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Is Intellectual Property Trivial?

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Abstract

We typically assume that intellectual property makes a substantial difference in regulating access to intellectual goods and thereby provides incentives for the production of intellectual goods. But the existence of alternative instruments by which to appropriate innovation returns suggests that even substantial changes in intellectual property may often make little difference in regulating access, which in turn means that those changes may often make little difference in regulating innovation incentives. This raises a conundrum: in markets where 'more or less IP' exerts no substantial effect on access costs and innovation gains, why do firms expend resources on influencing changes in intellectual property? The answer lies in the distribution across firms of the costs of substitution toward alternative appropriation instruments. Changes in intellectual property still exert nontrivial incentive/access effects so long as the relative costs of using alternative instruments are not equally distributed across firms. Where that is the case, changes in intellectual property can be decisive - but not, as is conventionally assumed, with respect to the total gains available as a result of the appropriation capacities provided by legal instruments, but with respect to the distribution of those gains among firms that exploit the appropriation capacities provided by a portfolio of legal and extralegal instruments. If alternative instruments are not available to all firms at comparable cost, then relaxations of intellectual property will shift gains to firms that have the lowest-cost access to alternative instruments and away from firms that have the highest-cost access to alternative instruments. The typical abundance of alternative instruments among incumbents and the typical paucity of such instruments among entrants in turn implies (contrary to conventional intuitions) that the distributive effects of relaxing intellectual property may often be 'regressive' and the distributive effects of strengthening intellectual property may often be 'progressive.' The conventional incentive thesis for intellectual property may therefore retain a significant scope of application, but for an unconventional reason: it induces innovation by firms that would otherwise be disadvantaged by

incumbents' cost advantage in capturing innovation returns through instruments other than intellectual property.

ARTICLE

IS INTELLECTUAL PROPERTY TRIVIAL?

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INTRODUCTION

Policy, scholarly, and popular discussions of the socially desirable level of protection provided by intellectual property rights typically take for granted that changes in the level of intellectual property protection matter a great deal. It is commonly assumed to make a substantial difference in regulating access to intellectual goods whether patent claims are broadly or narrowly interpreted, the copyright term is longer or shorter, or the fair use exemption is applied more or less generously. This assumption follows what appears to be an uncontroversial proposition commonly set forth in intellectual property jurisprudence and scholarship: patents, copyrights, and other entitlements determine which technologies and creative works fall into the private domain (to which access is constrained) and which remain in the public domain (to which access is unfettered).[1] In this Article, I show that this proposition *should* be controversial. It is not clear that changes—even substantial changes—in intellectual property protection typically make any meaningful difference in regulating access to the underlying pool of intellectual goods, which in turn means that these changes do not clearly make any meaningful difference in regulating the anticipated profits that drive innovation incentives. Contrary to natural intuitions, the size of the public domain may be sub-

[1] For indicative statements from case law, see *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980), which quotes *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948), for the proposition that abstract ideas are "manifestations of . . . nature, free to all men and reserved exclusively to none," and *International News Service v. Associated Press*, 248 U.S. 215, 250 (1918) (Brandeis, J., dissenting), claiming that "[t]he general rule of law is, that the noblest of human productions—knowledge, truths ascertained, conceptions, and ideas—become, after voluntary communication to others, free as the air to common use." For indicative statements from the scholarly literature, see Yochai Benkler, *Free as the Air to Common Use: First Amendment Constraints on Enclosure of the Public Domain*, 74 N.Y.U. L. REV. 354, 358 (1999), which states that "property rights in information mean that the government has prohibited certain uses or communications of information to all people but one, the owner. The public domain, conversely, is the range of uses privileged to all." *See also* Jessica Litman, *The Public Domain*, 39 EMORY L.J. 965, 968 (1990) (defining the public domain as "a commons that includes those aspects of copyrighted works which copyright does not protect").

stantially invariant to changes in intellectual property coverage.[2] This qualified indifference thesis is founded in a well-established empirical observation: firms generally can—and *do*—exploit devices *other* than intellectual property to limit access to, and thereby appropriate returns from, innovation investments.[3] Hence, intellectual goods that are unprotected by intellectual property may still be protected directly or indirectly by other legal or extralegal mechanisms, which broadly include technology, contract, organizational form, and various complementary assets.

If these alternative instruments can substantially replace the appropriation capacities provided by intellectual property rights, then legal changes that constrain those rights and thereby ostensibly expand the public domain have no substantial net effect; conversely, if these alternative instruments can match or exceed the appropriation capacities provided by intellectual property rights, then legal changes that expand these rights and thereby ostensibly narrow the public domain have no substantial net effect. This proposition is self-evidently true in the extreme case where perfect technological locks can be implemented at zero cost: contractions or expansions in intellectual property coverage have no marginal effect on the access costs incurred by third parties and, as a consequence, on the innovation gains anticipated by resource holders. In a broader class of intermediate settings, this proposition retains descriptive force to the extent that firms can exploit alternative instruments substantially to reproduce, or even surpass, the appropriation capacities provided by intellectual property.

If there is reason to doubt that nontrivial changes in intellectual property coverage always yield nontrivial effects on access to intellectual goods, then there must be reason to doubt the incentives/access tradeoff that is the familiar foundation for normative discussions about the desirable scope of intellectual property.[4] This tradeoff assumes that more intellectual property generates social harm by reducing access to intellectual goods, but generates social benefits by enhancing anticipated profits and thereby enhancing innovation incentives. Conversely, less intellectual property generates social

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[2] There are a variety of definitions of the public domain in the scholarly literature. In this Article, I use it in the broadest practical sense, as referring to technologies and creative works that are freely accessible by third parties without the holder's consent, whether as a matter of law, technology, or otherwise.

[3] *See infra* Section I.B.

[4] *See infra* note 11 and accompanying text.

benefits by expanding access to intellectual goods but generates social harm by reducing anticipated profits and thereby reducing innovation incentives. Hence, the policy challenge lies in setting intellectual property coverage so as always to yield a net social gain.

But the zero-sum tradeoff that drives this policy calculus does not hold universally, or even typically, as soon as we drop or relax the unstated but critical assumption that firms cannot use substantially cost-equivalent exclusionary devices. Without that assumption, the incentives/access tradeoff is no longer a safe bet. There can be no assurance that (i) nontrivial contractions in entitlement strength will nontrivially reduce the costs of accessing intellectual goods and thereby decrease innovators' anticipated rewards and investment incentives, or (ii) nontrivial expansions in entitlement strength will nontrivially increase the costs of accessing intellectual goods and thereby increase innovators' anticipated rewards and investment incentives. Any reduction in intellectual property coverage will have trivial effects if it simply induces firms to migrate to the next-least-costly alternative instrument by which to maintain reasonably equivalent appropriation capacities; and any expansion of intellectual property coverage will have trivial effects if firms already make use of alternative instruments that deliver equivalent or greater appropriation capacities at a comparable or lower cost.

This line of argument immediately raises a conundrum: if neither more nor less IP exerts a substantial effect on access costs and innovation gains over some meaningful range of circumstances, then why do profit-maximizing firms expend resources on influencing changes in intellectual property coverage?[5] Working out this conundrum yields a nuanced thesis that identifies more precisely the circumstances under which changes in intellectual property coverage do and do not matter. Even in a world of substantially cost-equivalent appropriation instruments, intellectual property coverage still makes a difference so long as we make the reasonable assumption that alternative instruments—or more precisely, the relative costs of using those instruments—are not equally distributed among all existing and potential participants in the relevant market.[6] Where that assumption is satisfied, any change in entitlement strength *does* have nontrivial effects.

Contrary to conventional assumptions, these are not effects on the total gains available as a result of the appropriation capacities pro-

[5] *See infra* note 65 and accompanying text.

[6] *See infra* subsection II.B.1.

vided by legal instruments, but on the distribution of those gains among firms that exploit the appropriation capacities provided by a portfolio of legal and extralegal instruments. Even if more or less intellectual property makes no difference on the margin so long as the market generally can use substitute instruments to cover shortfalls in intellectual property coverage, it makes considerable difference on the margin if each individual firm incurs nonidentical costs in migrating to those substitute instruments. If alternative instruments are not available at reasonably comparable cost to all actual and potential participants in the relevant market, then relaxations of intellectual property coverage will shift gains to firms that have the lowest-cost access to alternative instruments and away from firms that have the highest-cost access. Hence, even if intellectual property has trivial effects as an incentive instrument with respect to the market as a whole, every individual firm rationally invests resources in influencing intellectual property coverage. Everything else being equal, reducing coverage will shift rents away from firms with higher-cost appropriation technologies (which should lobby for "critical" intellectual property) while increasing coverage will shift economic rents away from firms with lower-cost appropriation technologies (which should lobby against "excessive" intellectual property).

If we recognize the typical availability of substantially cost-equivalent alternative instruments, then intellectual property is trivial with respect to the total rents generated by innovation investment. If we recognize that alternative instruments are typically distributed unequally across firm types, then intellectual property is nontrivial with respect to the distribution of rents in the relevant market. Surprisingly, the typical abundance of alternative instruments among incumbents and the typical paucity of such instruments among entrants imply that the distributive effects of relaxing intellectual property may often be "regressive" and the distributive effects of increasing intellectual property may often be "progressive."[7] Commentators usually assume that distributive effects run in precisely the contrary direction: stronger intellectual property coverage presumably increases the entry costs incurred by small-firm entrants and therefore increases the pricing power exercised by large-firm incumbents, which in turn punishes end-users.[8] But if intellectual property typically has a differential, nontrivial impact on smaller firms that have the highest-cost access to

[7] *See infra* Section II.B.

[8] *See infra* note 54 and accompanying text.

alternative instruments, then the relationship may be reversed. Weaker legal protections exacerbate large firms' inherent appropriation-cost advantage over small firms, which in turn implies that incumbents' market share is more securely protected under less, not more, intellectual property coverage, which in turn enhances pricing power and punishes end-users. Conversely, stronger intellectual property protections mitigate large firms' inherent cost advantage in appropriating innovation rents, which in turn implies that large firms' market share is *less* securely protected under more, not less, intellectual property coverage, which in turn constrains pricing power and benefits end-users. Contrary to the typical view that "strong IP" favors entrenched large firms while "weak IP" favors small-firm entrants, weak IP will often protect incumbents against entrants while strong IP will often protect entrants against incumbents.

To summarize, intellectual property typically has trivial incentive effects but nontrivial (and often progressive) distributive effects. But do these "progressive" distributive effects matter from a social point of view? Venture capitalists and garage inventors are not the standard candidates for distributive equity. Curiously, a refined understanding of intellectual property as a distributive instrument may breathe new life into the familiar, but empirically challenged, rationale for intellectual property as an incentive instrument. If we understand intellectual property as primarily a distributive instrument that shifts rents away from incumbents characterized by high levels of integration and toward entrants or other entities characterized by low levels of integration, then intellectual property may matter as an incentive instrument that operates primarily and indirectly at the "macro" level of industrial organization. In particular, if intellectual property supports the economic viability of stand-alone, transactional structures that exhibit weak appropriation capacities, it may facilitate certain *kinds* of innovation investment to which such structures are commonly thought to be well-suited, even if it has little effect on the total *volume* of innovative investment. While further inquiry is certainly required, it can be conservatively stated that there is limited but meaningful evidence (and widespread belief in the business world) that small firms and variants thereof (in the business vernacular, start-ups, spin-offs, and the like) exhibit unique innovative competencies in some industries at certain stages of the innovation life cycle.[9] Assuming that this view is more systematically demonstrated, then the conventional thesis that IP mat-

[9] *See infra* notes 71-73 and accompanying text.

ters as an incentive device may turn out to retain a significant scope of application, but for an *un*conventional reason: namely, because intellectual property induces innovative output by firms that would otherwise be disadvantaged by the inherent cost-advantage of large firms in capturing innovation returns through instruments other than intellectual property. Following this hypothesis, the distributive and incentive effects of intellectual property would nicely coincide: intellectual property makes the greatest difference in correcting distributional inequalities in appropriation costs in the same markets where it makes the greatest difference in eliciting innovative output from small-firm entrants and other weakly integrated entities.

The discussion proceeds as follows: in Part I, I review the incentives/access tradeoff and the related assumptions that lie behind it, describe empirical evidence that challenges those assumptions, and then reformulate the limited conditions under which intellectual property coverage will matter as an incentive instrument; in Part II, I identify the broader conditions under which intellectual property will matter as a distributive instrument for allocating innovation rents across firm types; finally, in Part III, I explore how the distributive function of intellectual property may indirectly yield incentive effects by supporting innovation investment by small firms and other weakly integrated entities.

I. WHY INTELLECTUAL PROPERTY IS AND IS NOT TRIVIAL

In this Part, I begin by drawing out the assumptions behind the conventional view that intellectual property is always nontrivial, which in turn supports the view that the incentives/access tradeoff always governs the choice between stronger or weaker levels of intellectual property protection. Second, I review empirical evidence that challenges these assumptions. Third, I identify a generic set of circumstances in which intellectual property does and does not matter as an incentive instrument, taking into account firms' capacities to shield innovation rents through mechanisms other than intellectual property.

A. *Why Intellectual Property Is Nontrivial (Always)*

Conventional discussions of intellectual property rest on a few common and interrelated propositions, which are usually left unstated in discussions that are otherwise dependent on these propositions being true in all or most cases. These assumptions are detailed below.

> *Conventional Proposition I*: Less intellectual property increases the size of the public domain; more intellectual property decreases it.

