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Patents and Competition:
Toward a Knowledge Theory of Progress

Rudolph J.R. Peritz
Professor of Law and Director,
IProgress Project
New York Law School

Introduction: Patents and Progress as a Means and Ends Problem

Even as the Patent Act of 1790 was sailing through the First Federal Congress, Thomas Jefferson and others remained skeptical of, if not downright opposed to a patent and copyright regime for promoting progress. Since then, severe criticism has followed the patent statute and its many amendments. In recent years, the Federal Trade Commission, the National Academies Board on Science, Technology, and Economic Policy, as well as a multitude of scholars and practitioners have questioned its effectiveness. And while Congress is not entertaining the possibility of wholesale abolition, it is once again considering changes to address some of the current Patent Act's perceived shortcomings. This paper develops an alternative to the dominant view of patents in order to explore a different approach to promoting progress. Although the approach is familiar in some of its particulars, its alternative logic produces a sharply different set of policies and doctrines.

The dominant view of patents derives from the constitutional norm of promoting progress and from an economic logic that material progress is served by granting inventors exclusive rights to the commercial exploitation of their intellectual work. The economic logic is a commercial incentive theory: When inventors are rewarded with exclusive commercial rights, they are more inclined to invent and then to develop their inventions; the result is progress in the form of more material benefits to society.

Commercial incentive theory provides a powerful policy framework for patent protection. Indeed, policy makers rely on it even though their confidence is largely unfounded, even though the literature has long warned them that they cannot know in advance whether patents will actually promote progress. Paradoxically, commercial incentive theory's very inability to provide a mechanism for predicting how patents will affect progress has driven an expansion of patent protection. Unable to forecast the impact of incentives embodied in particular doctrines and policies, decision-makers have tended to

adopt the fall-back position that simply expanding them promotes more progress. In short, policy makers have tended to follow an intuition that increasing the means increases the ends.

This trend toward increased propertization, driven by a commercial logic of material progress, has also hardened the boundaries between the patent regime and the adjacent domains of copyright and antitrust. It has strengthened the time-honored view that copyright and patent ideally are exclusive spheres which promote progress in distinctively different ways: Copyright protects authors' original expressions to advance "science"—what we today call knowledge. Patent protects the work of creative invention to advance "useful Arts"—in current terms, technology and industry. In this light, patents promote material progress while copyright advances the Enlightenment project of knowledge and, with it, the liberty-lighted path to civilization. This bifurcated view emerged long ago from a parsing of the Constitutional clause's parallel syntactical structure, seemingly corroborated by the First Congress's passage of two separate statutes in 1790.¹

The commercial logic of incentive theory has hardened this categorical division, even though a similar economic rationale supports copyright policy and though several well-ripened Supreme Court opinions, the actual practices of inventors and authors, as well as recent scholarly inquiry have blurred the categorical distinction. Despite the blurring, once a patent has issued, once an inventor has come out of the prosecution process as the winner in her intellectual contest with prior art, a rigid logic of commercialization takes over patent doctrine: Until it expires, a patent is seen first and foremost as the commercial means of promoting *material* progress. In consequence, incentive theory directs patent policy toward commercial markets and their capacity to produce the material benefits promised by patent protection, leaving the constitutional norm of advancing knowledge largely to copyright and its First Amendment emanations.

The commercial logic of incentive theory has also suppressed border tensions observed in the political geography of patent and antitrust relations. The patent regime was traditionally seen as granting rights to exclude competitors, rights that were termed monopoly privileges. The antitrust system, together with an insurgent patent misuse doctrine, sought to promote progress by championing competition in commercial markets and strictly limiting patent monopolies to their statutory boundaries. In recent years, a re-characterization of patents as property rights *rather than* monopolies has for the most part removed monopoly rhetoric from patent discourse and, in consequence, from antitrust issues involving patents. Furthermore, the commercial framework for both patent and antitrust policies has emphasized a common economic logic of encouraging commercial innovation, both to promote material progress and to sponsor Schumpeterian competition.² Economic incentive theory lies at the core of this shared logic for tolerating, if not

¹ I,8,8 quotation with author-inventor parallels italicized.

² My use of "innovation" and "invention" follows Schumpeterian convention. By "innovation," I mean the commercialization of invention. The use of "commercial innovation" thus reflects redundancy. Nonetheless, I use the phrase here to emphasize the commercial nature of innovation and to distinguish it from the prior activity of invention. Hereafter, simply "innovation" will be used in its conventional way. Re: Schumpeterian competition, see Section III of the paper

promoting, market power and even economic monopoly when achieved “on the merits.”³ Antitrust’s competition logic of innovation and patent’s property logic of innovation, the latter cleansed of its traditional monopoly rhetoric, can now be mediated by asking whether the particular patent rule or policy in question enhances *ex ante* incentives to innovate, and whether its antitrust counterpart enhances innovation *ex post*.⁴

This paper develops an alternative to the commercial logic that currently drives the incentive theory of patents, that produces its problem of means and ends, and that shapes its boundary conditions with neighboring regimes. The new logic flows from a different understanding of the public benefits promised by patent protection. The understanding derives from a normative shift in priority to patent’s knowledge benefit, one that stresses the importance of contributing new ideas and information to the public domain over the value of producing the material benefits anticipated from commercial exploitation. A knowledge theory displaces incentive theory as the primary logic for serving the patent regime’s goal of promoting progress. In this view, questions of efficiency and distribution relate first and foremost to knowledge and then to wealth. The paper explores the implications of a normative framework for patent policy that shifts primary attention to the domain of ideas.⁵ Accordingly, policy makers would first assess the impact on production of new knowledge, on access to public goods for free trade in ideas. Only thereafter would they inquire into the impact on patent’s commercial incentives to innovate.⁶

This turn toward the knowledge benefit provides a sharply different framework for shaping patent policy. A knowledge theory of progress informs far-reaching improvements to current doctrines and policies such as the experimental use defense, the reverse doctrine of equivalents, and the compatibility between patent protection and trade secrecy. In sum, paying primary attention to the knowledge benefit promises a workable theory for developing patent policy, a theory with normative content that hews more closely to the constitutional instruction to promote progress, and that offers more satisfying solutions to

³ “On the merits” is a category whose boundaries have changed over time, not unlike the patent requirement of non-obviousness. The classic antitrust statement is found in Learned Hand’s opinion in *U.S. v. ALCOA*, 148 F.2d 416 (2d Cir. 1945).

⁴ Although the dominant analysis posits the moment of invention as the appropriate dividing line between IP and antitrust, the point in time that has functional significance in patent policy is the moment of patent issuance, as discussed in Sections I and III of the paper. Moreover, the very concept of *ex ante* incentives raises serious questions. For example, because *ex ante* incentives to innovate are reasonable expectations of future benefits, the incentives can be understood as largely artifacts of the legal regimes that define those benefits. At the very least, this circularity means that expectations at the time of invention are defined by the legal regime then in place, including antitrust law. At most, the circularity suggests some sort of reliance interest in the legal regime in place at the time of the invention, an interest that pushes against changes in law that would harm the reliance interest.

⁵ I use “domain of ideas” as a short-hand rendition of “domain of ideas and information” and sometimes use “knowledge domain” synonymously. I have avoided using the “marketplace of ideas,” whose economic overtones and laissez-faire undertones produce heavy ideological and jurisprudential baggage. I have chosen it over other candidates, including “public domain” and “commons,” for reasons discussed in Section IV, *infra*. See Baker, Boyle, Ingber; Vincent Blasi, *Holmes and The Marketplace of Ideas*, 2004 SUP. CT. REV. 1 (2004). For earlier analysis of competition policy in various public spheres, including a marketplace of ideas, see Peritz, *Competition Policy in America*, particularly Ch. 2; Peritz, *Rule of Reason*, 1989 *Hastings L.J.*

⁶ I leave to another time a discussion of the importance as well as the workability of weighing in the balance the opportunity costs of restraining commercial competition, as understood in antitrust policy

border tensions with neighboring policy regimes, particularly antitrust, copyright and trade secrecy.⁷

The first section explicates the commercial incentive theory supporting the dominant approach to patents and concludes that the theory's limitations sabotage its value for policy makers. The next section investigates the traditional view of patent and antitrust as opposing means of producing innovation, as well as the current view that shifts the focus to the common ends of encouraging innovation. The section shows how, instead, both regimes have always depended on parallel yet distinctly different competition dynamics mediated by commitments to property ethics. The third section explores the conventional view of patent and copyright as mutually exclusive categories and finds strong support for an alternative portrayal that leads to the recognition that there is more policy overlap than exclusivity in their coverage of intellectual work. What emerges is the enhanced importance of the patent regime's intention to promote progress by advancing public knowledge and, with it, an alternative to the failed commercial incentive theory. The stage is set for the fourth section, the paper's nucleus, which develops the alternative approach to patents founded on a knowledge theory of progress, an approach driven by an unacknowledged competition dynamic situated in the domain of ideas. It explores the implications of a knowledge theory for promoting progress and, hence, for addressing questions of efficiency and distribution. The final section takes up the "So what?" question. It revises several key doctrines and policies to illustrate how a knowledge theory might promote progress through patents.

I. Patent's Means Problem: Commercial Incentive Theory

Policy makers begin with what might be called a constitutional norm that patent protection, along with copyright, is intended to promote progress. It is constitutional, of course, in its origins. Article I, Section 8, Clause 8 of the U.S. Constitution⁸ authorizes Congress to promote progress by enacting legislation that grants limited protection to the

⁷ Short methodological note: For the most part, conventional distinctions are not questioned in this paper, distinctions such as those between idea and invention, commercial and idea markets, and so on. Such distinctions have been debated at least since Plato. For example, is there a separate realm of ideas, apart from their articulation in and invention or expression? Both copyright and patent policies proceed on an assumption that resembles the realist or idealist notions that ideas occupy a separate realm of existence apart from their articulations. Thus, for example, the ideas behind inventions can be thought of as universally accessible in a public domain while the inventions are privately held in a commercial domain. Post-structuralists, following Derrida, would view this figuration as a centerless structure, as a constellation or network of articulations with no idea at the center because ideas only exist in their articulation. Jacques Derrida, *Structure, Sign, and Play in the Discourse of the Human Sciences*, in *The Structuralist Controversy* 247- 264 (Richard Macksey & Eugenio Donato, eds. 1970) What then, to make of the patent discourse of public ideas? Although that is a topic outside the scope of this paper, a useful beginning might be found in an Hegelian notion of levels of abstraction, expressed in some copyright opinions written by Judge Learned Hand, and in the range of views about the relationship between theory and practice, especially MICHEL FOUCAULT, *THE ORDER OF THINGS: AN ARCHAEOLOGY OF THE HUMAN SCIENCES* (1970); FOUCAULT, *POWER/KNOWLEDGE* (1980). PERITZ, *COMPETITION POLICY IN AMERICA* at Introduction (rev ed., 2001)

⁸ The Clause reads that Congress is empowered "To promote the Progress of Science and useful Arts, by securing for limited Times, to Authors and Inventors, the exclusive Right to their respective Writings and Discoveries."

work of inventors and authors. The constitutional norm— that Congress enact patent and copyright legislation to promote progress —provides the foundation for the commercial incentive theory that dominates current patent policy. The theory in its current form holds that expanding patent protection is the most effective means for promoting material progress because it increases the commercial incentives to invent and innovate, which, in today’s terms, leads to improved production and engineering technologies and, hence better products for better living.

The Supreme Court, at least since the mid-nineteenth century, has described the patent system as a “carefully crafted bargain for encouraging the creation and disclosure” of inventions “in return for the exclusive right to practice [them].”⁹ Careful crafting is necessary because both overprotection and underprotection can pose dangers to “the general good” of promoting progress.¹⁰

Since the latter half of the twentieth century, incentive theory has applied the logic of market economics to the task of determining “the general good.”¹¹ It proceeds from the belief that patents remedy a “market failure” that results from the “public goods” characteristics of the information and ideas articulated in inventions.¹² By rewarding the

⁹ *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 150-51 (1988); *Fogerty v. Fantasy, Inc.*, 510 U.S. 517, 524 (1994) (stating that “The primary objective of the Copyright Act is to encourage the production of original literary, artistic, and musical expression for the good of the public.”); *Kendall v. Winsor*, 62 U.S. (21 How.) 322, 327-28 (1858) (Observing that “the limited and temporary monopoly granted to inventors was... designed... [to] benefit ... the public . . .”).

¹⁰ *Fox Film Corp. v. Doyal*, 286 U.S. 123, 127 (1932) (copyright case using language of “public good”). *White v. Samsung Elect. Amer., Inc.*, 989 F.2d at 1512-1513 (9th Cir. 1993)(Kozinski, J., dissenting) (observing the regressive potential of overprotection). Kenneth Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *THE RATE AND DIRECTION OF INVENTIVE ACTIVITY: ECONOMIC AND SOCIAL FACTORS* 609 (National Bureau of Economic Research ed., 1962) (classic statement of incentive theory, though not without expressing doubts). Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 688 (1998) (discussing “tragedy of the anti-commons” as showing how when few persons have the right to exclude, the best use of others can be blocked); James M. Buchanan & Yong J. Yoon, *Symmetric Tragedies: Commons and Anticommons*, 43 J.L. & ECON. 1, 2 (2000) (describing anticommons as “useful metaphor for understanding how and why potential economic value may disappear into the ‘black hole’ of resource underutilization, a wastage that may be quantitatively comparable to the overutilization wastage employed in the conventional commons logic.”)

¹¹ James Boyle has provided a thoughtful and useful treatment of information economics, one that explicates the internal logic of the mainstream approach and then puts it into cultural and historical contexts. Boyle, *Cruel, Mean or Lavish? Economic Analysis, Price Discrimination and Digital Intellectual Property*, 53 VAND. L. REV. 2007 (2000); Boyle, *A Theory of Law and Information: Copyright, Spleens, Blackmail and Insider Trading*, 80 CAL. L. REV. 1413 (1992). See also CARL SHAPIRO & HAL R. VARIAN, *INFORMATION RULES* (1999).

