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Legal Studies Research Paper Series No. 2014-30

Ancillary Patent Markets and the Firm

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Ancillary Patent Markets and the Firm*

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Abstract

Intellectual property frequently carries with it exclusive rights not only over the primary subject matter of the rights granted, but also over ancillary subject matter that is not within the definition of the primary grant, as for example in the patent doctrine of contributory infringement. Previous scholars have explored the potential for intellectual property rights to affect the size and structure of firms by mitigating transaction costs both between firms and within firms. Here we extend that framework to consider the impact of ancillary rights, which we expect to have their own effects on a firm's "make or buy" decision. Ancillary rights may place an intellectual property holder in a position to license production of complementary products or components to other firms. In some instances the absence of ancillary rights may prompt firms to vertically integrate, in order to bring such transactions in house. We also anticipate that doctrines such as contributory infringement impact employee mobility out of firms holding patents. We anticipate that contributory infringement rights will tend to lower overall transaction costs, although this may vary with the circumstances in a particular industry.

* Copyright 2010-11. We are grateful to Stacey Dogan, Joe Liu, Kara Swanson, Mike Meurer, Jessica Silbey, and the participants in the Boston IP Colloquium; to Lydia Loren and participants in the 2012 Intellectual Property in the Trees Seminar; to Stefan Bechtold and participants in the Professorship in Intellectual Property workshop at ETH Zurich; to Alexander Peukert and participants in the graduate workshop on intellectual property at Goethe Universität, Frankfurt; as well as to Deitmar Harhoff and participants in the INNO-TEC graduate workshop at Ludwig Maximilians Universität, Munich, to participant at the 2013 University of Tilburg TILEC workshop on Innovation and the Patent System, as well as to an anonymous reviewer for their comments on previous versions of this work.

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I. Introduction

Over the past several decades, the work of economist Ronald Coase has had an enormous impact on our conception of law and our understanding of how it operates. Among the many influential ideas developed by Coase, one of the most influential has been his concept of the theory of the firm, a transactions cost analysis that illuminates and explains the size and structure of commercial businesses.¹ Coase's insight, and the work that has built upon it, has become a mainstay of corporate and business law analysis.

More recently, it has become the subject of discussion among intellectual property scholars, who have begun to use it as a tool to better understand the role of intellectual property (IP) in modern commercial firms. A number of scholars have suggested ways in which intellectual property may lower transaction costs, and so, all other factors being equal, alter the size or structure of modern firms.² In previous work we have added to that discussion by integrating analyses of the effects of intellectual property rights on both the internal and external transactions costs experienced by firms.³ We have argued that intellectual property rights simultaneously mediate the cost of both inter-firm and intra-firm transactions, which in turn affects the boundary between the firm and the market.⁴ We have discussed these effects with regard to the primary rights granted under patents, copyrights, trade secrets, and trademarks.⁵

In this paper we extend that analysis. Here we apply this framework to a recurring peculiarity found in intellectual property law: the incorporation within intellectual property protection of rights to items and activities that are not within the intellectual property grant proper. We adopt as our vehicle a particular doctrinal instance drawn from patent law. In patent law, the scope of the patent owner's rights is defined by the patent's claims⁶, and the law of patents generally asserts that inventions falling outside the claims are dedicated to the public unless covered by the claims of a different patent. Nonetheless, patent owners sometimes have under the law of *contributory infringement* the ability to control items that are clearly outside the patent claims.

We by no means intend to suggest that this rights structure is entirely unique to intellectual property. Physical property rights may carry with them associated ancillary rights that extend beyond the boundaries of the property, in order to ensure the use or enjoyment of the

¹ Ronald H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386 (1937).

² See, e.g., Jonathan Barnett, *Intellectual Property as a Law of Organization*, 84 *SO. CAL. L. REV.* 785 (2011); Oren Bar-Gill & Gideon Parchomovsky, *Law and the Boundaries of Technology-Intensive Firms*, 157 *U. PENN. L. REV.* 1649 (2009); Paul Heald, *A Transactions Cost Theory of Patent Law*, 66 *OHIO ST. L.J.* 473 (2005); Robert P. Merges, *A Transactional View of Property Rights* 20 *BERKELEY TECH. L.J.* 1477 (2005); Ashish Arora & Robert P. Merges, *Specialized Supply Firms, Property Rights, and Firm Boundaries*, 13 *IND. & CORP. CHANGE* 451 (2004); Dan L. Burk, *Intellectual Property and the Firm*, 71 *U. CHI. L. REV.* 3 (2004).