This proposition would seem to follow self-evidently from the fact that intellectual property increases the cost of using otherwise freely accessible intellectual resources. This in turn motivates widespread opposition to enclosure of the public domain by stronger forms of intellectual property and widespread advocacy for weaker forms of intellectual property to "free the commons."[10] Considered more closely, however, this proposition necessarily assumes that no other instruments exist by which holders of intellectual resources can implement substantially equivalent access restrictions at some substantially equivalent cost. Hence, it is more precise to say that increasing or decreasing the strength of intellectual property decreases or increases the size of the public domain, respectively, assuming the unavailability of other instruments by which resource holders can restrict access to substantially the same extent at substantially the same cost. Where that assumption is not satisfied, the market simply fills any appropriability deficit caused by the contraction of any state-provided property entitlement, and, conversely, the state simply mimics any market-provided appropriation capacities when it expands any intellectual property entitlement.

This is true (self-evidently) in the extreme case where technological locks on intellectual resources perfectly constrain access at zero cost: whether the state reduces or adds intellectual property protections would have no incremental impact on the size of the public domain, which holds constant. Even in intermediate scenarios where alternative instruments imperfectly restrict access at some positive incremental cost, this observation retains considerable force: expansions or reductions in intellectual property coverage will have a limited incremental effect on the size of the public domain to the extent

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[10] This literature is extensive. *See, e.g.*, LAWRENCE LESSIG, FREE CULTURE: HOW BIG MEDIA USES TECHNOLOGY AND THE LAW TO LOCK DOWN CULTURE AND CONTROL CREATIVITY (2004); LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD (2001); Benkler, *supra* note 1; James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, LAW & CONTEMP. PROBS., Winter/Spring 2003, at 33. For an indicative contribution from the advocacy literature, see NANCY KRANICH, BRENNAN CTR. FOR JUSTICE, INFORMATION COMMONS (2004). For a review of this literature, see Harry First, *Controlling the Intellectual Property Grab: Protect Innovation, Not Innovators*, 38 RUTGERS L.J. 365 (2007).

that firms can exploit alternative instruments to achieve a similar level of coverage at some reasonably equivalent cost.

> *Conventional Proposition II*: Less intellectual property decreases innovation gains; more intellectual property increases innovation gains.

Conventional Proposition II follows self-evidently from Conventional Proposition I. If intellectual property matters because it constrains access to the public domain, then it must also matter because expanding the resource holder's exclusive territory increases the gains that it can expect to derive from a successful innovation, which obviously increases its innovation incentives. Hence, all else being equal, innovation incentives are stronger in a world with more complete intellectual property coverage relative to a world with less complete coverage. Like Conventional Proposition I, Conventional Proposition II necessarily assumes that *no other* instruments exist by which resource holders can implement substantially equivalent access restrictions at some substantially equivalent cost. Hence, it is more precise to say that increasing or decreasing the strength of intellectual property increases or decreases innovation incentives, respectively, assuming the unavailability of other instruments by which resource holders can restrict access to substantially the same extent at substantially the same cost. Again, that is self-evidently true in the extreme case where technological locks perfectly restrain access: abolishing, or introducing even the strongest forms of, intellectual property makes no difference if innovators can exploit substitute technologies at zero incremental cost. This proposition holds true in intermediate settings to the extent that resource holders can use some combination of alternative instruments to regulate access and thereby appropriate returns from innovation investments at some reasonably equivalent cost.

> *Conventional Proposition III*: Intellectual property always poses a zero-sum tradeoff between incentive gains and access costs.

Taken together, Conventional Proposition I plus Conventional Proposition II yields Conventional Proposition III. Virtually all students learn, many academic commentaries repeat, and countless judicial opinions state that stronger or weaker intellectual property always involves an unavoidable tradeoff between increasing innovation incentives (and resulting innovation gains), which result from stronger intellectual property, and reducing access costs, which result from

weaker intellectual property.[11] This is equivalent to stating simply that entitlement strength correlates positively with innovation gains and access costs; the policymaker's challenge then is setting intellectual property strength such that innovation gains always exceed access costs. Strictly speaking, the access costs generated by intellectual property protections are confined to deadweight losses incurred whenever a buyer is willing to pay the marginal cost of an intellectual good but not the supracompetitive premium rationally demanded by its legally exclusive holder.[12] However, even an economically driven intellectual property regime would recognize that where a buyer is willing to pay the supracompetitive premium, distributive losses are incurred in the form of consumer surplus transferred from buyer to producer. These efficiency and distributive effects together drive the basic incentives/access tradeoff: marginal increases in intellectual property are socially desirable to the extent that marginal incentive gains exceed the associated bundle of marginal social costs; conversely, marginal decreases in intellectual property are socially desirable to the extent that marginal reductions in the associated bundle of social losses exceed marginal incentive losses. However, if neither Conventional Proposition I nor Conventional Proposition II holds,

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[11] The tradeoff is almost as old as the intellectual property system itself. As cited by the Supreme Court, Thomas Jefferson stated, "'[T]he things which are worth to the public the embarrassment of an exclusive patent,' . . . must outweigh the restrictive effect of the limited patent monopoly." Graham v. John Deere Co., 383 U.S. 1, 10-11 (1966). For contemporary examples, see ROBERT P. MERGES ET AL., INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE 13-15 (4th ed. 2006), which states that intellectual property solves the public-goods problem by providing exclusivity to artists and inventors but at the social cost of limited access and diffusion of new works and ideas, and WILLIAM M. LANDES & RICHARD A. POSNER, THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW 22-24 (2003), which argues that intellectual property should be designed to balance the benefits and costs in the incentives/access tradeoff.

[12] An important category of deadweight losses is also generated where efficient transactions are frustrated by legal, negotiation, and other administrative costs attendant to an intellectual property regime. This is a common theme of the expanding literature on "anticommons" effects, whereby proliferating intellectual property rights creates a "thicket" that impedes subsequent innovation. *See, e.g.*, Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998) (stating that excessively fragmented property rights can generate net social losses by impeding, rather than facilitating, investment); Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698 (1998) (reiterating Heller's thesis from *The Tragedy of the Anticommons* with respect to gene patents). For a more nuanced treatment that takes into account the market's potential ability to correct patent thickets, see Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, *in* 1 INNOVATION POLICY AND THE ECONOMY 119 (Adam B. Jaffe et al. eds., 2001).

then the incentive gains and the access costs attributable to even substantial changes in intellectual property coverage may often be nominal (or, as I show below, perverse), in which case the zero-sum incentives/access tradeoff is not a reliable framework for assessing proposed changes in intellectual property coverage.

B. *Market Alternatives to Intellectual Property*

The conventional proposition that IP matters and the various assumptions that stand behind it rest on a single (and usually unstated) empirical predicate: namely, that firms have no or limited access to cost-equivalent substitutes for intellectual property by which to regulate access to intellectual resources. Intellectual property *must* matter because it blemishes a pristine commons of intellectual goods free from restrictions on access. To the extent that the above predicate is not satisfied, each of these assumptions loses considerable force or scope of application, which in turn challenges the basic proposition that intellectual property generally makes a difference in regulating access costs and incentive gains. If firms can migrate to equivalent exclusionary instruments at no or little positive incremental cost, then providing more or less intellectual property will make no difference in regulating access (contra Conventional Proposition I), which means that it will make no difference in regulating incentives (contra Conventional Proposition II), which means that it does *not* involve any meaningful (or at least any "directionally uniform") tradeoff between innovation gains and access costs (contra Conventional Proposition III).

As discussed immediately below, a well-developed body of empirical evidence suggests that this required predicate is usually *not* substantially satisfied over a wide range of markets and industries, where firms typically use a combination of instruments other than intellectual property to substantially contain knowledge spillovers. Most strikingly, economically significant markets exist in which firms exhibit little reliance on intellectual property in order to appropriate returns from innovation investment but do rely on a host of other legal and extralegal instruments to regulate access.[13] Consider the worldwide market in financial and other data, which operates with great success virtually bereft of intellectual property but uses technology to limit ac-

[13] For a detailed taxonomy of such markets, see Jonathan M. Barnett, *Sharing in the Shadow of Property: Rational Cooperation in Innovation Markets* 30-38 (Univ. of S. Cal. Sch. of Law, Ctr. in Law, Econ. & Org., Research Paper No. C08-22, 2008) [hereinafter Barnett, *Sharing*], *available at* http://www.ssrn.com/abstract=1287283.

cess.[14] Hence, contrary to conventional intuitions, the pristine commons of an unregulated pool of intellectual resources may be a theoretical artifact that is rarely realized in practice. And that means that policymakers rarely face a choice between intellectual property or no restrictions at all; rather, the real choice is between intellectual property and some mix of substitute instruments to which resource holders will necessarily make recourse in order to capture innovation returns.

Evidence for this claim is found most directly in multiple survey studies that use questionnaires (sent to managers of medium to large manufacturing firms) to assess the relative importance of patents as a device for appropriating revenues relative to all other available instruments.[15] The results are remarkably consistent across time and industry: outside of the pharmaceutical and chemical industries, managers consistently rank patents among the least effective appropriation instruments and rarely respond affirmatively when asked if patent protection is a "but for" condition for undertaking a research project.[16]

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[14] To be precise, U.S. law provides virtually no protection for the factual content of database products, while the European Union provides certain sui generis protections for database products. *Compare* Feist Publ'ns, Inc. v. Rural Tel. Serv., Co., 499 U.S. 340, 362-64 (1991) (holding that a phone directory could not be the subject of copyright protection because it was not sufficiently original), *with* Parliament & Council Directive 96/9, On the Legal Protection of Databases, 1996 O.J. (L77) 20, 20 (EC) (noting that "databases are at present not sufficiently protected" and acting to cure this deficiency).

[15] *See* Richard C. Levin et al., *Appropriating the Returns from Industrial Research and Development*, 1987 BROOKINGS PAPERS ON ECON. ACTIVITY 783, 790-91 (surveying R&D managers in publicly traded firms in the United States with substantial R&D expenses); Edwin Mansfield, *Patents and Innovation: An Empirical Study*, 32 MGMT. SCI. 173, 174 (1986) (surveying R&D managers of one hundred randomly chosen U.S. firms from twelve industries); Wesley M. Cohen et al., *Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)* 4 (Nat'l Bureau of Econ. Research, Working Paper No. 7552, 2000) (surveying R&D managers randomly drawn from a sample of all R&D labs in the United States operating as part of a manufacturing firm). For a similar earlier survey using a smaller data set of forty-four U.K. firms, see C.T. TAYLOR & Z.A. SILBERSTON, THE ECONOMIC IMPACT OF THE PATENT SYSTEM 81-83 (1973).

[16] *See* TAYLOR & SILBERSTON, *supra* note 15, at 194-99 (finding that in twenty-four out of thirty companies in the sample set, managers believed that R&D investment was not or was minimally dependent on expected patent protection, and noting that companies that relied on patent protection were in the pharmaceuticals and chemicals sectors); Mansfield, *supra* note 15 (finding that firm managers in all industries other than chemicals and pharmaceuticals believed that, absent patent protection, inventions during that period would have decreased not even thirty percent); *see also* Levin et al., *supra* note 15, at 798 (finding that managers, outside chemicals and pharmaceuticals, often view patents as ineffective mechanisms to protect against imitation, and that managers use alternative devices to do so); Cohen et al., *supra* note 15, at 9 (finding that most industries, other than chemicals and pharmaceuticals, viewed patents as the least effective mechanism for appropriating returns from innovation).

The studies were conducted from the 1970s through the early 2000s, and, hence, presumptively rebut any meaningful correlation with contemporaneous changes in the perceived level of patent protection (in particular, the persistence of these results through the latest study rebuts any expectation that firms would attribute greater value to patents as a result of the Federal Circuit's increased enforcement of patents starting in the early 1980s). The apparent lack of correlation between managers' subjective ranking of the importance of patent protection and the legal strength of patent protection conforms nicely with other studies that have sought to identify, in various contexts, correlations between levels of R&D investment and changes in the legal strength of patent protection.[17] Remarkably, no determinate relationship can be identified: that is, the aggregate investments made by firms in R&D (as distinguished from firms' investments in patent prosecution and enforcement) do not appear to be affected—or stated most conservatively, do not seem to be systematically affected—by upward or downward adjustments in the effective strength of patent protection.

The aforementioned studies principally provide a ranking order of intellectual property relative to other appropriation instruments, where intellectual property tends to fall toward the bottom of the scale, and measure the sensitivity of innovative output to intellectual property coverage, which tends to be low. Business-management scholars have developed a large empirical literature that supplies an important complementary knowledge base by providing extensive detail on the diverse inventory of substitute devices by which firms can substantially regulate access. These alternative instruments can be

[17] Multiple studies have reached this type of result. *See, e.g.*, Josh Lerner, *The Economics of Technology and Innovation: 150 Years of Patent Protection*, 92 AM. ECON. REV. PAPERS & PROCEEDINGS 221, 222-23 (2002) (examining 177 policy changes in patent protection across 60 countries over a 150-year period and finding that changes have little effect on patenting rates by domestic entities but a meaningful effect on patenting by foreign entities); Samuel Kortum & Josh Lerner, *Stronger Protection or Technological Revolution: What Is Behind the Recent Surge in Patenting?* 31 (Nat'l Bureau of Econ. Research, Working Paper No. 6204, 1997), *available at* http://www.nber.org/papers/w6204 (finding that patenting rates have risen but measures of R&D intensity showed no significant change in recent years). For a fuller review of the evidence on whether patents provide incentives to invest in innovation, see generally James Bessen & Michael J. Meurer, *Do Patents Perform Like Property?*, ACAD. MGMT. PERSPS., Aug. 2008, at 8.

usefully organized into four general categories, discussed briefly in turn below.[18]

1. Technology

The most obvious alternative to intellectual property is technology, which is used widely by resource holders to limit unauthorized access, especially to tacit knowledge without which it is often difficult to replicate a successful product. Technologies for regulating access can be understood broadly to include secrecy precautions that constrain leakage of valuable information, formal and informal nondisclosure practices that govern research and development, and any product configuration or manufacturing process that increases third parties' replication costs. These can be surprisingly effective and long-lasting (consider the Coca-Cola formula): contrary to the conventional framework where imitators perfectly copy an original technology at virtually no cost, empirical inquiries tend to find that competitors often incur substantial costs in replicating an existing product.[19] In other industries, firms successfully use technology to condition access by end-users to what is otherwise a legally unprotected intellectual good: consider Bloomberg, the leader in the worldwide market for financial data (as noted above, largely unprotected under copyright law[20]), which requires that users purchase product-specific "Bloomberg terminals" in order to use the firm's database. Or, closer to home for a legal audience, consider the Westlaw or LexisNexis services for U.S. case law: while the immediate product is unprotected under copyright law,[21] the providers limit usage through technological measures

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[18] For a more detailed review of relevant evidence, see Jonathan M. Barnett, *Private Protection of Patentable Goods*, 25 CARDOZO L. REV. 1251, 1257-69 (2004) [hereinafter Barnett, *Private Protection*].