¹² See Paul M. Romer, *Endogenous Technological Change*, 98 J. Pol.Econ. S71, S73-4 (1990). *The Economist* has defined perfectly “public goods” as things that can be consumed by everybody in a society, or nobody at all. They have three characteristics: 1. non-rival – one person consuming them does not stop another person consuming them; 2. non-excludable – if one person can consume them, it is impossible to stop another person consuming them; 3. non-rejectable – people cannot choose not to consume them even if they want to. Examples include clean air, a national defense system and the judiciary. The combination of non-rivalry and non-excludability means that it can be hard to get people to pay to consume them. Thus public goods are regarded as an example of market failure. (available at <<http://www.economist.com>>).

inventor, by privatizing the commercial benefit of intellectual activity, the patent regime seeks to create an incentive for inventors to invent. Patents stop commercial imitators, who otherwise would swiftly capture some of profits and whose very presence as competitors would eliminate the rest, because “public goods” such as ideas and information are, in practical terms, freely copied and used. In consequence, one person’s use of an idea or fact does not deplete the supply of that idea or fact available to others and, moreover, stopping imitators and copycats is difficult if not impossible. Thus the easy appropriation of information and ideas sets off a gale of “market failure” that destroys an inventor’s ability to keep hold of the profits of invention; the failure is seen as driving her into other more remunerative activities. As a result, the market will not produce the optimal amount of invention.¹³ According to this commercial logic, the patent regime is viewed as the most efficient means for correcting the market failure and, thus, for producing material progress.

An incentive theory makes good intuitive sense in light of the constitutional norm of promoting progress; indeed, it might be a necessary implication. But incentive theory’s modern commercial formulation poses daunting challenges for a patent policy that seeks the “careful crafting” of “the general good.” One challenge is justifying the “public goods” logic that underlies the commercial incentive theory of serving the general good. Another emerges from the theory’s empirical intractability and theoretical infirmity.

The economic concept of “public goods” informs the commercial incentive theory of patent protection. The approach begins with an analogy posed between “intangible” ideas and “tangible” objects of property. The analogy allows incentive theorists to look to economic and historical scholarship studying the emergence of private ownership of lands held in common. This scholarship concludes that private ownership—the right to exclude others—is necessary for efficient use of property. The efficiency scholarship of “public goods” emerged at the confluence of two influential articles, published in quick succession. In 1967, a ground-breaking article by economist Harold Demsetz developed an historical conjecture about the rise of private property as the economically rational response to changing conditions of production. One year later, ecologist Garrett Hardin wrote “The Tragedy of the Commons,” whose title would serve as the battle cry for privatization to solve the problems of ecological and economic waste.¹⁴

In sum, their argument goes something like this: Private ownership avoids the “tragedy” that results from the unavoidable overuse of property held in common— what I will call public property.¹⁵ “Tragedy” is unavoidable because each user tries to maximize

¹³ There would nonetheless be inventors who could keep the crucial ideas and information secret while reaping the commercial benefits of their creative work. In these circumstances, there would be a different sort of market failure, one resulting from the failure to bring as much information into the market as a more transparent regime, like patents, would bring. As a general matter, more information permits markets to function more efficiently.

¹⁴ Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM.ECON.REV. 347 (1967); Garrett Hardin, *The Tragedy of the Commons*, SCIENCE, Dec. 13, 1968, at 1243. It should be noted that Hardin’s work influenced a wide range of followers, including environmentalists of various stripes.

¹⁵ There are differences between the two terms that should be taken into account but they are not applicable here. See, e.g., Charlotte Hess & Elinor Ostrom, *Ideas, Artifacts, and Facilities: Information as a Common-*

as quickly as possible his own benefits from the public property. Users perceive themselves and others as rivals for a limited resource. Because cooperation is deemed economically irrational in these circumstances, maximizing one's own short term use is the winning strategy.¹⁶ The cumulative result, the social effect, is depletion of the public resource by over-grazing, over-fishing and other forms of private-regarding behavior. Privatization of the resource, it is argued, changes the game by changing the incentive. Private-regarding behavior need no longer maximize gains by maximizing the speed of heedless use. The property right to exclude others allows for efficient management of resources by protecting returns over a longer period— for patents, it is twenty years. Thus, the core of private ownership of property is seen as the right to exclude others.¹⁷ In this view, enforcing ownership rights provides a system for settling disputes over property use and, thus, avoids the “tragedy of the commons”— the waste attributed to overuse of public property —by privatizing expected gains to create an incentive for investing in the property.

The Demsetz-Hardin conjecture of tragedy has been strongly criticized not only in legal and economics literature that questions the efficiency of property¹⁸ and the assumption against cooperation,¹⁹ but in legal and historical scholarship that rejects the attribution of social waste to the commons whose enclosures began in 16th century England.²⁰ In response, “tragedy” adherents insist that patent protection presents a stronger case for “enclosure,” for privatization, than tangible property because inventions

Pool Resource, 66 Law & Contemp Probs. 111 (2003) (appearing in “The Public Domain” Symposium, James Boyle, ed.)

¹⁶ Game theory economics terms this scenario the prisoners dilemma, for which the Nash Equilibrium is competition rather than cooperation. There are, of course, countless other games, including so-called cooperative games. Indeed, the prisoners dilemma can rationally be played as a cooperative game. Studies have suggested that iterative games of the prisoners dilemma are most likely to produce cooperative equilibria. See ROBERT AXELROD, *THE EVOLUTION OF COOPERATION* (1984); cf. EDWARD CHAMBERLIN, *THE THEORY OF MONOPOLISTIC COMPETITION* (1932) (developing oligopoly theory); Peritz, *Toward a Dynamic Antitrust Analysis*, 47 N.Y.L.S. L. Rev. 101 (2003).

¹⁷ Exclusive possession or use seems more often an artifact of property law than an attribute of tangible property. Tractors and plots of land are often used or held in common, even if the criterion is simultaneous use or possession. Indeed, even consumables such as the proverbial apple can be shared. Property law has long recognized such states of property rights, which were explained perhaps most clearly by Hohfeld, who made the fundamental point that property rights can be best understood as relations between persons rather than relations between a person and a thing. Wesley Hohfeld, *Some Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 23 Yale L.J. 16 (1923).

¹⁸ Frank I. Michelman, *Ethics, Economics and the Law of Property*, in 24 NOMOS 3, 25 (J. Roland Pennock & John W. Chapman, eds. 1982) (questioning dynamic efficiency of private property); Duncan Kennedy & Frank Michelman, *Are Property and Contract Efficient?*, 8 HOFSTRA L. REV. 711 (1980) (citing as antecedents ROBERT HALE, *FREEDOM THROUGH LAW* (1952); Hale, *Property and Distribution in a Supposedly Non-Coercive State*, 38 POL. SCI. Q. 470 (1923)).

¹⁹ Axelrod, *supra* note 12; Peritz, *supra* note 12.

²⁰ See, e.g., James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 LAW & CONTEMP. PROB. 33 (2003); Daniel N. McCloskey, *The Prudent Peasant: New Findings on Open Fields*, 51 J.ECON. HIST. 343(1991); Robert C. Allen, *The Efficiency and Distributional Consequences of Eighteenth Century Enclosures*, 92 Econ. J. 937 (1982). Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 688 (1998) (discussing Heller's "tragedy of the anti-commons" as redefining the theory, showing how when few persons have the right to exclude, the best use of others can be blocked).

embody information and ideas that are more easily appropriable as “public goods” than common wells and fishing waters. Moreover, internet access and modern digital technology allow for even more efficient copying and imitation. The underground springs of invention will dry up even more surely than their physical counterparts without a patent regime that rewards inventors for their efforts. This view holds sway in patent policy despite deep disagreement among economists.²¹

Whether based on the underlying constitutional norm of promoting progress or on the modern economic logic of “public goods,” there is a broad consensus that patent protection spurs innovation. But there is an important distinction to be drawn between the normative and economic grounds for incentive theory. If an inference from the information economics of “public goods,” then incentive theory rests on a commercial logic favoring propertization to cure the market failure that threatens to burn the roots of progress. If, on the other hand, incentive theory rests on the constitutional norm that authorizes Congress to promote progress, then patent policy need not be guided by the “public goods” analysis of information economics. Indeed, an originalist might point out that it was not information economics but political economy that informed the First Congress.²² In this historical light, patent protection can be understood as a permissible means of promoting progress, along with other means then believed to serve “the common good”— particularly the commitments to competition that were part of Anglo-American political economy since the 17th century. But originalism unadorned is not necessary. Indeed, the modern patent regime, as we shall see, has not been monopolized by the commercial logic of incentive theory and its tendency toward increasing propertization. The constitutional norm of promoting progress has carried forward a broader array of policy implications that remain a

²¹ The disagreement is efficiently stated by economist Jack Hirshleifer, who concluded that patent law may be either a necessary incentive for the producing inventions or an unnecessary legal monopoly in information that overcompensates an inventor who has already had the opportunity to profit from the information embodied in her invention. Hirshleifer, *The Private and Social Value of Information and the Reward to Inventive Activity*, 61 AM. ECON. REV. 561, 572-73 (1971); Sanford J. Grossman & Joseph E. Stiglitz, *On the Impossibility of Informationally Efficient Markets*, 70 AM. ECON. REV. 393 (1980) (arguing the impossibility of informationally efficient markets on the basis that either prices would perfectly reflect the available information about the market, denying economic incentive to those who expend resources to obtain information and thereby undermining the incentive to produce, or would introduce an extra cost into the price, so that it no longer reflected perfectly the available information).

²² Jefferson’s taper metaphor in the much-quoted letter to Isaac McPherson can be analogized to the “public goods” problem but, like every analogy, it is a play of similarities and differences rather than a recognition of identity. Much as been written about property’s place in 18th century political economy, both European and American. Re: American colonial history, Mensch, Buffalo L.Rev.; Alexander, Neb. L. Rev.; For now it is sufficient to note that, at least until the early 20th century, the framework was political economy and not market economics, the “community” and not the market. Hence, the discourse of monopoly and competition was closely tied to the socio-politics of competition and democracy, and to concerns about privilege and monopoly, which included not only patents for bridges or corporations but also patents for inventions. While the Supreme Court under Chief Justices Marshall and Taney would develop different views of property, they did concur that property rights should serve the government’s role “to promote the happiness and prosperity of the community.” The question, of course, was how. Taney in *Chas River Bridge*, 36 US (11 Pet.) 420, 547 (1837). While some of the scholarship has not paid close attention to patent and copyright, Baker, Underkuffler, other research has. Walterscheid book, Hyde & Orlan papers from Berkman ctr.. A socio-politics of competition persists, although the content has shifted over the years. See PERITZ, COMPETITION POLICY IN AMERICA for one account of these shifts.

force in patent policy, an array currently obscured by the dominant logic of commercial incentive theory.

This section next traces the empirical and theoretical fault lines in the commercial logic of modern incentive theory by quickly reviewing and synthesizing the literature, including some precincts that have not been generally understood to address the question.

The commercial logic of modern incentive theory proceeds from the assumption that patents produce a net economic good from the trade-off between economic costs and benefits. On the cost side of the equation, patents empower inventors to exclude rivals and thus to restrain competition in both invention and innovation.²³ As a result, patents produce economic costs in the form of higher prices and, with them, lower demand by all users— both consumers and subsequent inventors. Thus, not only will consumers pay higher prices in the short run but so will subsequent inventors, causing a decline in invention and innovation in the long run.²⁴ On the benefit side, a patent regime is believed to encourage inventors to produce more than they would in its absence, yielding increased economic benefits of new and better products, new ideas and information and, after the patent expires, better-informed imitative competition, leading to lower prices and increased activity by subsequent inventors.²⁵

But there are uncertainties about the incentive value of patents, beginning with questions about the extent to which inventors actually pursue business strategies that depend on patent portfolios. Studies suggest that trade secrecy is sometimes preferred by both small and large firms, particularly for process innovation, which is typically not self-revealing.²⁶

Moreover, there are substantial doubts, both theoretical and empirical, about whether patents increase innovation. Economists agree on very little. But they do agree on two things— first, that no one has devised a successful method for developing studies to

²³ *Pfaff v. Wells Elecs.*, 525 U.S. 55, 63 (1998) (“[T]he balance between the interest in motivating innovation and enlightenment by rewarding invention with patent protection on the one hand, and the interest in avoiding monopolies that unnecessarily stifle competition on the other, has been a feature of the federal patent laws since their inception.”). See discussion *infra* of experimental use defense as restraint on invention.

²⁴ More innovation is seen, through the lens of economist Joseph Schumpeter, as more competition, although paradoxically as more robust in concentrated markets. For an analysis of three sharply different views of competition by innovation, see Peritz, *AIInnovation Economics and U.S. Antitrust Law* in *POST-CHICAGO DEVELOPMENTS IN ANTITRUST LAW* (A. Cucinotta, R. Pardolesi, R. Van den Bergh, eds.) (London, U.K.: Edw. Elgar Press, 2002)(discussing J. Schumpeter, E. Chamberlin and B. Arthur).

²⁵ See Scotchmer, *On the Shoulders*; et al; More precisely, it is the marginal increases in information and imitative competition that develop from the spill-over effects of the published knowledge that would have been successfully hidden by inventors who chose to invent and then adopted the strategy of maintaining secrecy. But there are doubts about the assumption that material and knowledge benefits move in tandem, doubts that an incentive theory which promotes material benefits thereby promotes its knowledge counterpart. For discussion of this assumption, see *infra* section III.