³ See Dan L. Burk & Brett A. McDonnell, *The Goldilocks Hypothesis: Balancing Intellectual Property Rights at the Boundary of the Firm*, 2006 *U. ILL. L. REV.* 275; see also Dan L. Burk & Brett A. McDonnell, *Patents, Tax Shelters, and the Firm*, 12 *VA. TAX REV.* 981 (2007).

⁴ See Burk & McDonnell, *The Goldilocks Hypothesis*, *supra* note 3.

⁵ *Id.*; Dan L. Burk & Brett H. McDonnell, *Trademarks and the Boundaries of the Firm*, 51 *WM. & MARY L. REV.* 345 (2009).

⁶ *Autogiro Co. of America v. United States*, 384 F.2d 391 (Ct. Cl 1967).

primary property grant. The boundaries of real property are, for example, typically defined by a deed that uses natural markers, survey data, or other empirical criteria to delineate the boundaries of the parcel of land. The holder of title typically controls the use and disposition of resources within the boundary line, and typically does not control activities or resources outside the property line. But sometimes the land owner's rights may go further; for example, the law of nuisance may prohibit activities on an adjacent plot that would generate noise or onto blow dust onto the parcel in question.⁷ In such instances, the law of real property effectively extends the rights of the owner of one parcel of real property into another parcel that he ostensibly does not own.

But in the case of intellectual property, ancillary rights may operate at a considerable distance, impacting entirely separate markets. Our interest here is to investigate how such ancillary rights in intellectual property might affect the size and structure of firms. As in our previous work, we will consider how the transaction costs both for interactions between firms, and for interactions within firms, might be changed by the provision of such rights. We recognize as we have previously, that firms are subject to a wide variety of influences, including a wide variety of legal influences that may change their transaction costs; intellectual property is by no means the only factor at work.⁸ The effects of ancillary rights in intellectual property may in many cases be overwhelmed by other cost factors. However, we believe that ancillary rights in many other cases may be at least a significant factor affecting the costs a firm will experience, and we offer an analysis of plausible outcomes from such cases.

II. Intellectual Property and the Firm

In order to consider the effects of ancillary intellectual property rights on the firm, we must first briefly sketch the role of intellectual property within the theory of the firm, which in turn requires that we review some basic concepts regarding the theory of the firm itself. Coase argued that firms exist as islands of conscious, hierarchical decisionmaking within a market milieu, and which reduce the transaction costs of productive activity and exchange.⁹ Although market competition may push productive activity toward efficient levels, the search, negotiation, and bargaining that are necessary to market transactions are themselves costly activities. Organizing activity deliberately within a firm creates its own costs of search, bargaining, and coordination, but at times direction of productive activity by a manager will prove to be less costly than continual bargaining. Even if such direction is does not always track market levels of efficient production, it may nonetheless achieve a local cost minimum by avoiding the transactions costs of marketplace activity.

This insight leads quickly to the corollary concept that the size and structure of firms will be a function of the differential between the costs of marketplace transactions and the costs of managerial direction. When deciding between producing a good itself, or procuring it in the

⁷ Reynolds Metals Co. v. Martin, 337 F.2d 780 (9th Cir. 1964); Bradley v. American Smelting and Refining Co. 709 P.2d 782 (Wash. 1985); Wilson v. Interlake Steel Co., 649 P.2d 922 (Cal. 1982).

⁸ See Dan L. Burk & Brett H. McDonnell, *Trademarks and the Boundaries of the Firm*, 51 WM. & MARY L. REV. 345, 394 (2009).

⁹ See Coase, *supra* note 1.

marketplace -- the so-called “make or buy” decision -- firms will consider the transaction costs of each option. When market transaction costs are relatively low, the firm will negotiate to outsource production. When market transaction costs are relatively high, the firm will bring production within the lower cost structure of the firm. If firms decide to produce the good themselves, they grow larger to accommodate the additional activity; when they outsource production, they will grow smaller.