[19] *See* Edwin Mansfield et al., *Imitation Costs and Patents: An Empirical Study*, 91 ECON. J. 907, 909-10 (1981) (U.K.) (finding, based on interviews with firm managers in several industries, that imitation costs average about sixty-five percent of the cost incurred in innovation and that imitation time averages about seventy percent of the time required to develop the original product). Note that Mansfield defines imitation costs and time broadly to include both product development and all subsequent "bringing to market" costs. *Id.* at 909.

[20] *See supra* note 14.

[21] This observation is supported, in increasing scope of application, by case law, *see* Wheaton v. Peters, 33 U.S. (8 Pet.) 591, 668 (1834) (refusing to allow copyright protection for Supreme Court opinions), statute, *see* 17 U.S.C. § 105 (2006) (precluding copyright protection for federal governmental works), and Copyright Office policy, *see* COMPENDIUM II: COMPENDIUM OF COPYRIGHT OFFICE PRACTICES § 305.08(d) (1984) (disallowing copyright protection for federal or state government documents).

that effectively constrain access subject to a pricing schedule. And as is well known in the software, online-entertainment, and consumer-electronics sectors, firms make wide use of encryption, copy-protection, and a variety of other "digital rights management" (DRM) technologies that can finely regulate user access based on pricing plans and various other criteria.[22]

2. Contract

Firms widely use contractual instruments to impose limitations on the use of their products. Various examples can be cited. In the software industry, vendors attach "shrinkwrap" and "clickwrap" agreements to software purchased at retail or online venues, respectively, and bind the purchaser to terms that may exceed the rights to which the vendor is entitled under copyright or patent law. Every reader has almost certainly engaged in such a transaction. Suppose you download a copy of the standard version of Adobe Acrobat, the popular application for reading and producing PDF files. You will immediately become subject to the eleven-page Adobe Software License Agreement (available in thirty-two languages) that imposes a variety of obligations—including, among other things, covenants not to reverse engineer "or otherwise attempt to discover the source code" of the software and, subject to certain exceptions, not to transfer the software or authorize the software to be copied to another individual's computer.[23] Through this contractual instrument, Adobe constructs a customized and detailed intellectual property regime enforceable against the end-user irrespective of any rights to which Adobe may be entitled under intellectual property law.

This example illustrates a basic point: even if copyright or patent protection were abolished, firms could still bind point-of-sale consumers and other directly transacting parties through contractual restric-

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[22] DRM covers a broad range of technologies that regulate, track, and meter access to digital and online content—including text, audio, video, and photographic images—using encryption, encoding, digital watermarking, user authentication, and other techniques. For an overview of these technologies, see LAWRENCE HARTE, INTRODUCTION TO DIGITAL RIGHTS MANAGEMENT (DRM) (2006). For a critical review with special reference to the anticopying technologies that protect DVDs, see TARLETON GILLESPIE, WIRED SHUT: COPYRIGHT AND THE SHAPE OF DIGITAL CULTURE ch. 6 (2007), and with reference to music, see PATRICK BURKART & TOM MCCOURT, DIGITAL MUSIC WARS: OWNERSHIP AND CONTROL OF THE CELESTIAL JUKEBOX 102-11 (2006).

[23] ADOBE Software License Agreement cls. 4.3 & 4.5, *available at* http://www.adobe.com/products/eulas/pdfs/Gen_WWCombined-20080205_1329.pdf (last visited April 15, 2009).

tions. While the enforceability of these contracts is sometimes contested, the law seems fairly settled in most jurisdictions that these contracts are relatively immune to challenge so long as certain notice and other procedural requirements to satisfy judicial concerns over aggressive "fine print" tactics are met.[24] In sophisticated licensing transactions involving patented technologies or copyrighted works, rights holders typically include a variety of provisions that (among other things) limit the usage of the licensed technologies to geographically, commercially, or technologically defined "fields of use" or provide for "grant back" rights that require the licensee to share with the licensor any improvements that the licensee makes to the technology. In the context of corporate research and product development, firms constrain the outflow of tacit and other human-embodied knowledge through contractual provisions that punish employees economically for departing a firm—most notably, through noncompete provisions (admittedly of dubious enforceability in some jurisdictions) or forced-resale provisions (and other provisions of similarly punitive effect) in employee stock-option agreements. In all these contexts, contract provides an important instrument by which resource holders limit access, both by identified third parties with whom they enter into fully negotiated business relationships and unidentified third parties with whom they transact anonymously in the retail context.

3. Organization

Firms can select among a wide variety of structures to organize the research-and-development, production, marketing, and distribution functions that comprise any innovation process. Broadly speaking, these structures can be situated along a spectrum ranging from complete integration—where all functions are performed in-house—to zero integration—where a disembodied firm contractually outsources all functions. Each of these structural choices provides firms with different appropriation capacities. In general, increased integration improves a firm's ability to contain spillovers, where integration is understood to include both (i) vertical integration down the supply chain

[24] For a well-known decision that strongly upholds end-user licenses, see *ProCD, Inc. v. Zeidenberg*, 86 F.3d 1447, 1455 (7th Cir. 1996). For a more measured decision that advances a standard by which online contracts are enforceable provided that certain context-specific procedural requirements are satisfied, see *Specht v. Netscape Communications Corp.*, 150 F. Supp. 2d 585, 596 (S.D.N.Y. 2001). Note that the *ProCD* decision also rejects (and notes other circuits that reject) challenges to end-user licenses based on "preemption" arguments under copyright law. *See ProCD*, 86 F.3d at 1453-54.

from production through distribution, and (ii) horizontal integration across a portfolio of related products and services.[25] Hollywood film studios have historically followed a horizontal-integration strategy, which internalizes spillovers from successful releases by investing resources in the production of a wide variety of collateral merchandise and other derivative applications in a series of sequels and other adaptations.[26] Pharmaceutical firms have historically followed a vertical integration strategy, which internalizes spillovers by undertaking research, testing, production, and marketing through in-house functions, thereby limiting any inadvertent outflows of proprietary knowledge.[27] Intermediate options between full and zero integration include a wide variety of joint ventures, partnerships, and strategic alliances, where firms integrate some functions while using contractual instruments and equity investments to implement other functions through arm's length or long-term cooperative relationships with other firms. These hybrid arrangements are typical in the biopharmaceutical industry, which relies on contract- and equity-based partnerships between "upstream" suppliers of biotechnology innovations and "downstream" providers of capital-intensive production, marketing, and distribution capacities.[28] Through these varied organizational structures, participating firms can finely regulate voluntary knowledge "between-flows" among coventurers while limiting involuntary knowledge "outflows" to nonparticipants.

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[25] Note that I am using "horizontal integration" in a manner that departs somewhat from standard usage, where it usually refers to a firm's acquisition of its direct competitors. The phenomenon described in the text above could alternatively be called a diversified or conglomerate form of organization.

[26] On the diversified, conglomerate structure that tends to characterize firms that dominate the film and related media markets, see RICHARD E. CAVES, CREATIVE INDUSTRIES: CONTRACTS BETWEEN ART AND COMMERCE 314, 318-24 (2000), which observes that dominant media firms tend to operate diversified operations across cable, TV, publishing, and film markets—identifying Time Warner, Disney, News Corporation, and Viacom as examples—and attributes this diversified structure to an attempt to capture synergies through multiple applications of the same set of creative inputs within a single firm given the high costs of using arm's length contracts to achieve the same result.

[27] *See* Jonathan M. Barnett, *Cultivating the Genetic Commons: Imperfect Patent Protection and the Network Model of Innovation*, 37 SAN DIEGO L. REV. 987, 1016-17 (2000) [hereinafter Barnett, *Genetic Commons*].

[28] *See id.* at 1015-21; *see also* David B. Audretsch, *The Role of Small Firms in U.S. Biotechnology Clusters*, 17 SMALL BUS. ECON. 3 (2001); Gary P. Pisano, *Using Equity Participation To Support Exchange: Evidence from the Biotechnology Industry*, 5 J.L. ECON. & ORG. 109 (1989); Josh Lerner & Robert P. Merges, *The Control of Strategic Alliances: An Empirical Analysis of Biotechnology Collaborations* (Nat'l Bureau of Econ. Research, Working Paper No. 6014, 1997).

4. Complementary Assets

Business history is littered with the remains of firms with brilliant ideas that never achieved substantial market penetration. It is well established in the business-management literature that the commercial success of a new technology is critically dependent on a firm's ability to bundle its technology with complementary assets that facilitate securing market share against actual and potential competitors.[29] Broadly speaking, these assets encompass (i) economies of scope in the form of complementary goods and services offered to the target consumer (including service and support functions), (ii) economies of scale in the form of marketing, production, and distribution efficiencies, and (iii) firm goodwill.[30] Properly speaking, complementary assets form part of the total products-and-services bundle that any competitor must replicate in order to deliver a reasonable economic substitute that can threaten the incumbent's market position. Hence, any competitor in the consumer-goods industry will face a powerful obstacle simply by virtue of the fact that the leaders have access to an existing set of complementary assets in the form of goodwill, worldwide distribution and marketing networks, production infrastructure, and contractual and other relationships, all of which take years to accumulate and are not amenable to rapid imitation.

Complementary assets are a powerful tool that can substantially raise third parties' entry costs; hence, even in industries where the underlying technology enjoys little to no robust protection from intellectual property, these inherent cost barriers mean that established firms can reasonably expect to have the capacity to defend innovation rents against smaller-firm entrants. And conversely, smaller-firm entrants *cannot* reasonably expect to have substantial capacity to achieve the same outcome, which in turn reduces competitive threats and increases incumbents' pricing power even in the absence of any formal instrument by which to frustrate entry. Empirical studies that examine some or all of these factors provide ample support for this view,

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[29] For the leading source, see David J. Teece, *Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy*, 15 RES. POL'Y 285, 288 (1986), which explains, "In almost all cases, the successful commercialization of an innovation requires that the know-how in question be utilized in conjunction with other capabilities or assets."

[30] This list commonly includes tacit knowledge, which I have incorporated under the technology category discussed above.

showing that established incumbents historically exert a strong "first mover" advantage over subsequent entry threats.[31]

C. *Why Intellectual Property Is Trivial (Sometimes)*

Intuitively, we conceive of intellectual property as a legal instrument that uniquely imposes access restrictions on intellectual goods that are otherwise open to public use.[32] But it is more precise to say that intellectual property sets a per-unit price for coverage against unauthorized usage, which in turn regulates the rate of substitution by firms between intellectual property and all other available mechanisms by which to regulate access to intellectual goods. This reformulated framework is grounded in the rich body of empirical evidence showing that intellectual property rarely acts as a firm's unique source for imposing access restrictions on intellectual goods.[33] Intellectual property is therefore only one member of any firm's portfolio of appropriation instruments, each of which can be construed as offering "units of coverage" against unauthorized usage of intellectual goods at a certain, constant per-unit cost.[34] Each firm must then elect whether to expend resources on adopting and enforcing formally available intellectual property rights or implementing some combination of alternative instruments to secure innovation returns. This is a variant on the

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[31] For a review of the literature, see William T. Robinson et al., *First-Mover Advantages from Pioneering New Markets: A Survey of Empirical Evidence*, 9 REV. IND. ORG. 1 (1994) (Neth.). For further reviews of the literature that reach a similar view and provide independent research reaching similar results in selected markets, see Mary Lambkin, *Order of Entry and Performance in New Markets*, 9 STRATEGIC MGMT. J. (SPECIAL ISSUE) 127, 127 (1988), which states that "[i]t is widely believed, both by academics and management practitioners, that early entrants into newly developing markets enjoy an enduring competitive advantage over later entrants," and providing independent research further confirming this view, and Gary L. Lilien & Eunsang Yoon, *The Timing of Competitive Market Entry: An Exploratory Study of New Industrial Products*, 36 MGMT. SCI. 568, 569 (1990), which describes research showing that pioneering entrants generally maintain their market-share advantage and that pioneer entry is one of the major determinants of the long-term success of a new product. I note that some commentators contest whether the first-mover advantage is sometimes overstated, and that others even identify a second-mover advantage whereby pioneering firms' innovations are imitated by latecomers or existing incumbents. For various illustrations of this thesis, see STEVEN P. SCHNAARS, MANAGING IMITATION STRATEGIES (1994).

[32] *See supra* note 1.

[33] *See supra* subsections I.B.1-4.

[34] Note that I assume throughout that (i) while the costs of coverage differ across instruments, the units of coverage are homogenous, and (ii) there are no complementarities between appropriation instruments. It would be interesting to relax one or both of these assumptions in a more extended analysis.

economizing problem that commonly drives the transaction-cost-economics literature,[35] where the firm selects governance structures so as to limit the costs of third-party opportunism; in this construct, the firm allocates resources within its appropriation portfolio so as to maximize coverage against (and thereby limit the costs of) third-party expropriation of its intellectual resources.