²⁶ Levine study of CEOs; small firms and trade secrets; Benkler, *The Wealth of Networks*.

determine how patent protection affects innovation across an economy.²⁷ The basic problem? There are no reliable baselines from which to measure in broad terms how a patent regime affects innovation.²⁸ That's a problem for incentive theory because the goal is promoting invention and innovation, not maximizing the social transaction costs reflected in patent protection. In short, the idea is to attain the ends not maximize the means. Unable to devise a strategy for determining the incremental innovation attributable to patent protection, economists have turned to industry studies over the years, studies that have shown mixed results in different sectors, countries, and time periods.²⁹ There is widespread knowledge of the industry studies showing that expanding patent protection correlated with declines in innovation.³⁰

Thus, economists and other patent policy makers must be satisfied to search for what might be called dynamic x-efficiency, to determine largely in retrospect on an industry-by-industry basis whether particular patent policies and doctrines have promoted

²⁷ Assuming that we want to maximize innovation, our knowledge is inadequate to inspire great confidence even in the desirability of having a patent system at all. @ Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 Harv. L. Rev. 1813, 1833 (1984). See Fritz Machlup, *An Economic Review of the Patent System* (U.S. Senate, Committee on the Judiciary Study No. 15, 1958) (observing that “[t]he analysis of the ‘increment of invention’ attributable to the operation of the patent system, or to certain changes in the patent system, can only be highly speculative, because no experimental tests can be devised to isolate the effects of patent protection from all other changes that are going on in the economy.”); Richard Brunell, *Appropriation in Antitrust: How Much is Enough?*, 69 Antitrust L.J. 1 (2001). See generally, Stephen Breyer, *The Uneasy Case for Copyright*, 84 HARV. L. REV. 281 (1970). On the dynamics of inevitability, see W. F. Ogburn & D. S. Thomas, *Are Inventions Inevitable?*, 37 POL. SCI. Q. 83-98 (1922); Robert Merton, *Singletons and Multiples in Scientific Discovery*, 105 PROC. AM. PHIL. SOC. 370-86 (1961); ABBOTT PAYSON USHER, A HISTORY OF MECHANICAL INVENTIONS (1954), Chapter 2; Compare THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS (1962). For a useful analysis and bibliography of economic scholarship, see Richard S. Markovits, *On the Economic Efficiency of Using Law to Increase Research and Development: A Critique of Various Tax, Antitrust, Intellectual Property, and Tort Law Rules and Policy Proposals*, 39 HARV. J. LEGIS. 63 (2002).

²⁸ Fritz Machlup, *supra* note (arguing no empirical approach for measuring across economy); Kaplow, *supra* note; Richard Brunell, *Appropriation in Antitrust*, *supra* note. But see Josh Lerner, *Patent Protection and Innovation Over 150 Years*, Working Paper no.8977, National Bureau of Economic Research (Cambridge, Mass. 2002) (cited in YOCHAI BENKLER, THE WEALTH OF NETWORKS 38-39 (2006)).

²⁹ See Richard C. Levin, Alvin K. Klevorick, Richard R. Nelson, Sidney G. Winter, *Appropriating the Returns from Industrial Research and Development*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY (1987) (finding, *inter alia*, that patents were seen as less effective than lead time learning curve advantages and secrecy, except in pharma sector; that patents generally more useful for product than process inventions, because easier to maintain as trade secrets). Industry studies include Martin N. Baily, *Distinguished Lecture on Economics in Government: The New Economy: Post Mortem or Second Wind?*, 16 J. ECON. PERSPECTIVES, 3-22 (2002); Robert J. Gordon, *Technology and Economic Performance in the American Economy*, NATIONAL BUREAU OF ECONOMIC RESEARCH WORKING PAPER 8771 (February 2002); William Nordhaus, *The Sources of the Productivity Rebound and the Manufacturing Employment Puzzle*, NATIONAL BUREAU OF ECONOMIC RESEARCH WORKING PAPER 11354 (May 2005); F. M. Scherer, *Antitrust, Efficiency, and Progress*, 62 N.Y.U. L. REV. at 1014-1018 (1987).

³⁰ YOCHAI BENKLER, THE WEALTH OF NETWORKS 38-39 (2006) (citing Adam Jaffe, *The U.S. Patent System in Transition: Policy Innovation and the Innovation Process*, 29 RES. POL. 531 (2000)); K. Arrow, *Economic Welfare and the Allocation of Resources of Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITIES (R. Nelson, ed. 1962); *cf.* *White v. Samsung Elect. Amer., Inc.*, 989 F.2d at 1512-1513 (9th Cir. 1993) (Kozinski, J., dissenting) (referring to copyright and derivative works). [add pointer back to anti-commons cites]

progress and thus are likely to continue to do so. This micro-economic approach is understood as second-best because even if it can predict that a particular patent policy would likely enhance innovation in one product and geographic market, it cannot forecast the impact of change in other markets and, thus in the economy overall.³¹ Despite these shortcomings, commercial incentive theory has provided the logic driving patent policy, including its judicial expression by the Federal Circuit. Perhaps it should not be surprising that the patent court of appeals has relied on intuition rather than research, given that courts do not have the institutional competency and resources to engage in the kinds of inquiry required to develop such informed policy judgments. Yet despite its resources, Congress too has relied on intuition and “common sense” rather than a sufficient understanding of the uncertain economics of commercial incentive theory.³²

Even more troubling than the empirical intractability of commercial incentive theory are two theoretical problems. First, economists and other policy analysts contend that the exclusionary scope of patents can restrain innovation. For example, economists Merges & Nelson have made an elegant argument, with some empirical support, that narrower patent protection can provide a better means for promoting progress. They conclude that more diversity in research and development produces more innovation, that “two heads are better than one,” despite an increased likelihood of reinventing wheels. Less incentive and more competition arguably produce more innovation. But others have pointed to the increased transaction costs of innovation attributable to narrowing the reach of patents, whether the redundant research in less restricted fields of invention or the patent thickets that follow issuance.³³ The result is theoretical uncertainty.

A second theoretical frailty calls into question even those market studies that seem to show a positive correlation between patent protection and material progress. The commercial logic of incentive theory, cut to the bone, depends on the assumption that dynamic x-efficiency is served. There are several variables that researchers have used as proxies for innovation, including corporate profits, number of patents issued, and expenditures on research and development. But the best measure of material progress is

³¹ Congress has passed some special legislation for the pharmaceutical industry, although for the most part patent protection remains one-size-fits-all. E.g., Orphan Drug Act; Hatch-Waxman Act.

³² Compare, for example, the economists’ amicus brief in the Supreme Court’s controversial decision in *Eldred v. Ashcroft*, 537 U.S. 186 (2003) (amicus brief available at 2002 WL 1041866) with Senator Orrin Hatch’s (Rep., Utah) article defending the incentive logic of retroactively extending copyright protection to dead authors. Orrin G. Hatch & Thomas R. Lee, *To Promote the Progress of Science: The Copyright Clause and Congress’s Power to Extend Copyrights*, 16 HARV. J.L. & TECH. 1 (2002).

³³ WALSH ET AL., EFFECTS OF RESEARCH TOOL PATENTS AND LICENSING ON BIOMEDICAL INNOVATION, IN PATENTS IN THE KNOWLEDGE-BASED ECONOMY 285 (Wesley M. Cohen & Stephen A. Merrell eds., 2003). at 291 n.11 (“[It is] well recognized in the economics of innovation . . . that, given a technological objective (e.g., curing a disease) and uncertainty about the best way to attain it, that objective will be most effectively achieved to the extent that a greater number of approaches to it are pursued.”); Merges & Nelson, *On the Complex Economics of Patent Scope*, 90 Colum. L. Rev. 839, 873 (1990). Michele Boldrin & David K. Levine, *The Economics of Ideas and Intellectual Property*, Proceedings of the National Academy of Sciences of the U.S., 102 PNAS 1252 (2005), available at <http://www.pnas.org/cgi/content/full/102/1252>. Compare Edward Kitch, *The Nature and Function of the Patent System*, 20 J. Law & Econ. 265 (1977) (prospect theory, which extends incentive theory by praising channeling function of broad patents). Include recent HLR article revising Kitch. Pointer to Anti-commons literature cited in notes.

market adoption:³⁴ The adoption of the better product and, with it, the better technology, is taken to mean that innovation has spurred material progress. But serious doubts have been raised by influential economist Brian Arthur's path-breaking analysis of markets in which alternative technologies compete. His work has challenged the confidence of mainstream economists and policy makers in technology adoption as a reliable indicator of dynamic x-efficiency and thus of second-best progress.³⁵

In short, Arthur's analysis shows how commercial success can be the consequence of historical accident.³⁶ The troubling implication for an innovation economics of dynamic x-efficiency is that the better technology can lose in the marketplace. Instead of promoting progress, patent policy can create incentives that sometimes accelerate movement down a false path. It can expand the gap between the market success and the social welfare of winning technologies by increasing the opportunity cost attributable to the better technology's commercial defeat. As a result, some progress has been made but at the cost of greater progress lost.³⁷

It is Arthur's application of positive feedback logic, of increasing returns to demand, that has identified market adoption as an unreliable indicator of material progress. Arthur recognized that many industry sectors do not act according to price theory statics, which posits *negative* feedback loops that stabilize markets. The most familiar instance of negative feedback is seen in the inverse relationship between price and supply: As supply declines, prices tend to increase, which either dampens demand or attracts new supply and thereby dampens the price increase.

Positive feedback can accelerate rather than dampen the effects of market changes, even very small and transient ones. Although positive feedback loops can emerge in many markets, they are more likely to occur in high technology sectors where the competition involves products embodying incompatible technical standards. Examples include the old VHS-Beta videotape wars and the more recent CD and DVD standards battles for universal acceptance. In these circumstances, what gets ahead tends to get further ahead precisely because stabilizing reactions fail to appear. Instead, if one technology's customer base increases more quickly, users are increasingly drawn to that technology. They are drawn because they want to avoid the costs of switching from the losing technology but also because increasing system³⁸ membership in and of itself can make a technology more valuable—more people to telephone, to share WORD files, or to trade Sega video games. Such products are said to exhibit network or system effects. The attraction to larger networks or systems can trump price and quality competition when network or system size itself becomes more attractive to new users. What user of VHS technology would buy a Beta tape at any price, even if it produces better audio and video quality? Despite such

³⁴ All of these can but need not reflect innovation.

³⁵ W. BRIAN ARTHUR, INCREASING RETURNS AND PATH DEPENDENCE IN THE ECONOMY (1994).

³⁶ The results seem to apply to product but not process innovation except to the extent that product improvement derives from process innovation.

³⁷ Kornhauser, 1980 Hofstra L. Rev. (discussing false path & thus not progress)

³⁸ Brief note on networks and systems.

questions, most observers see the outcome of the videotape wars as the triumph of a competition on the merits, perhaps aided by smart marketing strategies.

Arthur offers another account, one that tells how an inferior technology might win by accident the battle of incompatible technologies: In early stages of commercial competition between alternative technologies, it is not unusual for products to show clusters of strong demand. These clusters reflect user adoptions based on judgments about price or quality, or perhaps simply on availability or other factors. In any event, most of the time, according to Arthur, clusters of product demand appear randomly.³⁹ But sometimes demand clusters for one technology just happen to aggregate close enough in time and space to register a demand spike that, understood in the network logic of system size, provokes a response that attracts even more demand. This accidental demand spike begins a positive feedback loop: For example, a random spike of VHS machine purchases could be a signal for Blockbuster and its rivals to stock more pre-recorded VHS tapes, which would make the VHS machines more valuable, which would make pre-recorded VHS tapes more valuable, and so on. If one of these strong positive feedback loops is triggered by a purely random aggregation of demand clusters, membership will nonetheless expand at an accelerating pace, set off by nothing more than historical accident. As network membership grows for one alternative in a market exhibiting network effects, the likelihood increases that the market will tip toward the spiking demand cluster, leading to market leadership or perhaps monopoly. Once the market has tipped toward a particular technology— VHS, for example —currently available alternatives as well as late bloomers tend to be locked-out, even if superior, because they must overcome an array of switching costs. Hence, in such markets, there is no assurance that competition by innovation yields adoption of the best product, no assurance that the path taken is the most efficient one.⁴⁰ It was entirely possible, Arthur demonstrated, for the better technology to lose by accident. In this light, market success is not a reliable indicator that victory was on the merits.

Moreover, in markets exhibiting network effects, patents can increase the returns to the inventor even beyond those of the traditional monopoly, with two undesirable results: First, increased social costs of commercial incentive without evidence that the increase correspondingly enhanced innovation; second, over-incentives for inventors to enter such markets.⁴¹

This section has explicated the commercial incentive theory that supports the dominant approach and has found that its limitations sabotage its value for patent policy makers. Heedless reliance on this unsupported theory has contributed to the trend toward increasing perpetration. Rightly respecting the constitutional norm of promoting

³⁹ The model does not mean to suggest that all spikes are random occurrences. Of course, market recognition of product quality and price can trigger spikes, as can reactions to sellers' strategic behavior. See Peritz, *Tipping* in NETWORK ACCESS: LESSONS LEARNED IN REGULATION AND ANTITRUST (Moss, D., ed.) (N.Y.: Routledge Press 2004).

. The point is that not all spikes indicate such recognition. This fundamental point is lost by some critics.

⁴⁰ Arthur called this Agrowth processes where probabilities of addition to categories could be *an arbitrary function* of their current proportions (or market share).@ ARTHUR, *supra* note , at xv.

⁴¹ On monopoly rents and declining marginal incentives to innovate, see Ayres, Mich. L.Rev.; Ayres, Envelope Theorem, Miss symposium.

progress, policy makers have followed an intuition that more expansive patent protection creates a greater incentive to invent and, with it, a step toward the goal of promoting material progress. But policy makers are caught in a double-bind: On the one hand, there is the constitutional norm of promoting progress. On the other, even the very limited empirical research, together with theoretical frailties, argue against reliance on commercial incentive theory.