The concept of transaction costs is broad and elastic (a polite term for vague). It includes the costs of identifying parties to a transaction, bargaining to reach an agreement, and enforcing the agreement reached. The literature on transaction costs is vast, but key structural elements which help define transaction costs include asymmetric information possessed by different parties, the difficulty of writing complete contracts in all but the simplest of situations, and the specificity of assets to particular uses and relationships. Markets and firms govern transactions in different ways, and create different sorts of opportunities for strategic interactions between the parties to those arrangements, thereby creating different kinds and levels of transaction costs. A transaction cost theory of the firm posits that the boundaries of firms adjust to minimize the total transaction costs required to engage in the transactions needed to produce a related set of goods and services. Note that a focus on transaction costs oversimplifies. Broad and elastic though the concept may be, it does not include all types of costs. The boundaries of firms may affect other types of costs as well, including production costs, i.e. the direct costs involved in transforming inputs into outputs. A more general theory of the firm would consider how firm boundaries affect all types of costs. However, following Coase, much of the best and most influential theory of the firm has focused on minimizing transaction costs.¹⁰ We follow that transaction cost approach, which still has much to teach us in understanding the relationship between law and the structure of firms.

A second corollary concept involves the role of law in lowering transaction costs. In particular, many commentators have recognized that property rights are a key component to lowering transaction costs between firms in the marketplace. Transactions can be structured around contracts that lower the uncertainty of an exchange, and that can penalize strategic behavior. But contracts are necessarily incomplete, and cannot cover all possible contingencies.¹¹ Indeed, some commentators have shown that there may be strong incentives for business partners to attempt to hold one another up, seeking extra concessions outside the original contract once the other party has committed resources to a project and those resources have become difficult to redeploy.¹² Property rights help to define who has the right to control and redeploy resources when deals go sour and contracts fail to specify how the resources are to

¹⁰ For an overview, see Oliver Williamson’s Nobel Prize lecture: Oliver E. Williamson, *Transaction Cost Economics: The Natural Progression*, 100 *Amer. Econ. Rev.* 673 (2010).

¹¹ Oliver D. Hart, *Incomplete Contracts and the Theory of the Firm*, in *THE NATURE OF THE FIRM: ORIGINS, EVOLUTION, AND DEVELOPMENT* 138, 141 (Oliver E. Williamson & Sidney G. Winter eds., 1991).

¹² Oliver Hart & John Moore, *Incomplete Contracts and Renegotiation*, 56 *ECONOMETRICA* 755 (1988); Oliver Hart & John Moore, *Property Rights and the Nature of the Firm*, 98 *J. POL. ECON.* 119 (1990); Aaron S. Edlin & Stefan Reichelstein, *Hold-ups, Standard Breach Remedies, and Optimal Investment*, 36 *AM. ECON. REV.* 478, 478 (1996); see also Lloyd Cohen, *Holdouts and Free Riders*, 20 *J. LEGAL STUD.* 351, 362 (1991) (describing the “hold-out” problem).

be allocated.¹³ Firms that can rely on residual property rights will be more willing to enter alliances with one another, knowing that they are protected by property rules in the event of a contract failure. Thus, one view of the firm is as a repository of residual property rights that determine the allocation of resources in the absence of some contractual allocation.

Of course, incomplete contracts and strategic behavior may raise transaction costs within firms as well. Employees may shirk their duties, or take advantage of the employer, especially at opportunities that may have been overlooked or unforeseen when their employment contracts were negotiated.¹⁴ Property rights may serve as a default to fill such gaps in the terms of employment. Employee contracts might not include clauses that specifically constrain employees from pilfering office supplies, or from use the company photocopier for personal matters, but property rights dictate the proper disposition of such resources. Property law in such instances dovetails with corporate and employment law principles of fiduciary duty that require employees to use the firm's resources for the firm's purposes.¹⁵ Property rights help delineate which resources belong to the firm, and so which resources are subject to such duties.

More recently, scholars have increasingly recognized that the conception of the firm as a repository of residual property rights encompasses not only to tangible property, but intellectual property as well.¹⁶ Many of the most valuable and critical assets of modern firms fall into the category of intangible or informational assets: goodwill, know-how, customer lists, business plans, industrial processes, product innovations, software, and so on. Such assets are legally secured by intellectual property regimes under the law of patents, copyrights, trademarks, and trade secrets. Consequently, several scholars have suggested that intellectual property may be important to lowering the transactions costs between firms in the market place.¹⁷ Proprietary information, once revealed in the course of negotiations, is easily misappropriated by a potential business partner.¹⁸ Contractual restrictions on such strategic behavior will always be incomplete, as contracts can never anticipate every contingency. In the absence of some property right, firms may be reluctant to disclose or license their intangible assets. Intellectual property regimes such as patent and copyright law may be crucial to deterring strategic misappropriation, and so encouraging more transactions.