Suppose that a firm has a fixed "appropriation budget" of resources dedicated to shielding innovation returns against third-party expropriation.[36] When legal changes reduce the strength of an intellectual property entitlement, the per-unit cost of obtaining coverage through intellectual property effectively rises, which induces the firm to shift resources toward the next-least-costly alternative instrument in its portfolio so as to sustain its existing coverage to the maximum extent possible. When legal changes increase the strength of an intellectual property entitlement, the per-unit cost of coverage through intellectual property effectively falls, which induces the firm to shift resources away from the next-least-costly instrument in its portfolio so as to maximize coverage. To illustrate this idea more concretely, suppose that a new legal standard makes it harder to defend the nonobviousness of a patent claim (as illustrated by the Supreme Court's 2007 decision in *KSR International v. Teleflex Inc.*[37]): everything else being equal, firms will rationally divert resources from adoption and enforcement of patents to alternative appropriation devices. Alternatively, suppose that a new legal standard makes it easier to defend the validity of a patent claim over nontechnical subject matter (as illustrated by the Federal Circuit's 1998 decision in *State Street Bank &*

[35] For the seminal reference, see OLIVER E. WILLIAMSON, THE MECHANISMS OF GOVERNANCE (1996).

[36] This fixed-budget assumption is a simplification for expositional purposes, equivalent to supposing a firm that expends all of its resources on appropriation activities and cannot access external capital. This assumption would be relaxed in a more extended analysis that explicitly models the firm's consumption choice as a function of the elasticity of the firm's demand for coverage against unauthorized usage with respect to changes in the cost of obtaining coverage through available appropriation instruments. Note that, generally speaking, it can be expected that relaxing the fixed-budget assumption would make the indifference thesis ("IP does not matter") more robust with respect to downward adjustments in intellectual property (since firms could expand the appropriation budget to fully replicate withdrawn state-provided appropriation capacities), which is the focus of this Article's analysis, but less robust with respect to upward adjustments in intellectual property (since firms could expand the appropriation budget to exploit additional state-provided appropriation capacities). In subsequent discussion, I show that certain applications of the indifference result hold even where this assumption is relaxed. *See infra* subsection I.C.4.

[37] 550 U.S. 398 (2007).

Trust Co. v. Signature Financial Group, Inc.[38]): everything else being equal, firms will rationally divert resources from alternative mechanisms to patents. So long as we assume a fixed appropriation budget and reasonably cost-equivalent alternative instruments, it logically follows that any firm's appropriation capacities are substantially invariant to the level of intellectual property protection.

Contrary to conventional expectations, IP does not *always* matter; rather, it is always an empirical question subject to the difference in per-unit cost of coverage between the relevant intellectual property entitlement and the next-least-costly combination of substitute instruments. This analysis will focus on the case where the state relaxes or even abolishes intellectual property protections over the relevant set of intellectual resources.[39] The market will not "sit still" in response to the withdrawal of intellectual property coverage. Firms will rationally divert the resources previously used to adopt and enforce the lapsed entitlement to the next-least-costly alternative instrument, thereby preventing some to almost all of the underlying intellectual resources from reverting to the public domain. Empirical evidence as described above—technology, contract, organization, and complementary assets—provides a firm basis for believing that the stock of alternative instruments is rich and therefore the value of any cost difference often may be nominal.[40] That is, there typically exist effective alternatives to cover substantially any reduction in intellectual property protection so that resource holders simply respond to downward adjustments in intellectual property coverage by diverting resources to alternative instruments. If so, then each of the Conventional Propositions is, at best, nominally true in a meaningful range of circumstances: that is, any firm's ability to control access, and therefore its anticipated incentive gains, is largely invariant to the effective level of intellectual property coverage, given that a firm approximately main-

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[38] 149 F.3d 1368 (Fed. Cir. 1998).

[39] The remainder of the discussion will continue to focus primarily on downward adjustments in intellectual property coverage, in part for reasons of space and in part because that is the proposed policy change under debate at the moment. As suggested by the general articulation of the discussion so far, I believe that the analysis would substantially apply with some modification to upward adjustments in intellectual property coverage. The basic intuition is simple. The same circumstances where downward adjustments of intellectual property make no difference are the same circumstances where upward adjustments of intellectual property make no difference: alternative instruments replicate the appropriation outcomes that firms would rationally secure by law at the same or higher cost.

[40] *See supra* subsections I.B.1-4.

tains its appropriation capacities by shifting resources within its appropriation portfolio.

A simple hypothetical will suffice to illustrate how this thesis complicates the incentives/access tradeoff that drives the standard policy calculus. Suppose that a profit-maximizing firm devotes its appropriation budget to protect 100% of the gains generated by its innovation investment through the adoption and enforcement of patent instruments. Now suppose that patents are abolished and therefore drop out of the appropriation portfolio. Does this affect the firm's ability to capture the gains from its investment ex post and hence its innovation incentives ex ante? Following a conventional analysis, the outcome is clearly determinate (so determinate that the question appears rhetorical): access costs will fall given the withdrawal of patent protection and the resulting expansion of the public domain, which in turn will cause innovation gains to fall as firms anticipate reduced appropriation capacities. But this reflects a *static* approach that fails to take into account market responses to changes in intellectual property protection. Following a *dynamic* approach, the outcome is indeterminate without further information. Firms may respond to the withdrawal of patent protection by migrating to alternative instruments that make up most of any lost appropriation capacity, in which case even a nontrivial reduction in patent coverage has a trivial effect in reducing access costs and innovation returns.[41] Even more dramatically, as argued further in subsection I.C.4, firms may migrate to alternative instruments that surpass any withdrawn appropriation capacities, in which case a nontrivial reduction in patent coverage has the nontrivial but perverse effect of increasing access costs and reducing innovation returns.

In contrast to the single determinate outcome anticipated in standard commentary, a dynamic analysis contemplates multiple possible outcomes following any downward adjustment in intellectual property. Each outcome, however, can be anticipated at some level of approximation as a function of the direction and size of any incentive/access effect as a result of the reduction in intellectual property coverage. Where the direction is positive (i.e., less IP reduces innovation gains and access costs), then the effect is "nonperverse"; and

[41] Note that my distinction between "static" and "dynamic" approaches does not track the distinction, sometimes made in intellectual property (and antitrust) commentary, between a static efficiency approach, which seeks to align market pricing with marginal cost (and therefore implies weak or no intellectual property rights), and a dynamic efficiency approach, which seeks to enable innovators to recover the fixed costs of research and development (and therefore implies strong intellectual property rights).

where size is substantial, the effect is "nontrivial," and vice versa. If, for simplicity, we use binary assignments of positive/negative values for direction and large/small values for size, then these outcomes can be derived based on the interaction between these two variables, as shown in Table 1 below. In case *A*, direction is positive and size is large, in which case innovation gains and access costs are reduced, following the standard incentives/access tradeoff; in case *B*, direction is positive but size is small, in which case the incentive/access tradeoff holds but to a trivial extent; and in case *C*, size is large but direction is negative, in which case innovation gains are reduced but access costs are increased, thereby partially reversing the standard incentives/access tradeoff.

Table 1: Possible Effects of Downward Adjustment in Intellectual Property Coverage

	Size (large)	**Size (small)**
Direction (positive)	*A*—Nonperverse, Nontrivial	*B*—Nonperverse, Trivial
Direction (negative)	*C*—Perverse, Nontrivial	—

A conventional static analysis views direction and size as fixed values: direction is always positive and size is always large, in which case the nonperverse, nontrivial result (case *A*) anticipated by standard commentary always and exclusively applies. But a dynamic analysis anticipates that both size and direction may vary. Size will vary as determined by the value of *D*, which denotes the difference in the per-unit cost of coverage between the relevant intellectual property entitlement and the remaining portfolio of alternative instruments. Suppose that $D = K_a - K_b$, where K_a equals the cost per unit of coverage provided by the relevant intellectual property instrument and K_b equals the cost per unit of coverage provided by alternative instruments. Standard analysis assumes (without demonstrating) that it is *always* the case that the value of K_b is infinite or exorbitant relative to the value of K_a, in which case $K_a < K_b$ and $D < 0$. This assumption implies that the firm will decline to adopt any alternative instrument in order to cure the appropriability shortfall, which means, in turn, that innovation gains and access costs always correlate positively with entitlement strength following the standard policy calculus (case *A* above). However, if we contemplate an unlimited range of negative and positive values for *D* (which is to say, we contemplate that the value of K_b is not always infinite or exorbitant relative to the value of K_a and may some-

times fall below it), then the standard relationship no longer necessarily holds to any substantial extent and can even be reversed. Specifically, two contrary outcomes may be obtained: (i) where $K_a = K_b$, then $D = 0$ (or, more realistically, $K_a \approx K_b$, so that $D \approx 0$) and there is no effect or no substantial effect (case *B* above); and (ii) where $K_a > K_b$, then $D > 0$, and, under certain additional assumptions described below, there can be a perverse effect (case *C* above).[42]

Below, I explore in greater detail these idealized cases, presented in the form of four stylized scenarios that exhibit different incentive effects and access effects consequent to downward adjustments in intellectual property protection. These include (i) two "simple" scenarios that demonstrate the extreme cases where there are no or perfect substitutes for intellectual property protection (corresponding to cases *A* and *B* above, respectively) and (ii) two "complex" scenarios where there exists a range of imperfect substitutes for intellectual property protection (corresponding to the perverse case *C* above and a variant of nontrivial case *A*). Each scenario exhibits standard or nonstandard effects on incentive gains and access costs as a result of two factors: (i) the distribution of per-unit *costs* of coverage across available appropriation instruments; and (ii) the distribution of *units* of coverage across available appropriation instruments. The following discussion identifies more precisely the conditions under which downward adjustments in intellectual property are and are not likely to exert any effect on innovation gains and access costs and, as a result, the conditions under which the standard incentives/access tradeoff is and is not likely to provide a reliable guideline for policy analysis of changes to intellectual property protections.

1. Simple Scenario I: Certainly Nontrivial, Nonperverse Effect

In Simple Scenario I, the cost of alternative instruments in the firm's appropriation portfolio is exorbitant or infinite relative to the cost of abolished intellectual property instruments. This would be satisfied in the case where there exists *no* substitute for intellectual property protection. Somewhat remarkably, given the substantial body of

[42] Some readers may observe that this perverse result, where a reduction in intellectual property coverage causes firms to purchase higher levels of coverage through a less costly, alternative instrument, begs the question of why a firm would have ever used the costlier (and now unavailable) legal instrument to achieve less coverage. The answer is that stronger protection may degrade the value of the product, in which case lower levels of coverage may maximize profits if firms must accept a sufficient discount on "excessively" protected goods. For further discussion, see *infra* subsection I.C.4.

empirical evidence to the contrary,[43] this is the case that drives most legal and economic analysis of intellectual property, which assumes that intellectual goods that are *legally* unprotected by intellectual property entitlements are *actually* unprotected. That is, any asset that is not protected by law falls into the open-access public domain.[44] Where this assumption is maintained, any downward adjustment in intellectual property is clearly nontrivial and yields all of the standard effects: reduced innovation incentives and increased access costs, which then requires that normative analysis proceed on the basis of the standard incentives/access tradeoff. But that is a result that simply follows by construction from an artificial set of assumptions that will infrequently or even rarely be satisfied in any practical setting. Clearly this is not the paradigm case that should govern policy discussions of intellectual property.

2. Simple Scenario II: Certainly Trivial, Nonperverse Effect

In Simple Scenario II, the cost of alternative instruments is equal or approximately equal to the cost of abolished or curtailed intellectual property instruments. This would be satisfied in the case where there is an exact substitute for intellectual property protection. Under this assumption, it self-evidently follows that eliminating intellectual property protection makes no difference since firms can substitute other instruments to achieve the same level of protection, in which case none of the standard effects follow: more or less intellectual property protection has no effect on innovation incentives or access costs and hence does not generate the conventional incentives/access tradeoff for purposes of normative analysis. Clearly this, too, is not the paradigm case that should govern policy discussions of intellectual property.

3. Complex Scenario I: Potentially Nontrivial, Nonperverse Effect

Simple Scenario I is obviously unrealistic. It must almost always be the case that firms have *some* other feasible instrument by which to raise competitors' imitation costs to some extent, and empirical inquiries suggest that those alternative instruments typically raise competitors' imitation costs by a substantial amount. But this scenario can easily be modified by simply assuming that the cost of alternative in-

[43] *See supra* Section I.B.
[44] *See supra* note 1.

struments less the cost of abolished or curtailed intellectual property instruments yields a positive but nonexorbitant value. This would be satisfied in a world where there exist materially but not radically costlier alternatives to intellectual property protection. Under this assumption, eliminating or curtailing intellectual property has a nontrivial effect to the extent that a firm's reallocation of its fixed appropriation budget to the next-least-costly set of substitute instruments will not fully replicate the protection formerly provided by intellectual property.

The *direction* of this effect is clear and follows standard expectations: the relaxation of intellectual property protection results in reduced coverage of the relevant pool of intellectual goods, in which case access is decreased, innovation incentives are reduced, and normative evaluation can proceed on the basis of the standard incentives/access tradeoff. But note that the *size* of this effect is not clear: that is, whether this certain effect is weakly or strongly nontrivial depends on the relative distance between the lapsed intellectual property instruments and the next-least-costly combination of alternative instruments. Where that distance has a small value, downward adjustments in intellectual property coverage can reduce incentives and increase access by only a small magnitude. Where that distance has a large value, however, abolishing intellectual property protection may make a significant difference, as the next-least-costly instrument stands at a considerable distance from the lapsed intellectual property instrument. In this latter case, firms will be unable to incur the incremental nontrivial costs of covering the entire shortfall by substituting toward alternative instruments. Where it costs substantially more to replicate the coverage formerly provided by intellectual property instruments, downward adjustments in intellectual property roughly follow conventional expectations: incentives are reduced and access is increased by nontrivial magnitudes, in which case normative analysis can proceed on the basis of the standard incentives/access tradeoff.