Is there an alternative to commercial incentive theory for shaping a patent regime? If not an intuition that maximizing commercial exploitation of patents promotes the material benefits of progress, then what's to be done about the constitutional norm? The following sections start to map an alternative, an alternative that derives from normative and analytical materials already found in the current patent regime, materials that can be thought of as the recessive genes of progress. The next section develops the patent regime's internal competition policy and raises the prospect of extending that policy beyond its narrow ambit. Then, section III explores the normative content of patent and copyright for an alternative to patent policy's commercial logic of incentive theory as the means of promoting material progress.

II. Patent's Second Means Problem: Competition or Exclusive Rights?

Mainstream theorists and policy makers have long recognized an incentive theory working in antitrust policy. Perhaps Judge Learned Hand said it best: “[F]inis opus coronat. The successful competitor, having been urged to compete, must not be turned upon when he wins.”⁴² Not unlike its patent policy counterpart, antitrust's incentive theory has located in the meritorious monopoly a virtue that complements the public benefits of competition. It is a virtue founded in the protection of property rights, virtuous in the conventional view that private property rights order commercial markets by providing the means for exchange, the means for enabling competition. Property rights and competition are seen as moving in harmony. But there has always been another side to their relationship, a tension that antitrust has mediated historically by interjecting an affirmative public policy of competition when private rights restrain unduly the workings of commercial markets.⁴³

After presenting two brief examples of this tension and its mediation, the section turns to patent policy, which approaches the issue from a different angle. The patent regime proceeds from the procedural assumption that competition orders innovation in commercial

⁴² U.S. v. Alum. Co. of Amer., 148 F.2d 416 (2d Cir. 1945) (translated as “[T]he end crowns the means.”)

⁴³ Peritz, Rule of Reason, 1989 Hastings L.J. At the same time, competition policy and property rights, each in their own ways, have provided discursive frameworks for mediating tensions between liberty and equality. See Peritz, Competition Policy in America (1996, rev.ed 2001). It should be noted that traditional antitrust jurisprudence does not reflect an instrumentalist view of property rights but something more akin to a liberty interest in exercising one's property rights. Since the emergence of the so-called Chicago School of neo-classical price theorists, however, property interests have been portrayed in terms that common law property and contract rights are efficient. From Coase to Epstein, Posner, Priest; but see Baker; Kennedy & Michelman, Rizzo, Dworkin, et al in 1980 Hofstra LJ symposium; Coase article in 50th anniversary collection.

markets. Exclusionary patent rights issue only when they offer extraordinary public benefits of useful invention and anticipated innovation. The section develops an approach to the intersection of patent and antitrust that departs not only from the traditional view of a conflict in means between monopoly and competition but also from the more recent one that harmonization is found in the ends of promoting innovation. Instead, the section returns to the question of means to explore how both policy domains resolve tensions between their own competition regimes and their own property logics.

A. Antitrust and Property Rights

Commitments to property rights have always suffused antitrust law.⁴⁴ To give a sense of how antitrust has sought to mediate between the public policy of competition and the private property rights that enable commercial markets, the section offers two quick looks at antitrust doctrine – the first, corporate merger regulation and the second, manufacturer restraints on distribution of their branded products. It concludes with some observations about antitrust jurisprudence and property rights.

A corporate merger is fundamentally a simple transaction. It is an exercise of a basic property right— a sale or exchange. The subject matter of the Supreme Court's landmark *Northern Securities* decision in 1904 was a railroad trust that President Teddy Roosevelt wanted to bust.⁴⁵ Legendary financier J.P. Morgan persuaded two groups of notorious robber barons, who owned railroads that competed along 9000 miles of parallel track, to merge their interests by exchanging their railroad stock for certificates in the Northern Securities Trust. One railroad was in bankruptcy and the other was losing money every day. The merger proposed a simple exchange of property – railroad stock for trust certificates. But a splintered Supreme Court held the exchange violated the Sherman Act because the merger would eliminate competition between the two enormous railroads. According to a bare majority of the Court, *competition policy* trumped property rights because of a monopoly result. Four judges dissented because they believed that *property rights* should be protected and that the merger should be permitted: Owners should be allowed to run their businesses as they see fit; certainly, they should have the right to sell or exchange their property. The four dissenters also insisted that the antitrust law, as applied by the majority, violated the constitutional protection of private property from government confiscation.

The case, in which Justice Holmes famously opined that “[g]reat cases, like hard cases, make bad law,”⁴⁶ produced an anti-trust decision by nine judges who issued four opinions that revealed a deep split over the relationship between competition policy and private property rights, even in the face of a monopoly trust.

⁴⁴ Peritz, *Competition Policy in America* (1996, 2001); 1990 Duke LJ, 1989 Hasting LJ

⁴⁵ *Northern Securities Trust*, 193 U.S. 197 (1904).

⁴⁶ *Id.* at 364.

In the hundred years since *Northern Securities*, the Court has returned to property questions repeatedly in cases involving manufacturers' restraints on distribution.⁴⁷ For the past 30 years, the Court's commitment to property rights has awarded different status to price restraints and non-price restraints, granting more lenient treatment to most non-price restraints. Indeed, the Court's property logic provides the very foundation for the dominant approach to vertical restraints.

The antitrust categories of price and non-price restraints is a commonplace today. But the Supreme Court did not give effect to separate categories of vertical restraints in antitrust law's first 75 years. Until 1963, the Court treated competition as a unitary process and restraints as an undifferentiated concept. It was in the *White Motor Company* case that the Supreme Court first announced that manufacturers' non-price restraints on dealers would be treated more leniently than price restraints.⁴⁸ Price restraints were categorically illegal. But with non-price restraints, defendants would now have the opportunity to demonstrate that their particular programs in fact enhanced competition. The Court's differentiation between price and non-price restraints was the result of an imaginative shift from viewing competition as a unitary process to seeing it as a bi-level process. In this bi-level process, at the higher level, White competed against other truck manufacturers – Ford, General Motors and Chrysler. Interbrand competition. At a lower level, White's dealers competed against one another. Intrabrand competition

Within this new framework of stratified markets, the Court could see in White Motor's argument a legitimate logic of competition. The logic is now familiar: White was a small truck manufacturer struggling to survive against large rivals whose economies of scale gave them significant cost advantages. It was a losing strategy for White to compete on price with General Motors, Ford and Chrysler. White Motor recognized that it had to develop a marketing strategy to compete on product quality and service. It had to differentiate its product to attract and hold a customer base. It had to add value to the White Motor trademark or leave the market. To accomplish this, White had to encourage its dealers to join it in non-price competition against the Big Three by investing in brand development— better service, more inventory, and so on. The only incentive that made economic sense required White to assure its dealers the profit margins needed to invest. Thus, White had to eliminate dealer competition, typically price competition, it argued to the Supreme Court, by limiting their geographic and customer markets. In short, White argued, intrabrand restraints and, through them, largely non-price competition, were necessary for corporate survival against the Big Three truck makers.

The Supreme Court accepted the argument, which depended upon a bi-level view of competition. At each level, restraints remained illegal *per se*. Manufacturer cartels were prohibited, as were restraints among dealers. But a vertical restraint between levels, one imposed by a manufacturer on its dealers below, was seen as potentially enhancing

⁴⁷ Property questions have caused wide oscillations in doctrine. See Peritz, A Genealogy of Vertical Restraints Doctrine, 40 *Hastings L.J.* 511 (1989).

⁴⁸ *White Motor Co.*, 372 U.S. 253 (1963); compare *Dr. Miles Medical Co.*, 220 U.S. 373 (1910). Mention *State Oil v. Khan* (maximum rpm not illegal *per se*).

competition among branded manufacturers, without whom there would be no competition at either level.⁴⁹

What was it that led the Court to adopt this bi-level view of competition? It was the property logic of ownership. Not ownership of the underlying products but ownership of a brand and the images and ideas reflected in it. It was ownership of the White Motor trademarks, not ownership of trucks and replacement parts.

After *White Motor*, antitrust courts started to treat competition among dealers, typically price competition, as less important than competition among manufacturers, often non-price competition, even when the manufacturers were not in dire straits. Competition among manufacturers, which hinged on development of trademark value, was given more and more sway. At bottom was the determination that manufacturers should be permitted to control the distribution and resale of their branded products, even though they retained no ownership in the goods themselves, when the restraints enhanced brand competition. Where price cutters were once hailed as heroes, as free traders, the property logic of trademarks branded them as free riders, as knaves who misappropriated the value of efforts by fellow dealers to develop brand names.⁵⁰ Since *White Motor*, antitrust's vertical restraints jurisprudence, its vision of competition, has inhabited the confines of trademark protection.⁵¹

In summary, antitrust has always been suffused with its own property ethics, including intellectual property rights, which have informed and sometimes shaped the competition policy that regulates commercial markets. Antitrust law does not make sense without recognizing the influence of property rights.

Yet antitrust was traditionally suspicious of patent and other intellectual property rights as monopoly privileges, whether or not economic monopolies. But in recent years, with a purely economic definition of monopoly, antitrust courts have expanded the scope of discretion permitted patent holders in the exercise of their exclusive commercial rights. Last term, for example, the Supreme Court overturned the long-held view that patent ownership gives rise to an antitrust presumption of market power. Plaintiffs must now carry the arduous and expensive burden of proving market power, regardless of the alleged

⁴⁹ The logic was top-down because only branded manufacturers were seen as legitimate property rights holders. Moreover, price competition was seen as sacrosanct and, thus, still *per se* illegal despite the fact that a manufacturer could apply the same economic logic to vertical price restraints, a fact that has not gone unrecognized by the Court and by scholars.

⁵⁰ It was Justice Oliver Wendell Holmes, Jr., who first characterized price cutters as knaves. Dr. Miles, *supra* (Holmes, J., dissenting). Of course, this “free rider” rationale echoes patent policy’s commercial incentive theory and reflects as well the propertization trend in trademark policy.

⁵¹ Since *White Motor*, the Court has become increasingly tolerant of branded manufacturers’ restraints in two important respects, both suggesting a shift toward propertization in antitrust. First, it has paid less attention to their market power and, in the process, given more weight to the property rights embodied in the brands. Second, manufacturers have been given leeway in setting maximum prices for the dealers because this conduct is seen as potentially pro-competitive—as limiting the market power of dealers. The rationale is controversial and can be seen as another marker of a trend toward increasing the scope of property rights. Such debates about shifts in antitrust have been common throughout its history, a policy history whose changes have been depicted in the imagery of a pendulum.

power's source. The practical result will be fewer antitrust cases claiming overreaching licenses and other anticompetitive restraints by patent holders. The decision came on the heels of a predecessor that has been interpreted as expanding any monopolist's power to refuse to deal with competitors.⁵² This antitrust flow toward increasing deference to freedom of contract and, with it, the exercise of property rights, has complemented the trend toward propertization of patents, producing a sort of multiplier effect on expanding patent rights and constricting competition, all based on a flawed theory of commercial incentive.

B. Patents and Competition

Intellectual property rights have always reflected their own tensions between competition and property rights, tensions that differ not only from those at work in the antitrust regime but also among themselves. Thus, for instance, tensions have played out differently within patent and trademark policies. Nonetheless, despite such differences, there has been an overarching trend toward increasing propertization in the past twenty years, a trend that threatens to collapse the longstanding patent policy structure by eliminating its internal competition component. This collapse toward propertization derives from the dominant approach to patent policy, which looks to a failed incentive logic to promote progress and, in consequence, falls back on an intuition that expanding patent protection always increases innovation. In short, maximizing wealth in commercial markets is taken as the proxy for progress. But as the paper's first section has shown, this intuitional approach has little in the way of theoretical and empirical foundation. The current section explicates the patent relationship between competition and exclusionary property rights in preparation for the paper's ultimate aim of developing an alternative to the dominant approach, which depends too much on exclusionary rights informed by commercial incentive theory. This section concludes that the goal of promoting progress can be better served by giving priority to competition in the patent regime's domain of ideas as the primary mechanism for resolving questions of patent policy.

According to the constitutional norm, the patent bargain is expected to promote progress by producing two kinds of public benefit. First and foremost, the patent regime anticipates a material benefit from the pecuniary incentive for inventors granted in the exclusive right to commercial exploitation of an invention.⁵³ Patents provide a financial inducement to serve the public interest through the work of invention, leading to product innovation that improves material conditions. The patent's limited term creates another material benefit, this one deferred to the patent's expiration date. After 20 years in the case of a utility patent, the invention itself falls into the public domain. This reversion to public use⁵⁴ triggers a general privilege to use the invention and, in so doing, invites competition by imitation that promises to lower prices and, thus, to distribute more widely the

⁵² *Illinois Tool Works Inc. v. Independent Ink, Inc.*, 126 S.Ct. 1281 (2006); *Verizon Communications, Inc. v. Trinko*, 540 U.S. 398 (2004).

⁵³ *Robinson case*; *Schechter & Thomas*; *Strandburg*; et al

⁵⁴ The future interest is a reversion to the transferor in the constitutional sense that patents are not common law property rights but rather statutory grants that reserve a reversionary interest in the public.

invention's expected material benefits. Moreover, to the extent that invention follows from imitation, invention too is furthered. The patent's limited term can also be seen as adding a sense of urgency to the inventor's incentive to innovate; it speeds up the new product's introduction to market, hastening the anticipated material benefit. Finally, in addition to the two material benefits, patents produce a knowledge benefit of new ideas and information. When a patent is issued— but in any event no later than 18 months after its filing —its particulars are published by the Patent Office. Public access to new knowledge in the patent instrument is intended to promote progress by teaching the current art to subsequent inventors. As we will see, patent's knowledge benefit has been confined to very narrow uses. In the United States, it should be noted, there is no obligation to work a patent. Hence, despite strict limits imposed on use of the knowledge benefit, its importance should not be underestimated because the inventory of public information and ideas expands, even if the owner simply stockpiles the patent and never develops the invention.