A related but distinct line of scholarship has also suggested that intellectual property rights will often serve to lower transaction costs within a firm. Paul Heald has argued that patents will facilitate team production, by reducing the costs of monitoring and tracking employee work to prevent employees from shirking their duties.¹⁹ Intellectual property also

¹³ See OLIVER D. HART, FIRMS, CONTRACTS, AND FINANCIAL STRUCTURE 30 (1995); Oliver Hart & John Moore, *Property Rights and the Nature of the Firm*, 98 J. POL. ECON. 1119 (1990).

¹⁴ Armen A. Alchian & Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 AM. ECON. REV. 777 (1972); Michael C. Jensen & William H. Meckling, *The Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure*, 3 J. FIN. ECON. 305 (1976).

¹⁵ See Burk & McDonnell, *The Goldilocks Hypothesis*, *supra* note 3 at 597.

¹⁶ See Burk, *supra* note 2; Merges, *supra* note 2; Arora & Merges, *supra* note 2.

¹⁷ See Arora & Merges, *supra* note 2; Bar-Gill & Parchomovsky, *supra* note 2; Barnett, *supra* note 2.

¹⁸ See Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in THE RATE AND DIRECTION OF INVENTIVE ACTIVITY 609 (Nat'l Bureau of Econ. Research ed., 1962).

¹⁹ See Heald, *supra* note 2 at 492; see also Anthony J. Casey, *Mind Control: Firms and the Production of Ideas*, 35 SEATTLE U.L. REV. (2012) (advocating a team production approach to intellectual property analysis).

helps to demarcate firm assets that may be difficult to distinguish from employee assets. Regimes of trade secrecy, copyright work made for hire, and patent assignment will tend to clarify firm ownership of intangible assets, and help separate employee's general human capital from firm specific capital.²⁰ This may promote employee mobility by distinguishing ideas and know-how that may be ported to a new employer from that which should remain with a previous employer. Both employees and potential new employers can be less apprehensive about inadvertent misappropriation of intangible goods.

But because the boundary of the firm is determined at least in part by the differential between internal and external transaction costs, the cumulative effect of intellectual property across both sets of costs must be considered in assessing the effects of intellectual property on the firm.²¹ The changes in transaction costs induced within the firm by intellectual property may be either augmented or offset by concomitant changes in transaction costs between firms. The optimal intellectual property regime for firms will be the one that minimizes the combination of transaction costs between firms and transaction costs within the firm.²² Such minimization will move the firm toward optimal size; optimizing costs in only one dimension may result in firms that are inefficiently large or inefficiently small.

Additionally, we have argued that an intellectual property regime which is too strong may be as detrimental to the size and structure of firms as an intellectual property regime that is too weak.²³ An anemic internal intellectual property regime may allow employees to divert or misappropriate the firm's intellectual assets, but an overly stringent intellectual property regime within the firm may hamper employee creativity and productivity, driving the most valuable employees away. Similarly, an anemic external intellectual property regime exposes the firm to strategic behavior by its business partners, but an overly stringent external intellectual property regime hampers production by complicating license negotiations and restricting the firm's freedom to operate. Thus, intellectual property is not an unmitigated benefit to the firm; there can be too much of a good thing.

III. Ancillary IP Markets

Analyses of IP and the firm have to date focused on what we might term the primary or core grant of intellectual property. In various forms of intellectual property, rights inhere in a particularly defined juridical artifact. In patent law, this is the invention as defined by the patent's claims. But patent law also routinely grants exclusive rights that are not within the definition of the core or primary grant of the intellectual property.²⁴ A typical instance is found in the rights associated with contributory infringement. These ancillary or related rights differ from the primary right because they are not necessarily associated with the defined artifact to which core rights attach. Often such right will be designated as a type of "indirect

²⁰ See Burk & McDonnell, *The Goldilocks Hypothesis*, *supra* note 3 at 633.

²¹ *Id.* at 622.

²² *Id.*

²³ See Burk & McDonnell, *The Goldilocks Hypothesis*, *supra* note 3 at 618.

²⁴ See A. Samuel Oddi, *Contributory Copyright Infringement: The Tort and Technological Tensions*, 64 NOTRE DAME L. REV. 47, 52-53 (1989).

infringement.” Such ancillary rights confer exclusivity in a different market than that of the core intellectual property grant.

