnology companies have long argued that intellectual property does not provide sufficient reward for a self-replicating product and that only through controlling the output of the patented product through licenses can they justify the costs of development.²²⁸ Saved seed, however, does not reduce the reward; the cost to agricultural biotechnology companies of farmers saving seed is “significant only for soybeans, wheat and cotton; production and handling characteristics of other plant species means seeds are generally purchased annually.”²²⁹

Using private ordering to require farmers to license new seed every year is doubling the reasonable royalty on the seed. On average, before the introduction of the terminator license, upon looking at the “annual planting[] of soybean, wheat and cotton seed, and the annual quantities purchased for replacements” a “simple calculation leads to the conclusion that producers of these crops purchase new seed, on average,

²²⁶ There are numerous factors used by courts to determine a reasonable royalty. The most commonly used are the fifteen Georgia-Pacific factors. *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified sub nom.* *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295, 295–302 (2d Cir. 1971).

²²⁷ *See, e.g.,* Murphy, *supra* note 61, at 61 (“[I]ntellectual property in genetically modified products must be protected in order to promote the costly research and development of such products.”).

²²⁸ *See id.* at 66 (“Although biotechnology applications ideally would be developed in a manner that would allow returns on investment across the globe, various factors instead presage a widening biotechnology gap between developed and developing states: the narrow genetic base of biotechnology innovations, the increasing privatization of biotechnology research and development (and concomitant decline in public sector support for agricultural research), the extensive capital requirements of biotechnology research and development, and the need to recoup those costs through pricing strategies built on intellectual property protections.”).

²²⁹ William Lesser, *The Impacts of Seed Patents*, 9 N. CENT. J. AGRIC. ECON. 37, 43 (1987).

every second year.”²³⁰ A reasonable royalty for innovation in seed, therefore, should be calculated at the rate of 50% of the market. Using contracts to manipulate this market, and to require farmers to license seed every year instead of every two years, doubles the reward granted the patent holder, increases the costs of protection, and decreases the benefit to society of the innovation.²³¹

The private ordering system relied on by the agricultural biotechnology industry restricts competitors from sharing germplasm, limits seed production, eliminates development of competing products, and manipulates the market in ways not foreseen by either the Sherman Act or the Patent Act. The increased concentration in the agricultural biotechnology field and the dominance of the terminator license can be “correlated with a fall in private research intensity, as measured by numbers of field [trials] or by lower sponsorship of R&D.”²³² Illegal restraint of trade is a clear result of the impact of the private ordering system and the quest to seek greater reward for innovation than the patent bargain grants.

VII. CONCLUSION

Private ordering is here to stay in the agricultural community. The ramifications of such a system are still playing out, but extend far beyond the reach of any system contemplated under the public laws. Terminator licenses are impacting the farming community, as well as corporate agriculture, in a fashion not yet understood by the public. The combination of private and public ordering gives the agricultural biotechnology industry the power to fix prices and unlawfully restrain trade.

Development of the terminator gene revolutionized the agricultural biotechnology industry. Even as corporations realized that the terminator gene could not be successfully introduced, they turned elsewhere to obtain stronger protection than that granted through public ordering. The terminator license has caused more harm than the terminator gene controversy anticipated. In creating an imperfect marketplace, the industry has harmed farmers, distributors, consumers, and itself. The ramifications of this fundamental change in agricultural biotechnology are only beginning to be understood. Imperfect competition as a result of the terminator license has directly and proximately resulted in the

²³⁰ *Id.* (citation omitted).

²³¹ See, e.g., Strom, *supra* note 55, at A22 (“[W]hat farmers do is keep their seed from one year to plant the next year, and so on,” Mr. Conway said. “The terminator gene would have destroyed one of the great benefits of the Green Revolution.”); Vidal, *supra* note 55 (According to Mr. Conway, “[w]hat the Terminator gene did . . . was [to] effectively kill the process that let farmers sow their own seeds.”).

²³² MOSS, *supra* note 76, at 19.

restraint of trade, a decrease in the availability of non-genetically modified seed, an increase in the price of seed, and a decrease in the downstream development of competing products.