The patent regime applies a temporal logic to organize the interplay among material and knowledge benefits. The organization revolves around two moments in time when abrupt phase shifts occur in the patent life cycle. Both moments trigger radical replacement of the mechanism for promoting progress. First, when the patent issues, the progress mechanism flips from a competition in ideas that drives the patent prosecution process to the property rights that thereafter exclude commercial rivals from the metes and bounds set out in the patent claims. Then, when the patent expires, bringing to life the deferred material benefit, the mechanism flips back from property rights to competition. But in this stage, it is commercial competition by imitation that provides the mechanism for producing more material benefits.

At the patent's expiration date, the deferred material benefit derives from a public privilege to use the invention. In this stage, the public is invited to imitate and otherwise use the invention claimed in the expired patent; this universal use privilege is triggered by a flip from exclusion to access, a switch from property rights to commercial competition as the means for producing material benefits. It should be noted that a privilege to imitate can produce two kinds of competition. First, there is the price competition associated with generic drugs and other copied products. Second, imitation is also an integral part of further invention and innovation.⁵⁵

The earlier moment of patent issuance is doubly abrupt because, here, life cycle change occurs in not only means but ends. First, like the phase shift at the patent expiration date, the progress mechanism flips at the moment of issuance; but here, it switches in the opposite direction— from competition to property rights. During the prosecution process, the PTO demands that the applicant carry a heavy burden of proof. Prosecution can be understood as requiring the inventor to overcome the presumption that commercial competition is the ordinary state of affairs, a presumption overcome by persuading the patent examiner that the claimed invention is extra-ordinary in relation to

⁵⁵ Moreover, the lines between invention and innovation, and between add-on and pioneering invention are not always clear. Cf. THOMAS KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* (1962) (posing analytical distinction between normal and revolutionary science but recognizing their phenomenological contiguity).

prior art and thus merits a patent monopoly, an exclusive right to commercial exploitation for a limited time.

In short, the invention must be novel, the idea behind it non-obvious. Long before the Austrian economist Joseph Schumpeter likened competition by innovation to “perennial gales of creative destruction,” the Anglo-American tradition held that commercial competition should provide the ordinary means to promote progress, with patent monopolies as *extra-ordinary*. Patent protection for innovation has been the exception, at least since England’s first patent law— aptly named the Statute of Monopolies in 1624. Since then the patent grant of an exclusive right to exploit one’s invention has been seen as an exception to the baseline rule of commercial competition.

The moment of patent issuance triggers an abrupt phase shift in ends as well as means. Issuance activates a sharp policy turn away from the knowledge benefit necessary to win a patent toward the material benefit anticipated from commercial development. To merit patent issuance, the prosecution phase requires an invention to overcome the competition of prior art by presenting a novel invention that embodies a non-obvious idea—in sum a knowledge benefit to “a person having ordinary skill in the art.” But once the patent issues, everything changes: The active phase of a patent’s life cycle favors not only exclusive rights over competition as the means but also commercial incentives and material benefits over further knowledge benefits as the ends. The information and ideas contained in the patent file envelope are published for all to see. Yet after issuance the published knowledge is no longer viewed as ideas and information available for use in an open intellectual competition; rather, it is treated as little more than a “no trespassing sign” announcing the metes and bounds of the patent holder’s statutory monopoly in commercial markets.

Thus patent issuance signals a phase transformation from a competitive process informed by the public knowledge standard of prior art, to a private property regime of exclusive rights to commercial exploitation. Commercial incentive theory applies the dominant property logic of exclusion to block commercial rivals from entering the private sectors defined in the patent instrument. Competition in the domain of ideas is left behind in the file folders of patent prosecution. The phase shift to commercial markets transfers competition policy to antitrust oversight, which is increasingly restrained by the very same incentive theory.⁵⁶ Nonetheless, the larger point remains: Both antitrust and patent policies do reflect fundamental though different commitments to competition as a mechanism for promoting progress.

III. The Ends Problem: Patents and Copyright

⁵⁶ Largely but not entirely. There is a weak patent misuse doctrine as well as compulsory patent licensing in limited ways, e.g., nuclear regulatory act and some matters of public health, and more broadly, limiting the remedy against the federal government to damages, i.e., compulsory licensing, for infringement for public purposes. It should be noted that competition policy regulates the conduct of private actors and, so, does not include the separate category of trade policy and its regulation of state conduct.

A question persists: If not a property-based incentive theory for patents as the means to promote material progress, what then? The preceding section suggests an avenue of inquiry in the competition policy that informs the prosecution phase of the patent life cycle. This section picks up that thread to investigate whether the knowledge benefit produced during the prosecution stage can be understood more broadly as a knowledge theory of progress, as more than an after-thought to the current incentive theory's commercial logic that dominates the patent's active phase. The section explores our deeply-rutted approach to federal intellectual property rights, which delegates to copyright primary responsibility for promoting progress by advancing knowledge. The conventional division of labor between copyright and patent is based largely on the traditional reading of the Constitution's intellectual property clause, whether parsing its parallel syntactical structure or reviewing its colonial history; it is based as well on copyright's relationship to freedom of expression, whether its antecedents in 18th century England or its modern jurisprudence of fair use.⁵⁷

In this light, patents have been assigned primary responsibility for promoting progress in "useful Arts"—for advancing technology and industry.⁵⁸ And so current orthodoxy seeks to draw a line in the shifting sands of progress. On one side is patent protection of inventions and discoveries to promote material progress; on the other stands copyright protection of expression to promote Enlightenment notions of intellectual and libertarian progress. Patents protect creative *embodiments* of ideas while copyright protects their original *expressions*. The very images of embodiment and expression project separate categories of tangible and textual articulation, of material and intellectual progress, of patent and copyright.

Nonetheless, modern practices blur the line—whether the PTO's annual avalanche of information in published patent instruments or the copyright protection of computer software as literary works. Expression and embodiment are not so easily disentangled. Long before Congress distressed purists by protecting computer software as literary works, creative articulations of ideas were not cleanly divided between embodiment and expression.

As the Supreme Court stated over 50 years ago, "[n]either the Copyright Act nor any other says that because a thing is patentable it may not be copyrighted."⁵⁹ The rationale had been unwittingly articulated almost a century earlier, in the still-debated case of *Baker v. Selden* (1879): "The very object of publishing a book on science or the useful arts is to communicate to the world the useful *knowledge* which it contains." The Court in *Baker* rejected the argument for copyright protection of particular accounting forms not because they failed to express new knowledge but because they embodied *useful* knowledge. It was patent protection that should provide protection for the author's intellectual work in the forms, because of what the Court termed the "*peculiar* nature of the art in [Selden's] books . . . which happen to correspond more closely than usual with the

⁵⁷ Short biblio note.

⁵⁸ The cross-over between copyright and patent protection of computer software as both expression and textual embodiment has recently provoked a few limited forays into First Amendment speech. See, e.g.,

⁵⁹ *Mazer v. Stein*, 347 U.S. 201, 217 (1954).

actual work performed by [one] who uses the art.”⁶⁰ The Court’s characterization of the accounting forms as “peculiar” was an attempt to portray as anomalous the textual embodiment of ideas, which is actually quite common, not only in professions such as accounting and architecture but also in scientific and historical research. The Court had to deal with the reality that a partition between copyright and patent protection could not depend upon a binary distinction between knowledge and material benefits, because they both produced knowledge benefits. And so the Court fell back on a division between form and function, between creative and industrial arts, a division whose feasibility and whose wisdom have been a subject of debate for centuries. Despite the orthodoxy of separation between copyright and patent, expression and embodiment were not easily unraveled because accountants, like scientists and engineers, often combine the expressions and embodiments of their creative ideas.

Yet the constitutional theory behind the division of labor between authors and inventors, between copyright and patent, remains powerful and influential. One by-product of this binary opposition is the failure to comprehend the significance of a vast common ground: Patent and copyright protect, respectively, embodiments and expressions of ideas and information; but both deny protection to the knowledge itself, which must be dedicated to public use. With this distinction in mind, the frontier between patent and copyright turns out to be not so much a boundary line between expression and embodiment as an intervening territory, an excluded middle of public ideas. Indeed, it is no secret that the Patent Office’s publication of issued and pending patents produces a huge flow of new ideas.⁶¹ What emerges from attention to this common ground between patent and copyright regimes is policy that takes seriously the central importance of advancing public knowledge to both the copyright and patent regimes.

Given the long-standing recognition that the patent regime promotes progress by producing knowledge, the claim that patent policy ignores the knowledge benefit might not ring true. But after the prosecution phase of the patent life cycle, the recognition has been more rhetorical than actual. Current patent doctrine and policy weigh material benefits so heavily and depend upon incentive theory so heedlessly during the patent term that public interest in the knowledge benefit by and large gives way.

Thus the patent life cycle reflects a bifurcation that is consonant with the conventional divide between copyright and patent. It results from the familiar rationale for patent protection, which lies in a constitutional bargain between the public and the inventor, a *quid pro quo*: government concession of exclusive private rights in exchange for the public benefits of technological and industrial progress. As we have seen, the patent bargain is construed as promoting progress by producing material and knowledge benefits. The preceding section has already described the temporal logic that organizes their interplay. The organization revolves around two moments in time when the patent life cycle reflects abrupt change. Recall that both moments trigger radical phase shifts by switching mechanisms for promoting progress. First, when the patent issues, the

⁶⁰ 101 U.S. 99, 103, 104 (1879) (emphasis added).

⁶¹ USPTO 2005 Annual Report states that 165,485 patents were issued; 291, 221 pending patents were published. Available at http://www.uspto.gov/web/offices/com/annual/2005/040201_patentperform.html.

mechanism flips from the competition in ideas driving the prosecution process to the property rights that exclude commercial rivals from the metes and bounds set out in the patent claims. Then, at the patent's expiration date, when the deferred material benefit springs to life, the mechanism flips back from property rights to competition. But here, commercial competition is the mechanism for producing material benefits.

The patent life cycle's phase change at the moment of patent issuance is doubly abrupt because there is not only a change in means but also in ends. Along with the flip in means from competition to exclusionary property rights, patent issuance activates a sharp turn away from the knowledge benefit toward the anticipated material benefit. During the prosecution process, an invention must surpass prior art by meeting statutory requirements, including novelty and non-obviousness. The applicant must state her case in accord with strict requirements of description and enablement, including a specification of the best mode known for successful use of the invention. In short, a patent will issue only when the file envelope presents clearly stated claims that embody a knowledge benefit to "a person having ordinary skill in the art." To illustrate the central importance of the knowledge benefit during the prosecution phase of the patent life cycle, the next few paragraphs describe three elements of the applicant's burden in the patent regime's own domain of ideas, in the intellectual competition to overcome the presumption that the knowledge embodied in prior art already promotes the progress claimed in the patent instrument.

First, perhaps paradoxically, the patent applicant must show that the invention is useful. As the Supreme Court put it many years ago, An idea of itself is not patentable, but a new device by which it may be made practically useful is.⁶² For example, the inventor of the telegraph, Samuel Morse, filed a patent application with multiple claims. A patent was granted for using electromagnetism to produce detectable signals over telegraph wires. But his notoriously broad claim of Aelectromagnetism, however developed for marking or printing intelligible characters, signs, or letters, at any distances@ did not withstand scrutiny. The Supreme Court rejected it as too abstract, as an idea that Amatters not by what process or machinery the result is accomplished.@ More recently, the Supreme Court characterized the utility requirement as follows: The Apatent system must be related to the world of commerce rather than to the realm of philosophy . . .@⁶³

The requirement that an invention be useful establishes a distinction between abstract ideas and commercial embodiments. Ideas are not patentable because exclusive rights cannot properly be granted to privatize the public goods that are intended for the domain of ideas. Even the brilliant idea "E=MC²" would not have been patentable.⁶⁴ Einstein could not have stopped others from patenting inventions that embodied his idea. The idea was free for all to use even though an incentive analysis, a propertization logic, could conclude that more brilliant ideas would result from patent protection of ideas. But the public costs of production would be too high. The public

⁶² RTP v. Howard, 87 US 498, 507 (1874)

⁶³ L. Hand in Parke-Davis v. Mulford, 189 F.2d 95 (S.D.N.Y. 1911). Quote from Brenner v. Manson, 383 US 519 (1966).

⁶⁴ The obviousness of the proposition has diminished since the Federal Circuit's retirement of the traditional doctrine that algorithms are not patentable. State St. Bank, etc.

domain of ideas would suffer too much.⁶⁵ In drawing a boundary between the idea and the invention, the knowledge benefit is given priority over the material benefit: The idea is a public good destined for free access in the public domain of ideas, not private property for development in commercial markets.

In addition to the burden of showing utility, the applicant must persuade the patent examiner that the invention is non-obvious. For 150 years, the courts applied an intuitive notion of non-obviousness, asking whether the device was truly an invention. In 1910, for example, the renowned jurist, Learned Hand, approved a patent for purified Adrenalin because it was "a new thing commercially and therapeutically." Although lawyers complained that this intuitive approach was vague, it clearly supports the view that progress was taken to require something not only "new" but useful—something embodying the new knowledge. Without embodiment in a useful invention, a patent would be granted for new knowledge that is intended for the public domain rather than rights for new invention in commercial markets.

My final example of the knowledge benefit's primary importance to the prosecution stage of the current patent regime is the requirement that the description of the invention in the patent application be clear and complete enough to enable those reasonably skilled in the art to make and use it. The Patent Act also requires that the applicant include any additional knowledge of the "best mode" of making and using the invention. The description and enablement requirements provide two kinds of knowledge benefit. First, without a stringent requirement, the patent examiner could not be certain that the applicant had reduced the idea to practice. There would be the danger of patenting an idea, of turning a public good into private property. Second, as the Supreme Court has stated, "If the description be so vague and uncertain that no one can tell, except by independent experiments, how to construct the patented device, the patent is void."⁶⁶ In other words, there would be insufficient informational value. The patent regime would produce the worst of all possible outcomes: private commercial rights to an idea and public goods without use value. The domain of ideas would shrivel while monopoly in commercial markets would increase.

In sum, the patent elements of utility, non-obviousness and enablement structure the inventor's intellectual competition against the ideas and information reflected in prior art. Success requires production of new knowledge, of public goods that will expand and improve the public inventory of prior art used for further invention and innovation.