A useful way to think about the primary and ancillary rights in intellectual property is to adopt a market based view, a definitional approach familiar from areas such as antitrust law.²⁵ Primary or core intellectual property grants tend to apply horizontally across a market or across closely overlapping markets for duplicate or similar goods.²⁶ Generally the markets in question may be defined in terms of substitutability; goods compete in the same market when one good is wholly or largely a substitute for the other.²⁷ Exact copies of a copyrighted work, patented device, or protected mark are clear market substitutes. Similar copies or variations of these may also be substitutes, which is why intellectual property rights in a given work, device, or mark typically extend to close variants.

In this article we are concerned with rights, often attached to the core right, that tend to apply non-horizontally – that is, across markets for dissimilar goods that are not substitutes for one another.²⁸ In many cases such ancillary rights will apply to complementary goods that will experience price and demand variations in parallel with the goods covered by the primary grant.²⁹ In some cases, these will be vertical inputs to the production of the artifact embodying of the core intellectual property; in other cases they will be complementary products for use with the product embodying the intellectual property.

We recognize that these divisions between vertically and horizontally oriented rights are typical, not universal, and not pristine. For example, it is entirely possible that in some instances, patent claims may encompass embodiments of an invention with applications in different markets. But in such cases, each of the embodiments, within its own market, is quite distinct from and not a substitute for a contributorily infringing device.³⁰ The core property right, even when it stretches across multiple markets, remains distinct from an ancillary right that is not contemplated in the claims.

A. Contributory Infringement Doctrine

²⁵ Although this approach has come under increasingly critical scrutiny. See, e.g., Louis Kaplow, *Why (Ever) Define Markets?*, 124 HARV. L. REV. 437 (2010). Lemley and McKenna have recently noted that a strict treatment of intellectual property under this approach would not be compatible with, nor probably workable alongside the actual functioning of intellectual property law. See Mark A. Lemley & Mark P. McKenna, *Is Pepsi Really a Substitute for Coke? Market Definition in Antitrust and IP*, 100 GEO. L.J. 2055 (2012). See also Herbert J. Hovenkamp, *Markets in IP and Antitrust*, 100 GEO. L.J. 2133 (2012) (noting that market definitions have different functions in intellectual property and antitrust law). However, since we are not concerned here with cabinining the proper scope of market power, the traditional definitional approach remains useful for our purposes.

²⁶ See CHRISTOPH WOLF, *VERTIKALE KONTROLLE DURCH IMMATERIALGÜTERRECHTE* (2009) (distinguishing horizontal and vertical IP relationships); see also H. HOVENKAMP et al., *IP & ANTITRUST*, VOL I § 20.3 (2011) (distinguishing horizontal from vertical competition).

²⁷ See ROBERT S. PINDYCK & DANIEL L. RUBINFELD, *MICROECONOMICS* 29 (2d ed. 1992)

²⁸ See WOLF, *supra* note 38.

²⁹ PINDYCK & RUBINFELD, *supra* note 28 at 101; see also HOVENKAMP et al, *supra* note 27 at 20-20 (noting that complementary are primarily vertical in nature).

³⁰ See *infra* notes 52 - 55 and accompanying text.

Perhaps the clearest example of such ancillary goods is found in American patent law's contributory infringement doctrine.³¹ Patented inventions are defined by written claims that attempt to describe the subject of the patent by setting forth the component parts of the invention and their relationship to one another.³² Among other doctrinal uses, the claims are employed to determine patent infringement. The text of the claims is compared to the accused device;³³ every element of the textual claims must be found in the accused device, in the claimed relationships, to reach a finding of infringement.³⁴ A different set of components in the same relationships, or the same components in a different relationship, would not be described by the literal language of the claims, and so would not infringe the patent, as they would constitute a different device or process than that in the patent. Only if a device or process constituting all the elements of the claims is made, used, sold, offered for sale, or imported without authorization³⁵, has infringement occurred.

This stricture of patent law provides the opportunity for mischief on the part of potential infringers. By selling components of a patented invention that are in a different relationship than that specified by the claims – for example, by selling the components disassembled – the seller avoids infringing the formal language of the patent.³⁶ Selling components is not making, using, selling, offering for sale, or importing the claimed invention, because the individual components are not in the relationship required under the patent claims: they may be a collection of parts to the claimed invention, but they are not the claimed invention. The invention only comes into existence when the components are placed in the relationship required by the claims – perhaps when assembled by a purchaser of the components. A purchaser who assembles the components becomes the infringer, “making” the claimed invention, but the seller of the components has not made or sold the invention.