This familiar nontrivial case is illustrated using hypothetical values in Table 2, below. Suppose that a record label spends $10 to purchase 100 units of coverage for each digital release through a copyright entitlement (which yields a per-unit cost of coverage equal to $0.10); then suppose that copyright protection is abolished or widely ignored in the relevant jurisdiction; and finally, suppose that the firm can spend the same $10 per release to implement a contractual license that can only deliver 80 units of coverage (which yields a per-unit cost of coverage equal to $0.125). That is, the contractual substitute exerts inferior

appropriation capacities relative to copyright protection, with the result that the firm internalizes a smaller portion of its innovation investment while third parties incur lower access costs. The relaxation of intellectual property protection causes a rise in the per-unit cost of coverage available to the resource holder, which in turn causes a fall in the number of units of coverage that can be purchased, which in turn limits the price that the producer can demand. Following the standard incentives/access tradeoff, access by third parties is increased at the price of reduced profits and incentives on the part of the innovator.

Table 2: Nontrivial, Nonperverse Outcome: Less IP Reduces Gains, Increases Access[45]

	Units of Coverage	Total Cost of Coverage	Price	Profits
No Protection	0	$0	$0	$0
Copyright Protection	100	$10	$40	$30
Next-Least-Costly Protection	80	$10	$32	$22

4. Complex Scenario II: Potentially Nontrivial, Perverse Effect

Recall that a dynamic analysis proposes that relaxations in intellectual property coverage induce all firms to migrate to the next-least-costly instrument in their appropriation portfolio so as to maintain their appropriation capacities to the maximum extent possible.[46] Assuming a fixed budget of appropriation resources, this implies that, if there is anything but perfect cost equivalence between intellectual property and alternative instruments, then any reduction in intellectual property coverage always yields *some* reduction in appropriation capacities, and hence, *some* reduction in anticipated innovation gains. Using the same amount of appropriation resources, firms that substitute toward the next-least-costly appropriation instrument will neces-

[45] Note that the figures in the "Profits" column assume that "cost of coverage" is the sole marginal cost (so profits equal price minus cost of coverage). This reflects a market where (i) the marginal cost of production and distribution is zero, and hence (ii) the vendor's pricing power is entirely derived from the exclusivity that it can establish through appropriation instruments, whether intellectual property or other devices. This would seem to describe the online music market, the provisional example discussed above. For simplicity, I exclude the vendor's fixed costs.

[46] *See supra* note 41 and accompanying text.

sarily be able to purchase fewer units of coverage than had previously been made available through the lapsed intellectual property entitlement. If this is the case, then the *direction* of the access and incentive effects of "more or less IP" is certain, but the *size* is uncertain, contingent solely on the difference in the per-unit cost of coverage provided by the next-least-costly appropriation instrument relative to the lapsed intellectual property instrument. So the effect is always nonperverse—less IP always means lower access costs and lower innovation gains—but the magnitude may or may not be nontrivial.

But even the *direction* may be uncertain. The nonperverse result implicitly assumes that a firm can always purchase precisely the number of units of coverage that it desires, but at increasing costs per unit of coverage as it moves through its appropriation portfolio. This ensures that a firm's substitution of the next-least-costly instrument in its portfolio would always provide coverage at some level that is lower than the preexisting level of coverage: given a fixed appropriation budget and a higher per-unit cost of coverage, the firm is forced to settle for a reduced appropriation capacity. However, even the direction of the effect could be uncertain if alternative instruments deliver units of coverage in "lumpy" quantities, such that the next-least-costly instrument (again, on a per-unit basis) offers *more* units of coverage than the firm had previously purchased using the withdrawn intellectual property entitlement. In that case, the next-least-costly appropriation instrument can only deliver appropriation capacities in an amount that exceeds the firm's appropriation budget. If we maintain the assumption of a fixed appropriation budget, the firm must then settle for zero appropriation capacities (since the minimum number of units of coverage that are available would exceed the budget); if we relax that assumption, the firm may divert resources from other uses to purchase a stronger but non-profit-maximizing amount of coverage.

A simple numerical example can illustrate this contingency, which is then presented in Table 3(a) below. Suppose, as above, that a record label spends $10 to purchase 100 units of coverage for each digital release through a copyright entitlement (which yields a per-unit cost of coverage equal to $0.10); then suppose that copyright protection is abolished in the relevant jurisdiction; and finally, suppose that the firm can spend $25 per release to implement a DRM technology that can deliver "packages" of at least 200 units of coverage (which yields a per-unit cost of coverage equal to $0.125). In this scenario, the technological substitute is superior to copyright protection, with the result that the firm internalizes a greater portion of its innovation

investment, and third parties incur higher access costs under a *lower* (zero) level of copyright protection.

But why would the firm not simply have used this more potent but more expensive instrument previously? If we assume a fixed appropriation budget, then the answer is straightforward: the firm could not afford it. If we relax that assumption, then we can hypothesize that the firm may have rationally declined to use this more potent alternative instrument because it degraded the value of its product, thereby limiting the price that it could demand from consumers, so that the firm maximizes profits at some imperfect level of protection against third-party access. However, given the absence of copyright protection, it may now be profit maximizing for the record label to employ this once-disfavored alternative: that is, if the firm now faces a choice between zero units of coverage (at $0), which will invite free imitation and push down price to marginal cost (assumed to be $0), and excessive units of coverage (200 units at $25), which will still yield some positive profits, it will rationally select the latter as its "second-best" option. The firm would *not* have selected this option if the appropriation portfolio still included an intermediate level of coverage (100 units at $10). This result is set forth in tabular form below, using hypothetical values to illustrate the stylized results.

Table 3(a): Nontrivial, Perverse Outcome: Less IP Reduces Gains and Access[47]

	Units of Coverage	Total Cost of Coverage	Price	Profits
No Protection	0	$0	$0	$0
Copyright Protection	100	$10	$40	$30
Next-Least-Costly Protection	200	$25	$35	$10

There is an interesting alternative to this hypothetical, whereby a perverse result can be reached without relaxing the assumption of a fixed appropriation budget. Suppose all the facts and hypothetical values stated above, except that DRM technology delivers 200 units of coverage at $10 per release (rather than $25 as supposed above). This would mean that DRM represents the firm's "next-*most*-costly" appropriation technology as compared to copyright and therefore com-

[47] See *supra* note 45 for some assumptions behind these values.

fortably fits within its appropriation budget. Put differently, the lapsed intellectual property entitlement delivered coverage at a higher per-unit cost (100 units of coverage for $10, yielding a per-unit cost of coverage equal to $0.10) relative to the alternative appropriation instrument (200 units of coverage for $10, yielding a per-unit cost of coverage equal to $0.05). But the firm will nonetheless accept this deal with reluctance: given that it must purchase at least 200 units of coverage, use of the DRM technology sufficiently degrades the value of the firm's product such that its profits are lower than they would be in a world in which copyright protection exists (but still higher than the zero profits obtained without purchasing any protection). Even though the DRM technology is more potent and has a lower per-unit cost of coverage relative to copyright, the firm maximizes profits by using the weaker and less cost-effective form of coverage. This is reflected in the following table.

Table 3(b): Nontrivial, Perverse Outcome: Less IP Reduces Gains and Access[48]

	Units of Coverage	Total Cost of Coverage	Price	Profits
No Protection	0	$0	$0	$0
Copyright Protection	100	$10	$40	$30
Next-Most-Costly Protection	200	$10	$35	$25

Both cases illustrate that the *directional* effect of any downward adjustment in intellectual property coverage can be perverse: that is, depending on the composition of the firm's appropriation portfolio, relaxing intellectual property protections can induce migration to an alternative instrument that is more potent than the lapsed intellectual property instrument and therefore *increases* access costs. At the same time, innovation incentives are *reduced* under a higher level of coverage because the firm earns lower profits due to product degradation: that is, reducing copyright protection forces the firm to utilize alternative instruments at non-profit-maximizing levels.[49] Where intellectual

[48] See *supra* note 45 for some assumptions behind these values.

[49] This possibility is vividly illustrated by the animal-breeding industry, where breeders apparently remedied the appropriability shortfall created by weak or nonexistent intellectual property protection by imposing strict contractual limitations and employing in-breeding practices to maintain control over livestock. *See* Rochelle Dreyfuss, Response,

property protection is constrained, firms may rationally migrate to draconian alternative instruments that result in product degradation but nonetheless enhance profits relative to having no protection at all. In short, intellectual property can be nontrivial but perverse: less IP can reduce innovation incentives—following conventional expectations—while *also* increasing access costs—contrary to conventional expectations.[50]

II. WHY INTELLECTUAL PROPERTY IS *NOT* TRIVIAL (SOMETIMES)

The discussion above has identified conditions under which downward adjustments in intellectual property coverage are likely to exert a trivial effect on access costs and innovation incentives, in which case innovative output will be roughly constant across the broad range of weak to strong intellectual property regimes. In this Part, I identify the conditions under which adjustments in intellectual property coverage *can* make a difference, not as an incentive instrument for regulating innovative output, but as a distributive instrument that shifts innovation rents from the holders of higher-cost appropriation instruments to the holders of lower-cost appropriation instruments.

A. *An Unconventional View of Intellectual Property*

In the foregoing discussion, I have set forth a few simple, preliminary propositions:

Fragile Equilibria, 93 VA. L. REV. IN BRIEF (2007), http://www.virginialawreview.org/inbrief.php?s=inbrief&p=2007/01/22/dreyfuss.

[50] There is an interesting "virtuous" variant of this perverse scenario. If we suppose an *upward* adjustment in intellectual property protections and assume a sufficiently lumpy distribution of units of coverage across appropriation instruments, then increasing intellectual property can sometimes increase innovation gains (following the standard outcome) but *decrease* access costs (contrary to the standard outcome). This will be possible where the previous low (or zero) level of intellectual property protection compelled the firm to select a non-profit-maximizing, excessive number of units of coverage provided by an alternative instrument. An increase in intellectual property coverage enables the firm to select a *lower* number of units of coverage, thereby avoiding product degradation and increasing the price that can be demanded from consumers. Applying the same analysis as used to generate the "perverse" outcomes identified above, this result can hold under a certain range of values whether the per-unit cost of coverage provided by the intellectual property instrument is more or less expensive than the existing alternative instrument (i.e., whether the alternative instrument is the next-least-costly or next-most-costly instrument in the firm's appropriation portfolio).

> *Unconventional Proposition I*: Intellectual property has a trivial effect on innovation incentives given perfect or near-perfect cost equivalence between intellectual property and alternative instruments.
>
> *Unconventional Proposition II*: Intellectual property has a nontrivial effect on innovation incentives where there is a lack of perfect or near-perfect cost equivalence between intellectual property and alternative instruments. The size of this effect, however, may be weakly nontrivial where there is no substantial difference between the cost of any lapsed formal instrument and the next-least-costly alternative instrument.
>
> *Unconventional Proposition III*: Intellectual property has a nontrivial but perverse effect on innovation incentives if we assume (i) a substantial cost difference between intellectual property and alternative instruments, and (ii) a lumpy distribution of the "units of coverage" across appropriation technologies such that the firm reallocates resources to the next-least-costly (or even next-most-costly) instrument that delivers more units of coverage than the lapsed intellectual property instrument.

These propositions collectively illustrate a fundamental thesis: there is no ground to presume the standard positive correlation between entitlement strength, on the one hand, and innovation incentives (more IP means more output) and access costs (more IP means more access costs), on the other hand, *unless* we assume that firms can only use alternative instruments at a substantially higher per-unit cost of coverage relative to intellectual property entitlements. Where there *is* substantial cost equivalence between legal and extralegal instruments, the incentives/access tradeoff has considerably less force. Even substantial downward adjustments in intellectual property have no appreciable effect on access costs, in which case (everything else being equal) innovation incentives are substantially unaffected and technological or creative output should be roughly constant. Moreover, even if the underlying assumption is satisfied—that is, even if there is *not* substantial cost equivalence, but alternative instruments deliver coverage in sufficiently "lumpy" quantities—then the former, but not the latter, correlation will hold true. That is, decreasing entitlement strength may lower output following conventional expectations but increase access costs contrary to expectations. Firms will rationally substitute toward appropriation instruments that deliver more

coverage at a higher total cost (which can imply a higher or lower *per-unit* cost) than the firm would otherwise be willing to fund. In short, the incentive/access tradeoff will sometimes yield a lose-lose result: less IP delivers both less output and less access.[51]

I will now focus on Unconventional Proposition II, which will, at varying magnitudes, yield the conventional positive correlation between entitlement strength and innovation incentives and access costs. Intuitively, this seems to capture most broadly the typical appropriation landscape in which firms tend to operate in most markets: neither the extreme scenario where there are no substitutes for intellectual property (Simple Scenario I) nor the extreme scenario where alternatives to intellectual property are perfect substitutes (Simple Scenario II). If we assume—as seems at least reasonable based on available evidence—that firms typically do have access to a wide range of alternative instruments at some nonexorbitant incremental cost, then it would follow that, in a large number of circumstances, even substantial downward adjustments in intellectual property protection are trivial or do not have a substantial effect with respect to innovation incentives and access costs. However, even if we are comfortable with the existing evidence on this point in some markets, we should preserve some meaningful scope of application for the conventional "IP matters" thesis. To hold that reductions in intellectual property coverage make no or little difference with respect to innovation gains and access costs requires a further assumption: namely, it must be the case that the costs of implementing substantially equivalent appropriation instruments are distributed roughly equally among actual and potential market participants. If that is not the case, then only a partial indifference thesis holds: while a reduction in intellectual property coverage will have a trivial effect on total innovation gains and total access costs, it will have a nontrivial effect on the distribution of innovation gains and access costs among the total pool of market participants.