But once the patent issues, everything changes: The effective or active phase of the patent life cycle favors exclusive rights over competition, commercial incentives and material benefits over knowledge benefits. The knowledge benefit that won the intellectual

⁶⁵ Copyright reflects a similar policy in merger doctrine. Commercial concerns also reflected, as they are in the trademark category of generic marks.

⁶⁶ The Incandescent Lamp Patent, 159 US 465 (1895). The patenting of computer software raises important questions about the knowledge benefit. The description element is satisfied by language of general means that does not require publication of source code. The result is patents that are too broad and information that is too vague to be useful. My approach would not permit the current approach to software patents.

competition in the prosecution stage is now confined within narrow limits to maximize the material benefits anticipated from commercial development of the invention. Gone is the prosecution stage's knowledge idiom of non-obviousness and teaching, of description and enablement. The information and ideas contained in the patent file envelope, though published for all to see, is not available for all to use because it is redefined in the narrow commercial terms of a "No Trespassing" sign posting the metes and bounds of the patent holder's statutory monopoly.

An illuminating example of patent law's abrupt switch in priority from knowledge to material benefit at the time of issuance is the sharp contrast seen in the pair of experimental use defenses available in succeeding stages of the patent life cycle. A broadly construed defense is available in the prosecution phase, when the applicant can assert that a seemingly public use of the invention prior to application should not bar patentability because the use was experimental. But after issuance, only a narrow defense is available to accused infringers for asserting experimental intentions in the unauthorized use of the invention. In the conventional view, the two defenses appear consistent because they both tilt in favor of the inventor, preserving her right to control first the research and then the commercial development. But their consistency belies a flip in priority at the moment of issuance, a turn from advancing knowledge to strictly protecting the private right to commercialize the invention.

A landmark case illustrates the prosecution phase's broad exception for experimental use that permitted an inventor to proceed with his patent application even though his wooden pavement had been used on a public toll road for six years. The Court concluded that even though the extended use was public, it was experimental because there was "a *bona fide* intent of testing the qualities of the machine." Wide discretion to the inventor was appropriate because it was he who should determine how "to bring the invention to perfection."⁶⁷

But after a patent issues, an accused infringer does not enjoy the broad latitude accorded the experimenting inventor, even if the infringer has the very same intention to experiment. For example, where an unauthorized use involved laboratory testing of a patented ingredient required for FDA approval of a generic drug to be sold after the patent expired, the Federal Circuit enjoined the testing because of commercial intentions, even though commercial benefits to the generics manufacturer would begin only after the patent expired.⁶⁸ The court's rationale stemmed from its resolve to protect the patent holder's prospects for maximizing financial returns— what the court saw as preserving the commercial incentive to innovate. The court did not require or allow evidence of actual or likely impact on incentives, but simply "reasoned" that more protection was better, despite congressional legislation intended to expedite FDA approval of generic drugs. Further, the

⁶⁷ *City of Elizabeth v. Pavement Co.*, 97 U.S. 126 (1877).

⁶⁸ Part V. will take up the experimental use defense in some detail. *Roche Prods., Inc. v. Bolar Pharm. Co.*, 733 F.2d 858, 863 (Fed. Cir. 1984), overridden on other grounds by 35 U.S.C. § 271(e) (2000).

court did not take into account any harm to the public interest reflected in a knowledge benefit that might have flowed from laboratory testing.⁶⁹

Whether laboratory testing of a pharmaceutical ingredient or basic research with a patented apparatus,⁷⁰ the Federal Circuit's approach to the experimental use defense has focused entirely on a broadly defined commercial incentive that envelops activity traditionally understood as research or experimentation. In each instance, the court expressed concern only for protecting the metes and bounds of exclusive commercial development as incentives to innovate, without taking into account the likely mix of innovation and invention, of commercial and scientific development and, thus, the prospects for producing material and knowledge benefits. This compulsive focus on commercial development and financial incentive is sharply different from the prosecution stage's commitment to permitting extensive experimentation "to bring the invention to perfection."

This section has explored the conventional analysis of patents and their relationship to copyright protection, and finds strong support for the view that there is more overlap than exclusivity in their coverage of intellectual work, particularly their intentions to advance knowledge. The patent regime embodies a life cycle whose first stage must yield a knowledge benefit in the form of new ideas and information. The mechanism for this prosecution phase is intellectual competition in an internal domain of ideas. There, the patent applicant must win the contest of non-obviousness against the field's prior art in order to reach a successful conclusion and move on to the second stage. A set of statutory requirements regulates the competition to assure both the use value of and public access to the knowledge embodied in the invention.⁷¹ What emerges from a close look at the prosecution phase is the outline of an alternative logic for patent policy, one that carries forward more forcefully into the next stage, into the 20-year patent term, the mechanism of competition in ideas and the accompanying commitment to advancing public knowledge.

IV. Re-Imagining Patent Policy: Competition in the Domain of Ideas

Thus patents can be usefully understood as having a life cycle. Cumulatively, the phases promote progress by encouraging the production of material benefits and the advancement of public knowledge. However, there are different priorities and different mechanisms at work in each stage. In the patent's effective or active phase, commercial development rights take on some familiar characteristics of property ownership, particularly the power to exclude competitors who trespass the metes and bounds of the grant. In this phase, commercial incentive theory—really more of an intuition than a theory—drives the patent right of exclusive commercial development. The exclusive right

⁶⁹ Or, for that matter, the public harm from delay of the deferred material benefit that was intended to arise after expiration of the patent.

⁷⁰ *Madey v. Duke Univ.*, 307 F.3d 1351 (Fed. Cir. 2002), discussed in Section IV, *infra*.

⁷¹ It should be noted that although scholars and policy makers have often depicted publication as the result of an incentive to publish, patent applicants actually have a disincentive to disclose useful information and ideas to rivals; it is well-known that patent attorneys seek to include as little information and ideas as possible in the file folder; hence the importance of the requirements of description, enablement and best mode.

is assumed to promote progress by improving the material conditions of life more efficiently than would innovation without such an incentive to inventors and to their sources of development capital.⁷² But too little account is taken of incentive theory's acknowledged failings. Despite them, incentive theory takes powerful hold at the moment of patent issuance, replacing the prosecution stage's mechanism of competition with one of exclusionary rights and shifting its aim away from advancing knowledge toward improving material conditions. When the patent term ends, the diffusion or imitation stage opens commercial development to all by terminating the exclusionary rights as well as the subordinate status of the knowledge goal.

The patent life cycle in all its complexity accounts for only one potential force in the dynamics of innovation, one legal vector⁷³ cutting across a vast eco-system of technological change, which has its own life cycle. Policy makers have taken up Joseph Schumpeter's view of technological change as a three-stage process of economic development. Economist F. M. Scherer described it as follows:

Invention to [Schumpeter] was the act of conceiving a new product or process and solving the purely technical problems associated with its application. Innovation involved the entrepreneurial functions required to carry a new technical possibility into economic practice for the first time— identifying the market, raising the necessary funds, building a new organization, cultivating the market, etc. Imitation or diffusion is the stage at which a new product or process comes into widespread use as one producer after another follows the innovating firm's lead.⁷⁴

Others have defined invention as including some “act of insight,” presumably some idea that provokes the conception itself.⁷⁵ Schumpeter believed that invention alone “produce[s] no economic effect.” It is the entrepreneurial process of innovation that “has a positive impact on the economic system as new industries and new goods displace the old.”⁷⁶ Innovation involves a multifaceted process of taking the invention to successful commercialization.⁷⁷

The patent regime becomes relevant in the phase transition between invention and innovation. At that moment the inventor chooses a legal framework for her commercial development plan— whether patent, trade secret, copyright or some other set of rights. Perhaps more than the others, patent protection has its own complex life cycle, which begins with the risky business of patent prosecution. The prosecution phase intervenes and

⁷² It should always be remembered that the patent grant is a right in the Hohfeldian sense of exclusion. There is no affirmative use privilege; use is always subject to other legal duties and obligations.

⁷³ There are other legal alternatives, including copyright, trade secret and contract. Discussion follows below.

⁷⁴ F. SCHERER, *INDUSTRIAL MARKET STRUCTURE AND MARKET PERFORMANCE* 350 (1970). *See also* P. STONEMAN, *THE ECONOMIC ANALYSIS OF TECHNOLOGICAL CHANGE* 8 (1983)

⁷⁵ *See, e.g.*, ABBOTT PAYSON USHER, *A HISTORY OF MECHANICAL INVENTIONS* (1929).

⁷⁶ *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1529 n.1 (Fed. Cir. 1995) (Newman, J., concurring) (citing Schumpeter, *Capitalism, Socialism, and Democracy* (3d ed. 1950) and stating that “*patented* innovation has a positive impact . . .”) [emphasis added].

⁷⁷ *See, e.g.*, RICHARD R. NELSON & SIDNEY G. WINTER, *AN EVOLUTIONARY THEORY OF ECONOMIC CHANGE* 263 (1982).

sometimes interrupts the transition from the invention to the innovation stages of technological development. The prosecution phase concludes with a legal judgment about the quality of the invention. But the legal judgment is based on the technological standard of prior art as the benchmark for progress. How is it that the prosecution process approaches the legal question of invention? And what are the implications for a theory of progress?

The idea of invention has long attracted the attention of philosophers, scientists and other writers. Aristotle in his *Rhetoric* defined invention as “discovering the best available means of persuasion.” Those attending the constitutional convention in eighteenth century Philadelphia saw invention as encompassing “[s]omething devised; a method of action, etc. contrived by the mind; a device, contrivance, design, plan, scheme” and considered it a synonym for a “discovery.”⁷⁸ During the long period in which the Supreme Court viewed a flash of creative genius as the inventive step required to surpass prior art, the poet and critic T.S. Eliot inscribed an analogous relationship between tradition and the individual talent: The poet’s individual talent changes a perfectly situated tradition to create a newly arranged one, still perfect though changed. Poets are seen as catalysts that advance the tradition, moving it to successive stages of perfection.⁷⁹

Eliot’s portrayal is consistent with the traditional view of advances in science, which presents progress as continuous improvement, at once perfecting yet remaining firmly rooted in the past.⁸⁰ In the latter half of the twentieth century, however, Thomas Kuhn argued for a radical revision of the traditional view in his well-known work, *The Structure of Scientific Revolutions*. He characterized the history of science as discontinuous rather than rooted in the past, and as introducing change that did not reflect advancement in some neutral, objective sense. Kuhn’s paradigm shifts were driven by surges of persuasion not unlike those depicted in Aristotle’s writing on rhetoric.⁸¹ In this light, change in science occurred by gaining consensus in interpretive communities not unlike the familiar image of free trade in ideas drawn by Justice Holmes in his free speech dissents of the 1919 term.⁸²

⁷⁸ 5 Oxford English Dictionary 453 (James A.H. Murray ed. 1901).

⁷⁹ T.S. ELIOT, *TRADITION AND THE INDIVIDUAL TALENT* (1920); compare MICHEL FOUCAULT, *ARCHAEOLOGY OF KNOWLEDGE* at Ch.1 (1969) (questioning the “theme of continuity” and its “notion of tradition,” which permits “without discontinuity the endless search of the origin . . . and [the] transfer [of] its merit to originality, to genius . . .”). On imitation and differentiation, see HAROLD BLOOM, *THE ANXIETY OF INFLUENCE: A THEORY OF POETRY* (1973).

⁸⁰ Regarding the debate over the relationship between evolution and (dis)continuity, see Stephen J. Gould’s writings on “punctuated equilibrium,” arguing that a proper understanding of Darwin’s theory calls for recognition of the local, discontinuous and contingent nature of change. Cf. GOULD, *ONTOGENY AND PHYLOGENY* (1977); *THE STRUCTURE OF EVOLUTIONARY THEORY* (2002).

⁸¹ THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* (1962); PAUL FEYERABEND, *AGAINST METHOD: OUTLINE OF AN ANARCHISTIC THEORY OF KNOWLEDGE* (1975) (denying even that temporary paradigms structure method).

⁸² Cites to Holmes 1919 triad: no government restraints. See my *Competition Policy in America* at Ch.2. See MICHEL FOUCAULT, *ARCHAEOLOGY OF KNOWLEDGE* (1969) (developing a notion of discourse); LANGUAGE, COUNTER-MEMORY, PRACTICE (ed. Donald F. Bouchard) (1977); STANLEY FISH, *IS THERE A TEXT IN THE CLASS* (1980) (synthesizing the notion of interpretive communities).

In this light, the legal process of patent prosecution bears a strong resemblance to both its scientific and literary counterparts: Success results from an engagement in the domain of ideas, from persuasion in an intellectual competition with prior art— whether portrayed as an attempt to dislodge tradition or to alter the current state of invention. To approach the question of what the patent prosecution contest entails, it is useful to compare this rivalry to commercial competition and its underlying policies.⁸³

The patent application process comprises two parallel lines of prosecution, for which legislation and agency regulations prescribe strict rules of engagement. First, the applicant must persuade the examiner that the device is novel, that there have been no commercial predecessors. Moreover, the device must be useful— that is, there must be more than an idea. Patent rights must attach to a commercial embodiment, not to an idea. The idea must be dedicated to the domain of public knowledge. Second, the applicant must engage with prior art in a competition in ideas. She must show that the underlying idea is non-obvious, that there are no close conceptual substitutes, no impinging intellectual antecedents in the prior art. It is this second line, the non-obviousness contest, that intersects the enterprise of invention portrayed by writers since Aristotle. Because the non-obviousness contest resides in the domain of ideas, the standard economics of information applied to commercial markets does not hold. Rather, a sharply different political economy of ideas takes hold, one that suggests a new policy analysis of the knowledge benefit for the patent regime.