Congress has responded to this potential loophole by making such preparatory activity an infringement of the patent – an indirect rather than a direct infringement.³⁷ The statute recognizes that a vendor can potentially aid and abet patent infringement without directly infringing the patent holder's exclusive rights, and such activity is penalized. The making, using, selling, offering, or importation of the claimed invention by someone further down the stream of commerce triggers contributory liability on the part of the upstream vendor who enabled the patent infringement. Direct infringement by one party triggers contributory liability of another.

But this creates a serious potential problem: every hardware store, electronics shop, or similar vendor of parts routinely sells components that can, and perhaps are, used to infringe patents. Patented inventions may well be comprised of stock components that are commonly available. Many “dual use” items may have infringing uses as well as perfectly legitimate, innocent uses. The vendor may have no way of knowing to what use a piece of hardware will be put. It would be counterproductive to impose liability for contributory infringement on any merchant selling stock items that were eventually misused by a purchaser – the liability of the

³¹ See 35 U.S.C. § 271 (c) (2008).

³² *Id.* at § 112.

³³ *Autogiro Co. of America v. United States*, 384 F.2d 391 (Ct. Cl. 1967).

³⁴ *Id.*

³⁵ 35 U.S.C. § 271(a) (2008).

³⁶ *Dawson v. Rohm & Haas*, 448 U.S. 176, 188 (1980).

³⁷ *Id.* at §271 (c).

vendor would depend on the use to which the purchaser put the item. Vendors would be put to the burden of attempting to determine the use to which an item was to be put, or eliminating from their stock myriad standard “dual use” items. Legitimate sales of common, useful items would be deterred for fear that they might be diverted to infringing uses.

The statute solves this dilemma by differentiating between “dual use” items that might have both infringing and non-infringing uses, and those that clearly have only infringing uses. The former class of items is referred to as “staple articles of commerce”; the latter is designated as items that are “specially made or adapted” for use with a patented invention.³⁸ Selling “staple articles of commerce” is not considered contributory infringement, even if such items are eventually put to an infringing use. The vendor is not tasked with determining how common or standard components will be used. But selling components that are specially made or adapted to be used with the patented invention, without the authorization of the patent holder, constitutes contributory infringement.³⁹ Since such items have essentially no use other than to infringe, the vendor knows or should know that they are likely to be used for infringement.

The net effect of this provision is that the patent holder accrues exclusive rights not only over the claimed invention described in the patent, but over any article specially made or adapted for use with the claimed invention, even though those items are not the subject of the patent.⁴⁰ The articles that could trigger contributory infringement liability are not vetted by the Patent Office for patentability; they may be obvious or anticipated or otherwise fail the statutory and constitutional requirements for a patent. They are not patented but they are nonetheless effectively covered by the patent: the patent owner can exclude others from dealing in such items. This of course implies that the patent owner can also *authorize* others to deal in such items. In order to make this extension of the patent right perfectly clear, Congress has explicitly provided in the statute that patent holders may manufacture such items, or license or refuse to license the rights to such specially made items.⁴¹

B. Doctrinal Limitations

This extension of the patent holder’s rights beyond the patent can lead to somewhat counterintuitive results. The limiting case for the contributory infringement right is likely found in the Supreme Court’s decision in *Dawson v. Rohm & Haas*.⁴² The plaintiff in *Dawson* held a patent on a method of weed control, consisting of application of the chemical propanil as an herbicide.⁴³ Propanil could only be used as an herbicide as provided under the patent; it had no other known use.⁴⁴ A patent on propanil itself had previously been challenged in court and judged invalid because the chemical was found obvious in light of the prior art.⁴⁵ Thus, the substance lay in the public domain, unpatented, unpatentable, and theoretically freely available for production and distribution by any chemical manufacturer.

³⁸ 35 U.S.C. § 271(c) (2008)

³⁹ *Id.*

⁴⁰ 448 U.S. at 214.

⁴¹ *See* 35 U.S.C. § 271 (d) (2008).

⁴² 448 U.S. 176 (1980).

⁴³ *Id.* at 182

⁴⁴ *Id.* at 199.

⁴⁵ *Id.* at 182.