Recall the extreme case where there is perfect cost equivalence between intellectual property and an alternative instrument in the form of a perfect technological lock. Obviously, stronger or weaker intellectual property coverage makes no difference in firms' total appropriation capacities, in which case innovation gains and access costs should be unaffected. Now suppose two firms, *A* and *B*, each of which

[51] Conversely, as noted *supra* note 50, there are plausible circumstances where increases in intellectual property protections can deliver a win-win result: more IP delivers both more output and more access.

are contemplating making expenditures to develop, produce, and distribute mutually noninfringing technologies that will exhibit roughly comparable cost and noncost attributes, except (i) *A* expects that it can protect its product against imitation by using the lock at a cost equivalent to enforcing available patent protections, and (ii) *B* expects that it can only do so at some substantially higher cost. Then stronger or weaker intellectual property clearly does matter in influencing the distribution of rents across firms, for the simple reason that only *A* can expect to accrue rents without patent protection. If patent protection is available, both firms enter, and all rents in the market are split equally between *A* and *B*, who are protected against outside entry; without patent protection, however, only *A* rationally enters, and therefore accrues all available rents in the market, while *B* rationally declines to make any investment at all.[52]

This hypothetical identifies circumstances where total rents in the market hold approximately constant irrespective of radical changes in intellectual property, but the distribution of those rents among individual firms in the market is radically altered. This case (of which multiple intermediate variants could be imagined) illustrates a simple proposition: so long as we assume an unequal distribution of cost-equivalent alternative instruments, less IP inherently advantages firms that have the lowest costs of substituting toward alternative instruments, while more IP will inherently ameliorate any such cost advantage, thereby sustaining firms that have the highest costs of substituting toward alternative instruments.

This yields an additional proposition:

> *Unconventional Proposition IV*: Intellectual property has (i) a trivial effect on innovation output if there is substantial cost equivalence between intellectual property and alternative instruments, but (ii) a nontrivial effect on the distribution of innovation gains across firms if substantially cost-equivalent alternative instruments are unequally distributed across actual and potential market participants.

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[52] This hypothetical assumes that (i) where both *A* and *B* enter, tacit collusion preserves supracompetitive rents, and (ii) where only *A* enters, *B* would not invest simply to exploit the opportunity to accrue the short-term gains from underpricing *A*, so long as *B* would still be unable to recover its fixed-cost R&D expenditures, resulting in an anticipated net loss. Presumably *B* could not extract a portion of *A*'s anticipated monopoly rents by threatening to sell its technology to a third party, so long as informational asymmetries (which are especially severe prior to product development, as assumed above) render any such threat sufficiently noncredible.

We can therefore suppose a market where, following element (i), even complete elimination of intellectual property protection has little or no effect on total innovation output because firms taken as a whole recover appropriation capacities through extralegal instruments. However, following element (ii), the absence of intellectual property selects against firms that have the highest-cost access to alternative, cost-equivalent appropriation instruments while it selects for firms that have the lowest-cost access. Thus, intellectual property is trivial as an incentive instrument but nontrivial as a distributive instrument. Put differently, assuming a robust supply of alternative exclusionary instruments, the total amount of innovation rents under a stronger or weaker intellectual property regime is roughly invariant while the distribution of rents varies considerably.

Extrapolating from Unconventional Proposition IV, we can now state more completely the conditions under which intellectual property will and will not matter. Specifically, more or less intellectual property has *completely* trivial effects where two conditions are met: (i) there is substantial cost equivalence between intellectual property and alternative instruments, and (ii) cost-equivalent alternative instruments are distributed roughly equally across firms. Where assumption (i) is not satisfied, then intellectual property is nontrivial as an incentive instrument; where assumption (ii) is not satisfied, then intellectual property is nontrivial as a distributive instrument. Where both assumptions are satisfied, then intellectual property is trivial in both respects. This taxonomy of possible outcomes is summarized in Table 4, below.

Table 4: Incentive and Distributive Effects of Intellectual Property

	Equal Distribution	**Unequal Distribution**
Cost Equivalence	Completely Trivial	Trivial Incentive Effect; Nontrivial Distributive Effect
Non–Cost Equivalence	Nontrivial Incentive Effect; Trivial Distributive Effect	Completely Nontrivial

These multiple outcomes stand in contrast to conventional commentary, which effectively presumes without contemplation that the "Completely Nontrivial" result is the only possible result. In particu-

lar, these results pose a challenge to two standard assumptions in scholarly and popular discussions of intellectual property. First, these results show that there is no determinative *incentive* effect of weaker or stronger intellectual property coverage,[53] absent information as to the distribution across alternative instruments of the costs of coverage (and, to be complete, information as to the distribution of *units* of coverage across alternative instruments, which can give rise to perverse outcomes). Second, even where there *is* substantial cost equivalence, and, therefore, innovative output should be roughly constant across different levels of intellectual property coverage, there is no determinative *distributive* effect of weaker or stronger intellectual property coverage, absent information as to the distribution across *firms* of the costs of using alternative instruments.

Scholarly and popular commentary normally assume that stronger intellectual property coverage has regressive distributive effects by shifting rents toward large firms that then enjoy strengthened barriers against market entry; and conversely, that weaker intellectual property coverage has progressive distributive effects by lowering entry barriers and shifting rents toward users and small firms that have limited access to alternative appropriation technologies. Take a typical example from a recent contribution, where the author states that allocating strong intellectual property rights presents a policy tradeoff between increasing innovation incentives by improving anticipated profits and raising barriers to entry by consolidating control over a particular industry.[54] That statement makes the implicit (and seemingly uncontroversial) assumption that a world with stronger intellectual property rights will necessarily impose higher entry costs, and therefore exhibit higher market concentration, relative to a world with weaker intellectual property rights. But that assumption can easily be falsified. Consider a counterexample: in the late nineteenth century, U.S. railroads formed information clearinghouses to which member firms disclosed

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[53] This refers to the standard positive correlation between innovation incentives and intellectual property protections. *See supra* Section I.A.

[54] Tim Wu, Essay, *Intellectual Property, Innovation, and Decentralized Decisions*, 92 VA. L. REV. 123, 123-26 (2006). This example is merely indicative of a long-standing argument in intellectual property commentary. For a historical example, see TEMP. NAT'L ECON. COMM., 76TH CONG., PATENTS AND FREE ENTERPRISE (S. Comm. Print 1941) (*prepared by* Walton Hamilton), *in* ROBERT P. MERGES & JANE C. GINSBURG, FOUNDATIONS OF INTELLECTUAL PROPERTY 46 (2004), which argues that during the nineteenth century patent rights foreclosed entry by individual inventors into mature technological fields while individual inventors flourished in any field where patent rights were absent.

technical knowledge, apparently in order to generate a large body of prior art that could operate to strike down any nonmember patent claims.[55] Consistent with this interpretation, member firms advised each other on how to innovate so as to design around nonmembers' patents and lobbied for legislative and judicial changes to limit patent damages and effect other favorable changes in the patent laws.[56]

This result seems anomalous under a conventional static analysis of intellectual property coverage. But a dynamic analysis of intellectual property coverage fully anticipates this outcome insofar as it does not make any directionally uniform assumption as to the distributive effects of weaker or stronger levels of legal protection against third-party imitation. Weaker patent rights most likely protected the market position of incumbents in the railroad industry, who were well sheltered against entry by the large fixed capital costs required to enter the industry. This observation can be generalized. If we anticipate that firms respond to adjustments in intellectual property coverage by substituting toward market alternatives in order to sustain appropriation capacities *and* assume that firms do not incur equal costs in exploiting alternative instruments, it follows that stronger intellectual property rights can easily *reduce* entry costs and endanger incumbents' market position. The distributive effects of weaker or stronger intellectual property coverage therefore depend on the relative costs incurred by different firms to substitute toward alternative instruments. Following that formulation, there is no ground to expect, as a general matter, that the standard distributive effect of upward and downward adjustments in intellectual property will be uniformly regressive or progressive, respectively. But this observation does not consign policy analysis to mere guesswork: the same dynamic framework supplies an analytical instrument by which to anticipate reasonably the distributive effects of adjustments in intellectual property coverage based on a well-defined set of relevant variables. I will now consider these distributive effects in greater detail.

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[55] *See* Steven W. Usselman, *Patents Purloined: Railroads, Inventors, and the Diffusion of Innovation in 19th-Century America*, 32 TECH. & CULTURE 1047, 1049 (1991) ("By pooling information regarding technical experiments and coordinating legal action, railroads developed the ability to establish precedence that could invalidate most patent claims against them.").

[56] *See id.* at 1064-74 (chronicling the collusive behavior of railroad patent associations).

B. *Distributive Effects of Intellectual Property*

Two typical scenarios can be envisioned that reverse or fail to replicate the standard distributive outcomes associated with upward or downward adjustments in intellectual property coverage: (i) "vertical" distributive effects, whereby rents are shifted from small-firm entrants to large-firm incumbents, and (ii) "horizontal" distributive effects, whereby rents are shifted *among* large firms situated roughly at the same level of industrial organization. Both effects are a function of the relative costs that firms incur in migrating to alternative appropriation instruments, but only the former effect is likely to be an outcome that demands policy intervention from a social point of view.

1. Vertical Distributive Effects

The business-management and industrial-organization literatures widely agree that large, established firms have greater access to alternative appropriation instruments relative to smaller entrants. This is largely due to the fact that most of these instruments—firm goodwill, economies of scale, and production and distribution capacities and efficiencies—are inherent by-products of the vertically integrated forms of organization and/or long-term market positions that tend to characterize incumbent firms.[57] Following this observation, the standard distributive result attributed to intellectual property is largely reversed: weaker intellectual property will have *regressive* effects by providing large firms with an appropriation-cost advantage over any potential small-firm competitor that must incur greater costs to replicate the incumbent's appropriation capacities. Under that same assumption, stronger intellectual property will have *progressive* effects by providing small firms with a tool by which to combat the natural appropriation-cost advantage of larger firms. That is, weak intellectual property can act as a barrier to entry that protects the market position of incumbents while strong intellectual property can act as a critical tool by which entrants can challenge incumbents' market position. Without patent protection, small-firm innovators (who, notably, are not part of the sample sets in the aforementioned survey studies that cast doubt on the relative importance of patent protection[58]) are arguably

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[57] For statements to this effect, see David B. Audretsch & Zoltan J. Acs, *Innovation as a Means of Entry: An Overview*, *in* ENTRY AND MARKET CONTESTABILITY 222, 224-25 (P.A. Geroski & J. Schwalbach eds., 1991), and Gary P. Pisano, *The R&D Boundaries of the Firm: An Empirical Analysis*, 35 ADMIN. SCI. Q. 153, 155 (1990).

[58] *See supra* note 15.

left to the mercy of established large firms and will, therefore, have substantially reduced incentives to undertake innovation projects.[59]

This intuition is amply confirmed by historical lobbying behavior in the patent context, which shows that small inventors (or investment entities that fund small inventors) tend to promote strong intellectual property coverage while large technology-dependent firms (outside of pharmaceuticals and chemicals) tend to promote moderate and sometimes even weak or zero levels of intellectual property coverage.[60] Following a dynamic analysis of adjustments in intellectual property coverage, this is an unsurprising outcome. Small firms rationally anticipate that any withdrawal of intellectual property coverage will operate to the advantage of larger firms, which bear fewer incremental costs in curing the resulting appropriability shortfall by recourse to alternative instruments. Conversely, large firms rationally anticipate that any withdrawal of intellectual property coverage will operate to the disadvantage of small firms, which bear larger incremental costs in curing the resulting appropriability shortfall by recourse to alternative instruments.

2. Horizontal Distributive Effects

The distributive effects of stronger or weaker intellectual property coverage may simply amount to socially indifferent resource transfers among large firms, none of which presents a plausible candidate for distributive equity. Suppose that an intellectual property entitlement is abolished and firms can recover at least some appropriation capacities by recourse to complementary assets that are not accessible at equal cost by all market participants. Reconsider our earlier hypothetical, in which copyright is no longer available to protect digitally released musical works, but with one modification: record labels have little access to substitute instruments for copyright but other entities have abundant access. This is not a far cry from the real world. The effective erosion of copyright protection over recorded music appears

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[59] Several authors make similar observations. *See* Levin et al., *supra* note 15, at 797; Richard Gilbert & Zvi Griliches, *Appropriating the Returns from Industrial Research & Development: Comments and Discussion*, 1987 BROOKINGS PAPERS ON ECON. ACTIVITY 787, 831; Cohen et al., *supra* note 15, at 2-3.

[60] *See* Jonathan M. Barnett, *Property as Process: How Innovation Markets Select Innovation Regimes*, 119 YALE L.J. (forthcoming 2009) (manuscript at 39-42, on file with author) [hereinafter Barnett, *Property as Process*] (examining this phenomenon in the financial-services, information-technology, and semiconductor industries).

to injure the record labels[61] while benefiting hardware manufacturers—such as Apple—and original equipment manufacturers (OEMs)—which sell portable media devices—whose utility increases as the cost of storable content falls.[62] Similarly, this erosion benefits ticket-selling, concert-promotion, and venue-management companies, which derive revenues from the sale of tickets to live performances, which are in turn promoted by the diffusion of free musical content.[63]

Downward adjustments in intellectual property coverage will then have little impact on total innovation rents but will shift those rents across firms, or even markets, so that entities that incur the lowest cost of accessing the substitute appropriation technology will tend to capture market share from entities that do not. Thus, the erosion of copyright in music may have little effect on the total rents generated by musical output, but it nonetheless operates to the great detriment of the record labels, which have relatively higher-cost access to any alternative instruments; and to the great benefit of hardware manufacturers and concert promoters, which have relatively lower-cost access to complementary assets that enable holders to capture at least some of the rents generated by music production, which now operates as a

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[61] For reviews and independent research relating to the economic injury suffered by record labels as a result of piracy, see Stan J. Liebowitz, *File Sharing: Creative Destruction or Just Plain Destruction?*, 49 J.L. & ECON. 1 (2006), and Martin Peitz & Paul Waelbroeck, *The Effect of Internet Piracy on Music Sales: Cross-Section Evidence*, 1 REV. ECON. RES. ON COPYRIGHT ISSUES 71, 78 (2004).