Seed is not software and the farmer is not the end user. Terminator licenses have ramifications far more significant than those associated with the terminator gene. When contracts are used to alter something so fundamental as the choice of what seed to plant, which harvest to reap, and which food to grow, closer public scrutiny is needed in determining the enforceability of these terminator licenses. The economic consequence of allowing the enforcement of seed licenses far outweighs the economic benefit of the patent bargain and the private bargain between the farmer and the agricultural biotechnology innovator. The concentration of the agricultural biotechnology industry has led to the exchange of licenses curtailing the manufacture and supply of seed and restraining trade, which belies the privileges conferred by the Patent Act and violates the Sherman Act.

The agricultural biotechnology industry is hardly the first economy to seek to expand the scope of its patent rights. What is unique is the power that the antitrust immunity misperception has given the agricultural biotechnology industry to leverage its patent rights to impose overbroad conditions on its licensees, conditions far beyond the legal scope of the patent right itself. In 2007, the Department of Justice and the Federal Trade Commission held a set of hearings to determine how licenses could violate the antitrust laws. The hearings reached the correct conclusion that “there are circumstances in which imposing conditions for a license may be anticompetitive, and that view is consistent with a long line of antitrust cases.”²³³

Private ordering to incentivize research and development has had limited success through monetary rewards for specific advances.²³⁴ Unlike the system described herein, these rewards are greatly limited in their scope and application, and successfully balance the costs of the reward with the costs of the innovation and provide an example of how the patent and antitrust laws should work together to provide that same balance through public ordering. Use of private ordering to replace public ordering increases the costs of protection, while decreasing the

²³³ U.S. DEP'T OF JUST. & FED. TRADE COMM'N, ANTI-TRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 32 (Apr. 2007).

²³⁴ See, e.g., NETFLIX PRIZE, <http://www.netflixprize.com/> (“The Netflix Prize sought to substantially improve the accuracy of predictions about how much someone is going to enjoy a movie based on their movie preferences”); *Who We Are*, XPRIZE FOUNDATION, <http://www.xprize.org/about/who-we-are>. (The X Prize Foundation’s “mission is to bring about radical breakthroughs for the benefit of humanity” through “large-scale, high-profile, incentivized prize competitions that stimulate investment in research and development worth far more than the prize itself.”).

benefit to society. The patent laws provide no shield for anticompetitive behavior of this nature.

To be pro-patent is to be pro-antitrust. The private ordering system described herein is anti-antitrust. In 1945, the Supreme Court said, “The far-reaching social and economic consequences of a patent, therefore, give the public a paramount interest in seeing that patent monopolies . . . are kept within their legitimate scope . . . [as] measured by both public and private standards of equity.”²³⁵ As private ordering replaces public ordering, patentees are not being held to public standards of equity. The time for recognition of the harms of the misperception, and the time for an understanding of the applicability of antitrust norms to disputes arising under the Patent Act, have come. The anti-antitrust environment would be one in which the government sanctions monopolies, and grants rewards to patent holders far in excess of the reasonable-royalty transgressors of patent rights must normally pay. Such an environment does not promote consumer welfare, and will lead to a depletion of resources—a tragedy of the commons—as the consumer has no choice in planting fields, or buying food.

The limited rights of the Patent Act do not provide a shield from antitrust law, and any such misperception is an abuse of the legal system. The Patent Act gives patentees the right to exclude others and with that right comes the ability to restrain trade so long as such restraint is not unlawful. Using the right to exclude others to restrain trade, elevate barriers to entry, restrict output, and limit competitors’ research and development does not promote consumer welfare. It is true that patentees have a negative right to exclude others from making, using, selling, or offering to sell the patented article, but that negative right is a reward that they receive for promotion of the science and useful arts. Allowing the negative right to become a positive right through the creation of a monopoly based on private ordering weakens the foundations of both the patent system and the antitrust system.

²³⁵ Precision Instrument Mfg. Co. v. Auto. Maint. Mach. Co., 324 U.S. 806, 816 (1945).