The defendant in the case had begun to manufacture and distribute propanil, and was sued by the patent holder for contributory infringement, on the theory that the substance was clearly specially made or adapted for use with the plaintiff's process patent -- the chemical had no use except for application as an herbicide as claimed in the process patent.⁴⁶ The defendant argued that the substance it produced was unpatented and unpatentable, and that the plaintiff's product patent could not be used to prevent manufacture of a substance clearly in the public domain.⁴⁷ But the Supreme Court held that the process patent could lawfully be used in exactly that manner, to assert a contributory infringement claim to prevent unauthorized manufacture of a substance with no substantial non-infringing use.⁴⁸ Thus, the process patent effectively encompassed the production and distribution of a chemical not covered by the patent, and which indeed could not be covered by *any* patent.

Much of the Court's discussion in *Dawson* concerned the use of the 271(c) ancillary right in "tied" licenses. The patent owner's exclusive rights in specially made or adapted components can be asserted independently to allow or disallow production of such components. However, it has often been used as the basis for bundled licenses, which conditions licensing or purchase of a patented invention on license or purchase of the components associated with the contributory infringement right. Tying of a patented item to an unpatented item, even one specially made or adapted for use with the patented item, was long viewed with suspicion.⁴⁹ This disfavor arose from a general animus in the early Twentieth Century against patents as constituting monopolies, and against tying as an anticompetitive attempt to extend the monopoly. Courts frequently found the bundling of such goods to constitute patent misuse, that is, an illegal attempt to leverage the exclusive rights of the patent beyond the intent of the patent grant.⁵⁰ Sometimes assertions of contributory infringement other than tying were also held to constitute misuse.

Frequent judicial invalidation of licenses for bundled goods led to complaints to Congress by patent owners, and so to the enactment of the statutory provisions explicitly approving the manufacture, licensing, and enforcement of exclusive rights related to specially made or adapted articles.⁵¹ Additionally, tying of patented and unpatented items was statutorily defined to constitute misuse only if the patent holder had market power in the patented item.⁵² This is essentially the antitrust standard for tying, although the statute does not explicitly equate misuse with an antitrust violation.⁵³ Antitrust violations involving a patent are by definition also misuse of a patent, but the statute seems to suggest the converse proposition: that, at least for tying arrangements, misuse is defined by the standard of an antitrust violation. On its face, the statutory language is potentially somewhat broader than this; it is certainly possible to possess

⁴⁶ *Id.* at 185-86.

⁴⁷ Specifically, the defendants argued that the patent holder's refusal to license its process to anyone except the purchasers of its own propanil was constituted patent misuse. *Id.* at 187. For discussion of misuse, see *infra* notes 52 - 55 and accompanying text.

⁴⁸ 448 U.S. at 223.

⁴⁹ Kenneth J. Burchfiel, *Patent Misuse and Antitrust Reform: Blessed Be The Tie*, 4 HARV. J.L. & TECH. 1 (1991).

⁵⁰ *Id.*

⁵¹ 35 U.S.C. § 271(d)

⁵² *Id.* at § 271(d)(5).

⁵³ See Tom Arnold & Louis Riley, *Contributory Infringement and Patent Misuse: The Enactment of § 271 and Its Subsequent Amendments*, 76 J. PAT. & TRADEMARK OFF. SOC'Y 357, 365 (1994).

market power without committing an antitrust violation, so that the class of possible misuses can be broader than the class of antitrust tying violations. But close identification of misuse with anticompetitive activity by the judiciary has largely relegated patent misuse to an uneasy existence as a sub-species of competition law.⁵⁴

IV. Ancillary IP and Transaction Costs

Ancillary rights such as those found in contributory infringement tend to arise in contexts that seem primarily directed toward accommodating enforcement of the primary rights: the ancillary right often seems intended to deter clever infringers from “aiding and abetting” the direct infringement of the primary right.⁵⁵ This strategy implicitly recognizes that enforcement of an intellectual property right is itself a costly activity, requiring an investment of resources to detect and deter infringement.⁵⁶ Direct infringement may be highly diffuse, occurring among myriad end users, perhaps in private or secluded settings. Ancillary rights may simplify the rights holder’s job of detecting and policing the primary right, by focusing on activity upstream from the direct infringement, where perpetrators may be fewer and easier to locate.

Without dismissing this as a possible justification for contributory infringement, we expect that such rights will change the transaction cost profile for firms holding patents, and so – intentionally or not – may impact the size and structure of firms. Consequently we turn to consideration of how deployment of ancillary rights may either increase or ameliorate transaction costs experienced by firms. As in previous work, we examine effects on both inter-firm and intra-firm costs, starting with the former.