[62] *See* Michael A. Einhorn, *Gorillas in Our Midst: Searching for King Kong in the Music Jungle*, 55 J. COPYRIGHT SOC'Y USA 145, 153 (2008) (observing that Apple sells its iTunes downloads at no profit in order to sell iPods); *A Catchy New Tune: After a Decade of Chaos, Has the Record Industry Finally Hit upon the Right Model?*, ECONOMIST, Oct. 4th–10th 2008, at 14 (observing that the delivery of music to complement the iPod and other portable devices offers an alternative to the traditional music business model based on the direct sale of recorded music); Dan Moren, *Apple Is Music Industry's Public Enemy No. 1*, MACWORLD, May 30, 2008, http://www.macworld.com/article/133694/2008/05/drmenemy.html (stating that record labels have lost their historical control over music distribution as Apple now dominates the market for online music downloads).

[63] *See* Einhorn, *supra* note 62, at 158 (noting that concert-promotion companies now occupy important positions in the music industry, with Live Nation being "the largest promoter of live concerts in the world" and "the second-largest entertainment and management company in the world"); *A Change of Tune: Faced with Shrinking Profits, Record Labels Are Touting a New Approach*, ECONOMIST, July 5, 2007, at 64, 64-65 (noting that concert revenues have been rising as CD sales, which increasingly serve primarily to advance performance revenues, have been falling); Ethan Smith, *Rock's New Republic*, WSJ., Winter 2008, at 76 (stating that Live Nation, the leading promoter of live concert performances, is seeking to take the place of record labels as the primary intermediary in the music industry, encompassing music, concert, and merchandise market segments).

"loss leader" to facilitate the sales of concert tickets and consumer-electronics devices. So long as incentive effects at the production and distribution levels are largely unchanged (which, to be sure, is still an open empirical question), the associated selection effects—whereby the record industry loses but the hardware and concert-promotion industries win—is a matter of social indifference from a distributive point of view.

III. WHY INTELLECTUAL PROPERTY MAY BE *INDIRECTLY* NONTRIVIAL (SOMETIMES)

The discussion above has yielded the following proposition: more or less intellectual property sometimes makes little difference in the total amount of innovation rents but great difference in the allocation of innovation rents among various participants in the market based on their relative costs of exploiting alternative appropriation instruments. This proposition nicely tracks two otherwise irreconcilable but well-established social facts: (i) there is little evidence that stronger or weaker intellectual property results in appreciably greater or lesser levels of innovation investment,[64] and (ii) firms and other participants devote substantial resources to influencing the levels of intellectual property protection made available by the state.[65] If intellectual property makes little difference on the margin as an incentive device, then result (i) is entirely anticipated; if intellectual property makes a sub-

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[64] *See supra* note 17 and accompanying text.

[65] Private-firm expenditures on influencing intellectual property legislation are large by any measure. For examples in copyright and patent, respectively, see WILLIAM M. LANDES & RICHARD A. POSNER, THE POLITICAL ECONOMY OF INTELLECTUAL PROPERTY LAW 16 (2004) [hereinafter LANDES & POSNER, POLITICAL ECONOMY] (citing data from the Center for Responsive Politics showing that in 1996, media interests donated $1.5 million to six of the sponsors of the Copyright Term Extension Act); Posting of Donald Zuhn to Patent Docs: Biotech & Pharma Patent Law & News Blog, Lobbying Spending Spree Continues, http://www.patentdocs.org/2008/05/lobbying-spendi.html (May 20, 2008) (reporting that Millennium Pharmaceuticals, Genentech, AstraZeneca, and Abbott Laboratories each spent between $1.28 million and $4.4 million on lobbying in 2007, most of which presumably addressed patent reform or related issues). Firms and industry associations exert influence at the judicial level by regularly filing amicus curiae briefs in leading litigations. *See* LANDES & POSNER, POLITICAL ECONOMY, *supra*, at 19; *see also* Brief of Business Software Alliance, Software and Information Industry Ass'n, Information Technology Industry Council, and Information Technology Ass'n of America as Amici Curiae in Support of Petitioners at 7, eBay, Inc. v. MercExchange, LLC, 547 U.S. 388 (2006) (No. 05-0130) (arguing against the Federal Circuit's automatic-injunction standard in patent infringement cases); Brief of Biotechnology Industry Organization as Amicus Curiae in Support of Respondent at 3, *eBay*, 547 U.S. 388 (arguing for the retention of the automatic-injunction standard).

stantial difference on the margin as a distributive device, then result (ii) is also entirely anticipated. If intellectual property sometimes operates principally as a distributive device for allocating innovation rents among market participants, then downward or upward adjustments in intellectual property can be reduced to simple politics: intellectual property outcomes mediated by the judicial and/or legislative processes are socially indifferent reflections of privately self-interested investments by firms and other participants to maximize their portions of the social pie generated by innovation investment.

Individual firms recognize that stronger or weaker intellectual property regimes reward or punish firms that have higher-cost or lower-cost access to certain alternative appropriation technologies and self-interestedly undertake lobbying actions to generate the level of intellectual property protection that maximizes the firm's competitive cost advantage or minimizes its competitive cost disadvantage. It is no accident that craft guilds opposed patent protection in the early modern era: this protection represented an appropriation instrument that would enable individual inventors to overcome the powerful appropriation-cost advantages of the established guild entities, protected by alternative instruments in the form of goodwill, know-how, and imperfect legal exclusivity over the employment of skilled labor and the sale of certain goods.[66] And it is no accident that record labels vigorously support copyright protection in our late modern era: this represents an appropriation instrument that enables them to overcome the appropriation-cost advantages of hardware manufacturers, concert promoters, and other holders of complementary assets, which (unlike record labels) can recoup returns from musical output even in the face of (or precisely due to) widespread piracy.

At this point, we could take the following view: as a positive matter, intellectual property *can* and often *does* make a difference by allocating innovation rents among market participants; however, as a normative matter, these selection effects are immaterial and therefore whether there is more or less intellectual property is a matter of indif-

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[66] *See* CHRISTINE MACLEOD, INVENTING THE INDUSTRIAL REVOLUTION: THE ENGLISH PATENT SYSTEM, 1660–1800, at 188 (1988) (noting that medieval guildsmen viewed patents as "an unfair obstruction to the course of their business"); Dominique Foray & Liliane Hilaire Perez, *The Economics of Open Technology: Collective Organisation and Individual Claims in the "Fabrique Lyonnaise" During the Old Regime*, *in* NEW FRONTIERS IN THE ECONOMICS OF INNOVATION AND NEW TECHNOLOGY 239, 243-44 (Cristiano Antonelli et al. eds., 2006) (discussing the eighteenth-century French silk trade, in which monopolies and secrecy were opposed and openness with technology was encouraged).

ference from a social point of view. But this indifference thesis must consider a final possibility that is not socially indifferent: namely, that the distributive outcomes generated by stronger or weaker levels of intellectual property may indirectly exert incentive effects with respect to the *direction* (or quality) of innovation investment, even if they exert no incentive effect with respect to the *rate* (or quantity) of innovation investment.[67] If that is the case, then changes in intellectual property protection cannot be reduced to simple politics and implicate a collective interest in maximizing the social value generated by innovation investment.

If intellectual property is not trivial with respect to incentive effects on the direction of innovation investment, then there must be some correlation between the types of firms—or, more generally, the forms of organization and other transactional structures—that are advantaged by stronger or weaker forms of intellectual property and certain types of innovation investment. Stronger levels of intellectual property coverage logically tend to favor small, relatively unintegrated firms by overcoming the "natural" appropriation-cost advantage enjoyed by large, relatively integrated firms, which have lower-cost access to alternative instruments. Conversely, weaker levels of intellectual property coverage logically tend to favor large firms by exacerbating their inherent appropriation-cost advantage over entrants that do not have access to the appropriation technologies inherent in an integrated form of firm organization. If intellectual property is abolished, then there are few tools available to an unintegrated firm by which to recover returns from innovation investment in the face of competition by incumbents that have unique access to alternative instruments, including global distribution networks, production efficiencies, and firm goodwill. Hence, even if intellectual property has little effect on the innovative output of the market in general (which will tend to recover innovation rents through some other mechanism), it may have a great effect on the transactional and organizational structures used to govern the production and distribution of intellectual goods, which in turn operates to the advantage of some firms and the disadvantage of all others.

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[67] For the original source of the distinction between the "rate" and "direction" of innovation investments, see Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Innovation, in* NAT'L BUREAU OF ECON. RESEARCH, THE RATE AND DIRECTION OF INVENTIVE ACTIVITY 609 (1962).

This proposition can be illustrated briefly by historical changes in firm organization in the semiconductor industry, which has experienced substantial changes in the enforcement of patents and other intellectual property entitlements.[68] During the several decades prior to and through the early 1980s, patent rights were generally weak: using this paper's terminology, the state set an exorbitant price to purchase units of coverage against third-party imitation. During this time, firms in the industry tended to operate under vertically integrated structures—that is, each firm independently maintained R&D, production, and distribution capacities—that constrained involuntary spillovers by limiting outside access to private knowledge at various points in the product development and supply chain. The high price of patent protection caused firms to exploit lower-cost appropriation technologies in order to capture innovation returns and indirectly raised entry barriers to any firm that could not access those alternative appropriation technologies at the same or comparable cost.

Starting in the early 1980s, however, patent protection was strengthened as a result of strong enforcement of patent rights by the Court of Appeals for the Federal Circuit, which in turn supported wider adoption and litigation of patent rights in the semiconductor industry in particular.[69] Using the terminology set forth above, the state effectively lowered the price at which firms could purchase units of coverage through patent protection, which logically enables the entry of firms that cannot access alternative appropriation technologies at a feasible cost and therefore rely primarily on intellectual property to defend innovation rents. That is precisely what happened.

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[68] This paragraph consolidates the more extended discussion of the semiconductor industry conducted in Barnett, *Property as Process*, *supra* note 60. *See also* David J. Teece, Peter Grindley & Edward Sherry, *Appendix A: The Semi-Conductor Industry*, *in* DAVID J. TEECE, MANAGING INTELLECTUAL CAPITAL 193 (2000) (investigating licensing and cross-licensing procedures in the electronics industries); Rosemarie Ham Ziedonis & Bronwyn H. Hall, *The Effects of Strengthening Patent Rights on Firms Engaged in Cumulative Innovation: Insights from the Semiconductor Industry*, *in* ENTREPRENEURIAL INPUTS AND OUTCOMES 133 (Gary D. Libecap ed., 2001) (examining the effects of the "pro-patent" shift of the 1980s on the semiconductor industry).

[69] In 1984, the industry successfully lobbied for the enactment of sui generis "mask work" design protections. *See* Semiconductor Chip Protection Act of 1984, 17 U.S.C. §§ 901–914 (2006). However, the statute has had little effect due to certain technological advances that frustrate replication based solely on reverse engineering of the layout design. *See* Leon Radomsky, *Sixteen Years After the Passage of the U.S. Semiconductor Chip Protection Act: Is International Protection Working?*, 15 BERKELEY TECH. L.J. 1049, 1051-52 (2000). Note that this is an example where private appropriation instruments surpass, and render moot, an *upward* adjustment in intellectual property protection.

Roughly as the coverage and strength of available intellectual property protections increased, the semiconductor market witnessed the rapid growth of "fabless" and other "design-only" firms that operate under weakly integrated structures that are largely restricted to developing patent-protected "chip designs," which are marketed as intermediate inputs to strongly integrated entities that develop "systems on a chip" for incorporation into fully assembled electronic devices. Supported by the background structure of intellectual property rights, these "design shops" can safely rely on contract to disclose and transfer patented assets and related know-how to other entities that undertake capital-intensive manufacturing and other functions farther down the supply chain.

Even if innovative output is largely invariant to the level of intellectual property protections, both firm organization and industry composition will vary considerably as a function of the strength of governing intellectual property entitlements: the state-determined price of maintaining coverage through intellectual property favors the use of certain transactional and organizational structures used to capture returns from innovation investments, which in turn rewards firms that can access those structures at the lowest cost and punishes all others. If so, then intellectual property is primarily a "second-order" regulatory device for influencing the organizational structures under which intellectual production takes place rather than a "first-order" regulatory device for directly inducing innovative output. As a positive proposition, that is a matter of great interest and demands further inquiry to understand its scope of application.[70] But, even if assumed

[70] Professors Arora and Merges pioneered this line of inquiry. *See* Ashish Arora & Robert P. Merges, *Specialized Supply Firms, Property Rights and Firm Boundaries*, 13 INDUS. & CORP. CHANGE 451 (2004) (showing that intellectual property rights can promote efficiency by influencing the location of technological innovation); Robert P. Merges, *A Transactional View of Property Rights*, 20 BERKELEY TECH. L.J. 1477 (2005) (describing how contract law and property rights are more effective when combined, thereby increasing certainty and flexibility and eliminating some of the limitations of each enforcement method); Robert P. Merges, *Intellectual Property and the Costs of Commercial Exchange: A Review Essay*, 93 MICH. L. REV. 1570 (1995) (book review) (noting that strong forms of intellectual property increase the viability of contract-based arrangements for licensing technical know-how). For additional discussion of this relationship, see the contribution by Oren Bar-Gill and Gideon Parchomovsky in this Symposium, *Law and the Boundaries of Technology-Intensive Firms*, 157 U. PA. L. REV. 1649 (2009). For relevant empirical studies, see Ashish Arora & Marco Ceccagnoli, *Patent Protection, Complementary Assets, and Firms' Incentives for Technology Licensing*, 52 MGMT. SCI. 293 (2006), Joanne E. Oxley, *Appropriability Hazards and Governance in Strategic Alliances: A Transaction Cost Approach*, 13 J.L. ECON. & ORG. 387 (1997), Joanne E. Oxley, *Institutional Environment and the Mechanisms of Governance: The Impact of Intellectual Property Pro-*

to be true over some meaningful range of circumstances, does this proposition have any relevance as a normative matter?