The economics of commercial markets derives from a fundamental assumption of scarcity. If there were no scarcity, then there would be no need for a calculus of allotment because the resource would be “free” to satisfy all demand. Modern economics has divided the social science of scarcity into two categories, one for resolving questions of distributional fairness and the other for allocative efficiency. Both sets of questions call for a value or variable by which to determine fairness and efficiency, and then a standard to compare the fairness and efficiency outcomes of different policies.

In theory, the scarcity variable can represent a wide range of social goods—from voting rights to forty acres and a mule. In practice, there have been few. Traditionally economists have used utility as the measure for allocating and distributing scarce goods: How does the allocation and distribution that results from a policy or rule affect the personal satisfaction of individuals? Do they feel better off? These questions, posed in terms of subjective utility, have been notoriously resistant to quantitative comparisons and, as economists have become more interested in computability, they have turned to wealth as a proxy for personal satisfaction because wealth is a computable variable. Thus they can ask quantifiable questions about distributional fairness and allocative efficiency of wealth.

But the shift to wealth has raised other difficulties. Perhaps the greatest stems from the gap between utility and wealth as measures of social progress. In short, a change in wealth need not correlate with a change in utility. For example, a policy that increases a

⁸³ Ronald Coase has argued that most distinctions between commercial and idea markets don't make economic sense. Coase, *The Market for Goods and the Market for Ideas*, 64 AM. ECON. REV. 834 (1974). Compare Blasi, *supra* note, for a more careful analysis.

rich person's wealth by a few dollars has little effect on his feelings of well-being in comparison to the effect of a few dollars on a poor person's feelings.⁸⁴ In recent years, economists following Schumpeter have shifted from wealth and utility to innovation as the scarcity variable and, with it, have extended the time horizon for progress from short to longer term. For example, a patent policy that encourages innovation is said to provide best the material benefits that enhance wealth and utility over the longer haul.

As for the question of distributional fairness, inquiries have entailed largely the economic scarcity variables of utility and wealth. But political questions of source diversity in the public domain of speech and press have migrated into policy analysis of the telecommunications sector. Moreover, as discussed earlier, economists have debated the effects of source diversity on enhancing innovation through patents.⁸⁵

Still, distributional questions in terms of wealth and utility have been the usual focus, and they have been largely carved out of market economics.⁸⁶ That division has permitted market economics to proceed based on the simplifying assumption that the allocative effects of market transactions can be studied without regard to their distributional consequences. The assumption puts aside the fundamental economic axiom that allocative efficiency depends on the underlying distributional conditions. Why the dependency? As an individual's wealth or level of personal satisfaction changes, her tastes can change. When tastes change, what was an efficient allocation of resources changes as well. Thus, a rule or policy that affects distribution, as most do, cannot be assumed efficient under the new distributional array simply because it is efficient under the current distribution. Questions of distribution and allocation cannot be so easily separated even though disciplinary boundaries have been drawn between them. In short, allocative efficiency is a function of distributional conditions.

After quarantining distributional questions and choosing the variable, market economists apply one of two standards for comparing alternative policies to allocate scarce resources in commercial markets.⁸⁷ The traditional approach has followed Vilfredo Pareto's imperative that law makers adopt policies that make at least one person feel better off without diminishing anyone else's feelings of well-being. If the variable is wealth, then at least one person must be wealthier and no one less wealthy. The Pareto standard of comparison is severe because there is the requirement that no one be harmed. An alternative standard, identified with the earlier Utilitarians, instructs that good policies are those that improve society as a whole even when some are left worse off. What is

⁸⁴ Pigou and marginal utility of money. It has been argued that wealth is a social good independent of utility. Posner in 1979 *J.Legal.Studies* v. Dworkin articles in 1980 *Hofstra L.Rev.*

⁸⁵ Kitch and prospect theory v. Nelson & Merges and 2-heads-better-than-1

⁸⁶ Political philosopher John Rawls added the distributional codicil that a maximizing rule should apply only when it improves the economic condition of those worst off. RAWLS, *A THEORY OF JUSTICE* (1971).

⁸⁷ Economists also study productive efficiency, which involves questions of relative cost, of maximizing output from a set of input factors. The classical economists focused on cost characteristics of industries and defined a market price as a "fair price" when it reflected the cost of input factors. This notion is retained in the modern concept of x-efficiency. It also involves transaction costs, studied most influentially by Ronald Coase and thereafter by Oliver Williamson. Information economics to some extent can be understood in these terms, particularly the work of von Hayek and Stigler.

important is the net effect. Most modern economists have adopted the net effect standard of comparison but have replaced utility with wealth. The result is a rendition of allocative efficiency that means wealth maximization. For those economists who follow Schumpeter, efficiency means maximizing innovation over the long term to improve production, rather than maximizing wealth over the short term under fixed conditions of production and consumption.

Patent prosecution begins when invention has reached some useful conclusion. The enterprise of invention certainly has a commercial dimension, not only in the aspirations of its participants but also in the very process of creation. For the most part, invention depends upon not only intellectual work with prior art but also financial support. But the process of invention is finally intellectual work, work that can be understood as situated in a knowledge domain of ideas and information. Whether the corporate researcher at IBM or the solitary figure in the garret, an inventor engages extant ideas and information just as Eliot's poet confronts tradition and as Kuhn's scientist works under the impress of the reigning paradigm.⁸⁸ This engagement is utterly different from transactions in commercial markets.

First and foremost, a well-functioning knowledge domain does not require an allocation mechanism because there is no scarcity problem. Unlike goods in commercial markets, there is no scarcity problem because ideas and information are not consumed in use. Their use is non-rivalrous in the fundamental sense that it does not diminish supply. Hence, because knowledge is a "free" good, the economic logics of allocative efficiency are not applicable. And because there is no scarcity, exchange value in the knowledge domain is zero.⁸⁹ Hence, in such a knowledge domain, the economic concept of exchange does not seem to apply.⁹⁰ Testing, study, analysis, debate and similar forms of engagement, what might be called free trade in ideas, describe the conduct more aptly than market exchange. If engagement with knowledge, if free trade in ideas and information, is productive, it results in invention. Even the seemingly negative enterprises of falsification and criticism clear the way for invention, for the persuasion that either shapes and fills paradigms or shifts them, that either reiterates prior art or improves it.

While more wealth is the measure of progress in commercial markets, more knowledge is the measure in the domain of ideas. Whereas allocative efficiency is a function of wealth, inventive efficiency is a function of knowledge. More knowledge and better access to it are the conditions for more and better invention. Where wealth is the product of exchange value in commercial markets, invention is the result of use value in the knowledge domain. But inventive efficiency is a complex notion that is founded in the

⁸⁸ Kuhn would recognize that normal and revolutionary science cannot always be distinguished in the moment; they overlap, interweave and sometimes separate—when the anomalies aggregate to the point that the interpretive community is persuaded that they outweigh the regularities of a research paradigm.

⁸⁹ Taking the Coasian assumption of no transaction costs, an assumption that need not be entirely hypothetical, particularly in light of better Internet access. It should also be noted that when use is nonrivalrous, no one's use deprives another and, thus, the Pareto standard is always satisfied so long as someone is better off. Both the Pareto and net effects standards collapse into questions of access and distributional efficiency.

⁹⁰ Imperfections of course can lead to barter or sales as means of cooperation.

constitutional norm of promoting progress, complex because it is not self-evidently driven by a maximizing logic. As this paper has already described, more invention is not necessarily better. Still it seems self-evident that more knowledge is necessarily better, particularly when “more” is defined as including not only a quantitative increase but also better access and improved quality. In this light, policy directed at the knowledge domain cannot be evaluated in the economic terms of wealth because free goods have no exchange value and, not surprisingly, conduct in the knowledge domain does not resemble the exchange transactions seen in commercial markets. Rather, promoting progress through knowledge policy calls for attention to use value in the public domain of ideas and, with it, a focus on the question of knowledge distribution.

During the prosecution stage of the patent life cycle, the contest for issuance takes place largely in a knowledge domain defined by the requirement of non-obviousness, in accord with the strict standards for description, enablement and best mode, as well as the bar of prior publication and use. These can all be usefully understood as background rules of engagement in a domain of ideas, rules for an intellectual competition against prior art, rules that channel the engagement toward producing “more” knowledge. But once the patent issues, the use of the ideas and information in the patent instrument is no longer non-rivalrous. Indeed, at the moment of issuance, the patent grant of commercial exclusivity creates a scarce good of commercial development rights and separates it from the “free” good of knowledge.

That is a patent’s very purpose, whether understood in terms of the constitutional norm of progress or the economic logic of incentive theory. The expansion of patent protection, as well as its proprietization, under the dominant logic of commercial incentive can be seen as resulting from the difficulty in working out a way to separate the domains of knowledge and commerce, to distinguish between the use value of the knowledge and the commercial value of the invention. The modern patent regime reflects this difficulty in its heedless reliance on an incentive theory that defines the constitutional norm of promoting progress only in terms of the invention’s commercial value. The consequences are widespread, all of them due to a relentless policy imperative to maximize the commercial value of patents.

If the goal is to promote progress through invention, then patent policy would lend priority to the domain of ideas, where invention depends upon knowledge rather than wealth,⁹¹ and where the logic of efficiency is not allocative. The chief concern would be improving ideas and information, including access to them. Invention policy calls for attention to use value of knowledge rather than commercial value of patent rights and the material goods that result. In the domain of ideas, efficiency is productive in character insofar as the goal is to get the most and best use out of the “free” resource of public knowledge. It is purely maximizing in its goal of increasing the store of information and ideas because it need not concern itself with allocation questions that derive from scarcity. Finally, in the domain of ideas, use value raises the problem of distribution; but again, it is a question that is entirely different from its counterpart in commercial markets. Here, non-

⁹¹ Studies inconclusive re Schumpeter’s conjecture that stable monopolies produce more innovation than firms in competitive markets.

rivalrous use allows universal distribution without consumption but, of course, the distribution must be accomplished. And so the issue becomes one of access, which reflects the challenge of improving distributional efficiencies and thereby increasing productive efficiency.⁹²

Two fundamental questions arise: First, can patent policy generate rules that separate use value of knowledge in the domain of ideas from commercial value of exclusionary rights without allowing one to overwhelm the other? Second, if they cannot be entirely separated, then can the effects of particular rules and policies be adjudicated or weighed in some meaningful way? In that case, lending priority to the domain of ideas would call for a presumption favoring rules that promote advances in knowledge and an adjudication process whose goal, at most, would be minimizing the harm to commercial incentive. This inclination would derive not from the instrumental value of commercial incentive but rather from respect for traditions, *stare decisis* and current institutional practices—in sum, an extensive network of practices reflecting reliance in the current regime.⁹³

Perhaps the most promising first approach to these questions is by example. With this in mind, the next section takes up these questions not in the abstract but in the context of particular policies and doctrines. Examples are taken not only from the prosecution phase of the patent life cycle but also from the more challenging stage of active exclusionary rights, where the dominant force is the theory of commercial incentive that currently gives no weight to the continuing use value of the knowledge produced in the prosecution stage. What might the patent term's active stage look like if driven by a knowledge policy that seeks to stress the use value of knowledge in the public domain of ideas?

V. So what?

This paper explores the thesis that the constitutional norm of promoting progress is better served by a patent regime that carries forward from the prosecution stage to the patent's statutory term the primary importance of advancing knowledge and the use of competition in ideas as the mechanism for that advancement. Here are some specific examples of how patent law and policy would change and, in this view, improve.

First, the experimental use defense against infringement would be expanded. Recognizing the primary importance of contributing new ideas and information to the public domain would likely lead to a different outcome in cases like the *Duke University v. Madey* litigation because the court would *begin* its inquiry by examining the impact on the knowledge benefit. The Federal Circuit fixed its gaze on protecting a patent holder's incentive, his so-called commercial interest, in a case involving basic scientific research.

⁹² Coase theorem. As for the question of who will engage in invention, incentive theory cannot provide a reliable answer. History as well as strategic theories of first mover advantage tell us that there will be plenty of inventors and incentives for them. Beyond that the answer is indeterminate.

⁹³ See, e.g., Machlup, *supra*.

The court rejected Duke University’s defense that its unauthorized research with a patented invention should be permitted as experimental use. The court concluded that Duke’s prospect of government funding together with its “business of education” satisfied the standard of commercial intention; thus, the experimental use defense was rejected.⁹⁴ Despite the court’s language of commerce, it was the patent holder’s financial interest that preempted any consideration of how prohibiting basic research in such circumstances would serve the policy of promoting progress. Given this standard of pecuniary interest, it is hard to imagine any research with a patented invention that would qualify as experimental use.

Some scholars have found this outcome acceptable because the intended market for research devices is, after all, researchers.⁹⁵ But patents for basic research devices are problematic in two respects. First, taking an originalist perspective, such devices were highly unusual in the late eighteenth century because invention was not practiced in the R&D departments of large institutions, whether corporations or universities. In consequence, commercial rights in them would not have fallen into the imaginative framework for patentable subject matter calling for exclusive commercial rights. Just imagine a patent for Ben Franklin’s key, kite and string.

Second, even if one rejects historical argument for viewing basic research tools as non-commercial matter, allowing unauthorized use in a university research environment serves the goal of advancing knowledge. A research university’s primary goal is to advance knowledge. The experimental use defense was first expressed in 1813, in a much-quoted opinion by Justice Story who declared that the exclusive rights to a patent were not infringed by Philosophical experiments. The *Duke University* opinion took that to mean A idle curiosity. But Justice Story intended something significantly different. By referring to philosophical experiments, he meant natural philosophy— what we today call science. In a later opinion, he posed a distinction between A . . . intent to use for profit and . . . the mere purpose of philosophical experiment.⁹⁶ In a notable dissent, Judge Pauline Newman of the Federal Circuit similarly differentiated between research and development.⁹⁷ The premise underlying both distinctions emerges when the experimental use defense is understood as the doctrine that seeks to carry forward from the prosecution phase to the patent term the constitutional norm of promoting progress by advancing knowledge. The policy is intended to permit competition in ideas by recognizing a use privilege in the “public good” of knowledge published in the patent instrument and thereby deposited in the public domain of ideas— the “free” resource created for further invention.⁹⁸ An experimental use defense makes sense when it is seen as protecting the use value of public knowledge in the domain of ideas.