The differential survival rates of large and small firms—or, more precisely, integrated and nonintegrated organizational forms—under different levels of intellectual property protection are simply an industrial phenomenon that implicates no incentive effects, *unless* there is evidence to believe that small firms—or, more precisely and generally, weakly integrated entities—have unique innovation capacities at some stage of the innovation process in some economically meaningful settings. There is voluminous research on the topic, which, described conservatively, is less than determinative in the aggregate. A fair amount of this research, however, supports the view that small firms are most suited to undertake breakthrough research projects and are often the catalysts of novel technologies that trigger new innovation cycles.[71] There is especially compelling support for the innovative vigor of small firms in the biotechnology market, which, as noted in part earlier, historically has been driven by the research and development activities of "upstream" firms, which in turn license patent-protected innovations to large, vertically integrated "downstream" pharmaceutical firms.[72] Given the high stakes involved and lucrative opportunities for third-party expropriation, it is hard to imagine how these contractual arrangements among otherwise unrelated entities would be implemented rationally without secure property rights.

These limited findings (which correspond to widespread beliefs in the business world on the entrepreneurial virtues of start-ups and spin-offs[73]) may be a function of certain organizational features or a simple reflection of different competitive pressures: large firms tend to undertake low-risk, incremental innovation projects that preserve market share while small firms tend to undertake high-risk, radical in-

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tection on the Structure of Inter-Firm Alliances, 38 J. ECON. BEHAV. & ORG. 283 (1999), and Pisano, *supra* note 57.

[71] For some leading sources and reviews of the literature, see P.A. GEROSKI, MARKET DYNAMICS AND ENTRY (1991), and MORTON I. KAMIEN & NANCY L. SCHWARTZ, MARKET STRUCTURE AND INNOVATION (1982). For reviews of the literature for a legal audience, see Barnett, *Genetic Commons*, *supra* note 27, at 1025 n.106, and Barnett, *Private Protection*, *supra* note 18, at 1287-89.

[72] *See supra* note 28 and accompanying text.

[73] *See* NAT'L ACAD. OF ENG'G, RISK & INNOVATION: THE ROLE AND IMPORTANCE OF SMALL HIGH-TECH COMPANIES IN THE U.S. ECONOMY 9 (1995) (noting that small or rapidly growing high-tech companies receive considerable attention in the media, business community, and policy circles).

novation projects that seek to capture market share.[74] In markets where this connection between small firms and radical innovation investment has some empirical grounding, the distributive effects of weaker intellectual property protections—and the collateral effects on the economic viability of certain transactional structures—may indirectly have incentive effects on the *direction* of innovation projects that are pursued in the market. While appropriation capacities in general, and therefore innovative output in particular, may be roughly constant under stronger and weaker intellectual property regimes, thereby implying a complete indifference result, the distribution of innovation projects among incremental and radical projects may be substantially different, thereby implying a partial indifference result. In that case, IP matters—not only as a distributive instrument for allocating innovation rents, but, indirectly, as an incentive instrument for driving innovation investment by entities that are inherently best-suited to undertake the highest-risk research projects. Even if there is little to no change in output under a weak or strong intellectual property regime, the average distance of each "inventive step" (or to use some patent-law vocabulary, the average degree of nonobviousness) is likely to be smallest under a weak intellectual property regime and largest under a strong intellectual property regime. If that is the case (and we do not yet have sufficient information to make a robust determination), then more or less intellectual property certainly does matter at least some of the time in some markets, even if (or more precisely, *only if*) intellectual property is construed primarily in its traditional function as an incentive instrument.

CONCLUSION

Is intellectual property trivial? For participants in the heated debates over the socially desirable scope of intellectual property reform, this would appear to be a rhetorical question hardly worthy of consideration. But it is certainly *not* a rhetorical question in light of the am-

[74] The standard culprits for large-firm underperformance in R&D are informational asymmetries and agency costs, which lead large-firm managers to favor safe projects over risky projects even if the latter have a higher discounted present value. For arguments to this effect, see NAT'L ACAD. OF ENG'G, *supra* note 73, at 37-39, 48-51, and Bengt Holmström, *Agency Costs and Innovation*, *in* THE MARKETS FOR INNOVATION, OWNERSHIP AND CONTROL 131 (Richard H. Day et al. eds., 1993). Broader arguments additionally fault the hierarchical structure of large-firm organizations as stifling radical innovation. *E.g.*, David J. Teece, *Firm Organization, Industrial Structure, and Technological Innovation*, 31 J. ECON. BEHAV. & ORG. 193, 200-01, 212-13 (1996).

ple empirical evidence suggesting that, in most markets, greater or lesser levels of intellectual property protection may make little difference in regulating innovative output, coupled with abundant evidence documenting the wide panoply of alternative instruments by which to shield innovation returns. Hence, there is a sound basis for the oft-suggested view that a large swath of technological and cultural markets are likely to support robust levels of innovation investment with or without robust levels of intellectual property protection (provided that it is additionally observed that firms use *other* devices to regulate access).[75]

This positive observation would seem to support the normative position that intellectual property protections in most markets can be relaxed substantially with little effect on innovative output. The reasoning is simple: if firms can protect intellectual goods without intellectual property, then there would seem to be little, if any, social cost in substantially curtailing or even abolishing intellectual property altogether. To the contrary, there would necessarily be a social gain if innovative output were unaffected while the social costs of the intellectual property regime were eliminated. But that reasoning is too simple: it ignores the (nontrivial) possibility that the social costs of alternative cost-equivalent appropriation instruments, to which firms will necessarily migrate if intellectual property coverage is reduced, may exceed the social costs of any lapsed intellectual property instruments. That possibility is commonly ignored in the intellectual property context, where even economically informed commentators regularly advocate substantially limiting or withdrawing intellectual property protections because markets can and do use other instruments in order to extract sufficient innovation returns.[76]

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[75] This proviso is often dropped. For a fuller description of the extensive implications of this omission and a revised understanding of markets that apparently support intellectual production without intellectual property, see Barnett, *Sharing*, *supra* note 13.

[76] See MICHELE BOLDRIN & DAVID K. LEVINE, AGAINST INTELLECTUAL MONOPOLY (2008), which pursues this argument in detail in a book-length contribution that advocates the complete abolition of intellectual property. For other indicative examples, see LAWRENCE LESSIG, THE FUTURE OF IDEAS, *supra* note 10, at 12-14, which provides examples of musical creation, scientific research, and software development where innovators build freely on previous contributions and then argues that free access, rather than a market-based ownership system, is the presumptive regime that should govern informational goods, and Michael A. Carrier, *Cabining Intellectual Property Through a Property Paradigm*, 54 DUKE L.J. 1, 36-37 (2004), which questions the need for copyright given that "many forms of creative expression—such as fashions, new words and slogans, jokes and magic tricks, and the food industry—have flourished in the absence of protection."

This typical argument suffers from the blindness of a static analysis. It assumes that reductions in intellectual property coverage will inherently expand the public domain of freely accessible knowledge and thereby lower entry costs into the relevant market, albeit at the expense of reduced innovation gains. But normative analysis of intellectual property coverage must be dynamic (and complex) if it is to be realistic: that is, it must anticipate that any downward adjustment in intellectual property coverage will trigger a variety of possible market responses that may neutralize or even reverse the adjustment, resulting in (i) no net change in access costs, (ii) a net reduction in access costs, or (iii) in the most perverse case, even a net increase in access costs coupled with a reduction in innovation gains. Certainly, further theoretical work is required to identify more precisely the parameters under which changes in intellectual property protection are likely to yield net positive, negative, or neutral incentive/access effects. But even in the simplest and most benevolent scenario, where the market simply substitutes substantially cost-equivalent appropriation instruments for state-provided legal entitlements such that innovation incentives and access costs are held constant, there is a plausible case for a net social loss. This is because the private appropriation technologies that support this invariance result may be available at relatively lower cost to strongly integrated, large-firm organizations and relatively higher cost to weakly integrated, small-firm organizations. Hence, even if weaker or stronger levels of intellectual property protection have little effect on access costs and innovation gains, thereby resulting in substantially equivalent levels of innovative output, any relaxation of intellectual property rights may still result in a distributive loss insofar as the costs of making recourse to alternative instruments vary across firm types.

This discussion identifies one of the most salient questions for future policy analysis: do we care about distributive losses that transfer rents from some firms (usually smaller, weakly integrated entities) to other firms (usually larger, strongly integrated entities) as a function of different levels of intellectual property protection? This question might be rephrased even more simply as follows: do the distributive effects generated by adjustments in intellectual property coverage raise any efficiency implications?[77] Certainly some rent transfers are

[77] I leave open the precise definition of efficiency—whether it be the narrow definition of allocative efficiency, the broader definition of productive efficiency, or the even broader definition of innovative efficiency—for purposes of assessing the social costs of distributive losses attendant to rent transfers induced by adjustments in intel-

socially indifferent. For example, there is no obvious distributive ground for favoring record labels over hardware manufacturers or concert promoters in the music business, or vice versa. So the transfer of rents within the music business as a result of the erosion of copyright is a descriptive observation with no normative implications. But some rent transfers may raise the prospect of considerable social losses from an efficiency point of view, which may in turn identify a determinant policy response. In particular, if weak levels of intellectual property protection drive firms to shield legally unprotected spillovers by accumulating a broad set of complementary assets and competencies so as to achieve high levels of vertical and horizontal integration, then it will inherently escalate the minimum cost of entering the market, thereby limiting entry threats, enhancing incumbents' pricing power, and distorting incumbents' choices of organizational forms and transactional designs. And if there is ground to tie integrated forms of business organization and high levels of market concentration with depressed incentives to make certain types of innovation investments, then the distributive losses from weak intellectual property protection plausibly would yield substantial efficiency losses even if innovative output in general is largely unaffected.

The ultimate lesson for intellectual property policy can be stated most precisely as follows: It is difficult to anticipate the effects of adjustments in intellectual property coverage without undertaking a dynamic analysis that anticipates firms' different capacities to exploit alternative instruments, which may allow some firms to replicate or even exceed appropriation capacities provided by intellectual property entitlements. This analysis requires information as to three crucial factors: (i) the distribution of costs of coverage across intellectual property and alternative appropriation technologies; (ii) the distribution of the costs of alternative appropriation technologies across firm types; and, in some cases, (iii) the distribution of the units of coverage across alternative appropriation technologies. Simple correlations between more IP and more output and less access, or less IP and less output and more access, are useful for some analytical purposes in scholarly discussion and strategic purposes in political rhetoric. But, for purposes of practically oriented policy analysis, these correlations are often unsupported by empirical conditions on the ground and are

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lectual property coverage. For discussions of these various distinctions, see Joseph F. Brodley, *The Economic Goals of Antitrust: Efficiency, Consumer Welfare, and Technological Progress*, 62 N.Y.U. L. REV. 1020, 1032-33 (1987), and F.M. Scherer, *Antitrust, Efficiency, and Progress*, 62 N.Y.U. L. REV. 998, 998-1002 (1987).

therefore unlikely to provide a reliable framework by which to anticipate the complex and sometimes perverse effects of proposed changes in intellectual property coverage. Hence, the familiar "antimonopoly" tendency to favor relaxed intellectual property protections in order to free the commons can inadvertently advance concentrated market conditions where entrenched incumbents are protected by natural barriers to entry by "disruptive" small-firm competitors.

Serious thought should be given to whether the weak patent regime that prevailed in the United States from roughly the 1930s through the early 1980s supported conglomerate forms of industrial organization in industries that are often viewed as having suffered from low entry rates, limited price competition, and conservative tendencies of technological innovation. And serious thought should be given to whether the relatively strong patent regime that has prevailed since the early 1980s has supported the development in some of the most innovative technology sectors (most notably, biotechnology and semiconductors) of a variety of cooperative structures that exploit the differential competencies of largely unintegrated firms, including, in particular, smaller firms that have strong design competencies but lack manufacturing or distribution capacities. If there is a strong relationship between intellectual property protection and firms' choices of organizational forms and transactional structures, *and* if firms' choices of industrial organization or transactional structures in turn govern the direction of firms' innovation investments in a manner that is socially relevant, then the social costs of weak intellectual property protection would be great *even* in the otherwise neutral case where innovative output is largely insensitive to stronger or weaker levels of intellectual property protection. So intellectual property might very well matter, but by a circuitous route that cannot be anticipated by straightforward application of the standard incentives/access tradeoff.

Inquiry into these tantalizing questions holds the promise of a powerful intellectual marriage between the incentive framework that characterizes the intellectual property literature and the economizing framework that characterizes the transaction-cost-economics literature. If intellectual property plays a meaningful role as an incentive instrument, our best current understanding suggests that it can only do so if there is ground to believe that supporting innovation investment within weakly integrated forms of organization yields efficiency gains by bolstering those entities' unique competencies at certain stages in the innovation process. If there is evidence to support this

view (and, preliminarily, there is support in a number of important industries), then intellectual property *does* matter—as an incentive instrument that regulates firms' innovation behavior indirectly at the level of organizational and transactional design. If not, then it really *is* largely trivial, in which case it reduces to a socially indifferent distributive instrument for slicing up the economic pie created by innovation investments—a "merely" political question as to which any socially interested normative analysis may have little to add.