⁹⁴ *Madey v. Duke Univ.*, 307 F.3d 1351 (Fed. Cir. 2002)

⁹⁵ Compare Eisenberg, Dreyfuss, Mueller, Strandburg, O’Rourke, Barton, Rai, et al

⁹⁶ *Whittemore v. Cutter*, 29 Fed. Cas. 1120, 1121 (C.C.D.Mass.1813) (No. 17,600) (Story, J.); *Sawin v. Guild*, 1 Gall. 485, 21 Fed.Cas. 554 (C.C.D.Mass.1813) (Story, J.).

⁹⁷ *Integra Lifesciences I, Ltd. v. Merck KgaA*, 331 F.3d 860, 893 (9th Cir. 2003) (Newman, J., concurring and dissenting in part).

⁹⁸ Note that both “public good” and “free” resource have double meanings—one of them economic and the other common usage.

But the distinction between advancing knowledge and pursuing commercial advantage is not so easily made, whether based on status or conduct. What of commercial firms? Shouldn't they be permitted the same use privileges when they engage in research, especially basic research with no commercial horizon nearby? And what of university research institutes that partner with commercial firms? Both parties benefit financially from research that leads to commercialization.⁹⁹ One way of making sense of the *Duke University* opinion's broad language of commerce is to view it as anticipating the difficulty of drawing a workable distinction between advancing knowledge and pursuing commercial advantage.

How might a useful distinction be drawn that would recognize the use value of knowledge in the domain of ideas yet protect commercial incentives? First, if the failures of incentive theory are taken seriously, then courts should not worry about making the distinction. So long as a robust experimental use defense improves access to an expanding reservoir of public knowledge and supports competition in ideas, the constitutional norm of promoting progress would be satisfied. But if unearned weight is given to the incentive value of patents, there is a compromise position, one that has taken various forms in the extant literature of experimental use. The position is reached by an approach that separates patent rights from remedies. Although a right strictly construed calls for an exclusionary remedy, patent entitlements can have commercial value without injunctive relief. Monetary damages can compensate for commercial harm while permitting the use of public knowledge in the domain of ideas. To the extent that the patent holder can prove that the unauthorized use spills over into commercial markets, damages can be awarded.

The experimental use defense as a remedy limitation makes good sense insofar as it protects the use value of public knowledge while it can recognize a commercial injury to be compensated. The intended benefit would be an expansion of the knowledge benefit and extension of competition as the mechanism for promoting progress. If damages are awarded, they would not be automatic but would require the patent holder to prove direct commercial harm on account of infringing competition. For example, in a case involving experimentation on the FDA's fast track for approval of generic drugs, damages would be awarded only when commercial activity such as infringing manufacture or sale begins before the patent term expires and directly leads to loss of sales. In the case of basic research, damages would again require proof of commercial harm resulting directly from infringing competition rather than simply financial loss to the patent holder. If there is no commercial market for the device, there would be no damages awarded. The short period of exclusivity for research devices—typically a few years—proposed by some scholars would be unacceptable under this approach because such a delay would typically put the infringing experimenter too far behind the cutting edge of research. The remedy of injunction should fall under the weight of a successful experimental use defense.

Second, the current weak standard for non-obviousness can be understood as a failure of consideration in the patent bargain. The slide into triviality under the "ordinary skill" test, together with the "suggestion" test for combinations, means that the knowledge

⁹⁹ For a discussion that suggests the over-estimation of commercial value to universities, see Benkler, *The Wealth of Networks* (2006).

benefit to the public is lacking in content.¹⁰⁰ A good example is the deluge of patents in the U.S. for thermal insulating sleeves for coffee cups. They are very popular in the U.S.—the cardboard ring that helps you hold your paper hot cup without burning your fingers. The Patent Office has added an entire classification category for this field of “invention.” By 2003, the Patent Office had already issued at least 159 patents in this category. Reorienting patent law would cut against this devolution, this failure of a knowledge benefit.¹⁰¹

The non-obviousness standard has long been a source of controversy. With the volume of patent applications, examiners are swamped. In some classifications, the prior art is overwhelming in scale and scope. In more recent categories such as business methods and computer software, prior art is spotty in coverage and thin in content. Examiners need help, much as juries need expert help in the standard of care in professional malpractice cases and in the next best design in products liability cases. Whether common law tort or patent prosecution, state of the art should be treated as a question of fact whose resolution is informed by expert opinion. The challenge for improving the determination of non-obviousness requires greater access to prior art, both to the documents themselves and to experts in the field. Computer networking technology and peer-to-peer design offer great promise for improving not only the examiner’s understanding of prior art, with the assistance of those having (extra)ordinary skill in the art, but also the inventor’s access to a searchable network of data bases. The PTO has joined with IBM and the Institute for Information Law & Policy at New York Law School to develop such a pilot project for assisting patent examiners in their determinations of whether an invention is non-obvious in light of prior art.¹⁰²

Third, the relationship between patents and trade secrets would be clarified. The current focus on commercial markets has led the Supreme Court to view patents and trade secrets as consistent with one another because they both create incentives for commercial development. But attention to the domain of ideas brings into plain view fundamental conflict. Patent law’s commitment to publication of knowledge is in sharp contrast to trade secrecy. Where their subject matter overlaps, where an invention meets the requirements for patent protection, the constitutional norm of promoting progress, informed by the logic of advancing knowledge as a “free” resource in the domain of ideas, suggests that trade secret rights should not be enforced when secrecy blocks access to knowledge that could be produced as patent=s knowledge benefit.

There are at least two approaches to resolving the conflict. One would call for re-evaluation of the current view that the patent regime does not pre-empt trade secret protection. Under a knowledge theory of progress, trade secret protection would be categorically unavailable for patentable devices. The inventor would then have a choice between unprotectable secrecy and patent protection. The result would be more patents

¹⁰⁰ Cites for ordinary skill and suggestion tests.

¹⁰¹ See *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy* (FTC 2003), available at <<http://www.ftc.gov/opa/2003/10/cpreport.htm>>. The thermal sleeve example comes from John H. Barton, *Non-Obviousness*, 43 *IDEA* 475 (2003).

¹⁰² <http://www.dotank.nyls.edu/communitypatent/index.php>

and less secrecy. This approach would benefit greatly from a more efficient patent application process that decreases the time and expense involved because lower transaction costs would increase the attractiveness of the patent alternative.

In the alternative, treatment of the conflict would fall not under the broad arc of pre-emption doctrine but rather the more limited rubric of remedy. The remedy phase of a misappropriation case would now include an additional element—the issue of whether the claimed trade secret would qualify as a “patentable device.” If it would, then no injunction would issue. Once out of hiding, a trade secret should not be allowed to return.¹⁰³ How to allocate the burden of proof? To hew most closely to the constitutional norm of promoting progress by advancing knowledge, the trade secret owner would carry the burden of showing that the device was not patentable. This placement would be consistent with a strong policy of channeling inventors toward patent protection and, thus, toward increasing the public good of ideas and information. Should there be an equitable urge to take account of the unfair competition associated with misappropriation of trade secrets, the owner would be permitted the remedy of damages up to the time that the trade secret is made public. Of course, trial transcripts and other documents would not be sealed. Trade secret law should be refashioned to minimize its impact on the supply of public goods in the marketplace of ideas. In short, the incentive to shift from trade secret to patent protection should be maximized.

Fourth, patents for the production of naturally occurring substances would be limited to protection of the process. An opinion in the early twentieth century, written by the illustrious Judge Learned Hand, still stands as the authoritative rationale for patenting purified forms of natural substances. In that case, the purified hormone, Adrenalin, was patented because it was a new thing commercially and therapeutically.¹⁰⁴ Clearly, the rationale emerged from a focus on commercial markets. But the affects of patenting the product were much broader because, in practical terms, it encompassed the very idea of purifying the hormone. Later process patents would have a blocking relationship with the original product patent. A better solution would have been protection of the particular process of purification and the particular use, leaving the idea of purified Adrenalin in the public domain and thus opening the knowledge domain to new ideas for purifying or using the hormone. Indeed, the idea of purifying or using any natural substance, especially those with a history of therapeutic uses, would seem to be as old as humankind. The same rationale would hold for genome research— process and specific use patents for isolating and for using particular gene sequences, but no product patents in the genes themselves. Competition to invent new production processes and new uses for Adrenalin and for gene sequences would be encouraged, progress would be promoted, because access to the idea of purified Adrenalin or an isolated gene sequence would not be foreclosed.

Fifth, a knowledge theory of progress would provide stronger support for the reverse doctrine of equivalents, which limits the literal scope of patent claims and specifications to the “principle of the device”— to the idea embodied in it. Whereas the affirmative doctrine of equivalents broadens the scope of liability by including a device as

¹⁰³ See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470 (1974)(Douglas, J., dissenting).

¹⁰⁴ *Parke-Davis v. Mulford*, 189 F.2d 95 (S.D.N.Y. 1911).

infringing when it performs “substantially the same function, in substantially the same way, to achieve substantially the same result,”¹⁰⁵ the reverse doctrine narrows liability by excluding some devices that perform literally the same function, in literally the same way, to achieve literally the same result. As the Supreme Court put it in the old *Air Brake* case,

We have repeatedly held that a charge of infringement is sometimes made out, though the letter of the claims be avoided. . . . The converse is equally true. The patentee may bring the defendant within the letter of his claims, but if the latter has so far changed the principle of the device that the claims of the patent, literally construed, have ceased to represent his actual invention, he is as little subject to be adjudged an infringer as one who has violated the letter of a statute has to be convicted, when he has done nothing in conflict with its spirit and intent.¹⁰⁶

The doctrine’s startling result is escape from liability for a device that literally infringes a patent, escape because it embodies a new principle: A new idea underlies what appears to be a literally identical claim. Recognizing that the reverse doctrine of equivalents serves the knowledge theory of progress would make courts less reluctant to put it into practice. While the Federal Circuit has never actually applied the doctrine and, indeed, has criticized it,¹⁰⁷ the court has considered it on at least two occasions.¹⁰⁸ In the *Genentech* case (1991), for example, the Federal Circuit concluded that the defense could have applied where the second inventor produced the same blood protein as the first but in a less expensive and more commercially significant form. The language echoes Learned Hand’s opinion in the *Adrenaline* case, which also involved a naturally occurring substance, and seems to misapprehend the underlying policy as one of commercial non-equivalency rather than recognition of new principle as expressed in the Supreme Court’s *Air Brake* decision and more recent opinions.¹⁰⁹ The reverse doctrine involves the question of non-obviousness and thus the determination whether a new principle or idea is offered rather than whether there is an immediate commercial benefit.¹¹⁰

¹⁰⁵ *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1364 (Fed. Cir. 2000); see *Mach. Co. v. Murphy*, 97 U.S. 120 (1877).

¹⁰⁶ *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 568 (1892).

¹⁰⁷ *Tate Access Floors, Inc. v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1368 (Fed. Cir. 2002).

¹⁰⁸ *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1581 (Fed. Cir. 1991) (instructing the trial court that on remand “[t]he principles of patent law must be applied in accordance with the statutory purpose, and the issues raised by new technologies require considered analysis. Genentech has raised questions of scientific and evidentiary fact that are material to the issue of infringement.”); *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1351 (Fed. Cir. 2003) (considering the doctrine).

¹⁰⁹ *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608-09 (1950) (improvement can avoid infringement, even if it “falls within the literal words of the claim,” as long as it “is so far changed in principle from a patented article that it performs the same or a similar function in a substantially different way”).

¹¹⁰ The question of commercial benefit seems more appropriately adjudicated under the rubric of novelty; the *Air Brake* opinion seems to have concluded that the novelty requirement was also met. *Westinghouse*, 170 U.S. at 571 (“Conceding that the functions of the two devices are practically the same, the means used in accomplishing this function are so different that we find it impossible to say, even in favor of a primary patent, that they are mechanical equivalents.”)

Primary attention to the knowledge benefit and, with it, competition in the domain of ideas, would have widespread impact. In addition to the examples above, doctrines such as patent misuse and inequitable conduct would be re-shaped. The limited use value of specification in patent instruments for computer software would call for enhanced disclosure, perhaps under a more demanding best mode requirement that includes some source code. More broadly the enablement requirement might be judged on a standard of whether the patent instrument enables engagement in the domain of ideas, something akin to reverse engineering of patented elements.

Afterword

The paper suggests that patent policy hews most closely to the constitutional norm of promoting progress when it advances knowledge through free trade in the domain of ideas, a notion sharply different from competition in a marketplace of ideas and its commercial overtones of wealth and scarcity. A knowledge theory of progress is all the more appealing because the commercial incentive theory that currently dominates patent policy is theoretically suspect and empirically intractable. If the constitutional norm is to promote progress through invention, then patent policy would lend priority to the domain of ideas where invention depends upon knowledge not wealth, where the logic of efficiency is productive and not allocative, and where, finally, the primary concern is maximizing access to ideas and information. Invention policy calls for attention to use value of knowledge rather than exchange value of patent rights and the goods that result. In this domain of ideas and information, we want to encourage the widest use of the knowledge benefit. Here, use does not consume; ideas and information are undiminished. There is no tragedy of the commons. In the domain of ideas, no harm arises from intense use of what is a “public good,” in the multiple meanings of that phrase. If anything, there is a constitutional call for intense use of the “free” resource. Here, the directive for progress summons not a tragedy but a comedy of the knowledge commons.¹¹¹

¹¹¹ For an early and influential view of a commercial comedy of the commons, see C. Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 *Chi. L. Rev.* 11 (1986). Re: tragedy, comedy, Aristotle, *Poetics*; Northrup Frye, *The Anatomy of Criticism* (1957); Hayden White, *Metahistory* (1973); et al.