A. Inter-firm Costs

Our previous papers examining the transactions costs effects of primary allocations of intellectual property suggested that, although having some such rights will facilitate bargaining, property rights are not an unmixed blessing. At some point the ubiquity and scope of intellectual property could serve to increase transaction costs between firms, through the formation of an “anti-commons”⁵⁷ or similar rights “thickets”⁵⁸ that impede a firm’s ability to locate and negotiate with all the necessary parties. We expect that the benefits of ancillary rights will similarly be subject to diminishing returns; indeed, the danger may be greater in the case of ancillary rights. Since ancillary rights lie outside the established boundaries of a primary intellectual property grant, and potentially encompass multiple items of differing subject matter, their potential for creating a stifling thicket of rights may be particularly high.

⁵⁴ See John Barton, *Patents and Antitrust: A Rethinking in Light of Patent Breadth and Sequential Innovation*, 65 ANTITRUST L.J. 449, 449 (1997).

⁵⁵ See Mark Bartholomew & Patrick McArdle, *Causing Infringement*, 64 VAND. L. REV. 675, 695 (2011).

⁵⁶ See Douglas Lichtman & William Landes, *Indirect Liability for Copyright Infringement: An Economic Perspective*, 16 HARV. J.L. & TECH. 395, 397 (2003).

⁵⁷ MICHAEL HELLER, *THE GRIDLOCK ECONOMY* (2008).

⁵⁸ Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting* in INNOVATION POLICY AND THE ECONOMY 119 (Adam Jaffe, Josh Lerner & Scott Stern eds., 2001).

In a related vein, we note that the effects of ancillary rights, especially those involving complementary goods, will be most noticeable in relatively pristine negotiations, where the interests of multiple parties do not produce coordination or hold-out costs. Such situations may be found in actual settings where the owner of a primary right, such as a patent, dominates an industry, or where producer interests are coordinated through an industry association. For example, the need for developing and promulgating technical standards often facilitates such associations.

It should be apparent that such conditions, where negotiations can be relatively simple, are also conditions that will be a matter of concern under antitrust and related competition law. We have already noted above the usefulness of adopting a view of ancillary rights drawn from the antitrust view of vertical and horizontal market complementarity. While our focus here is on intellectual property rather than antitrust, certain aspects of antitrust analysis, particularly analysis of tying arrangements, are important to the discussion of ancillary rights. For example, we think it significant that, in patent law, overreaching assertions of contributory infringement were long constrained by patent misuse doctrine, which bears pronounced characteristics of competition law.⁵⁹ Congressional judgment that misuse itself was being applied too liberally led to statutory curtailment of the doctrine⁶⁰, but tying arrangements involving the contributory infringement right in patents remains limited by a market power standard drawn from antitrust.⁶¹ Antitrust analysis is pertinent in determining what forms of tying might be efficient and permissible for other forms of intellectual property as well. Thus, antitrust metrics help to identify those situations where ancillary rights may alter a firm's "make or buy" decisions.

Tying complements

Much of the antitrust competition analysis of ancillary rights has focused on the practice of tying or conditioning licenses for patents or other intellectual property on acceptance of an accompanying license to articles falling under the ancillary right. Exclusive licensing of complements, or suits to curtail unauthorized production of complements, have historically been viewed as a bid by the producer of a primary good to illegitimately extend the economic leverage of a patent into adjacent markets.⁶²

Neo-classical economic analysts have more recently asserted that in general such tying is relatively innocuous.⁶³ These commentators have argued that there is only a single rent that can be extracted for a given product; the buyer has a certain willingness to pay and no more. The rent extracted from the buyer might be divided in any number of ways; in the case of tying, it might be divided between the tying product and the tied product; the tying product might be priced at any amount from zero up to the full willingness to pay, and the tied product might be priced at any complementary amount from zero up the full willingness to pay. But in any event

⁵⁹ Robert P. Merges, *Reflections on Current Legislation Affecting Patent Misuse*, 70 J. PAT. & TRADEMARK OFF. SOC'Y 793 (1988).

⁶⁰ See *supra* notes 52 - 55 and accompanying text.

⁶¹ Richard Calkins, *Patent Law: The Impact of the 1988 Patent Misuse Reform Act and the Noerr-Pennington Doctrine on Misuse Defense and Antitrust Counterclaims*, 38 DRAKE L. REV. 197 (1988-89).

⁶² Lewis Kaplow, *Extension of Monopoly Through Leverage*, 85 COLUM. L. REV. 515 (1985); Donald F. Turner, *Legal Restrictions on Exploitation of the Patent Monopoly: An Economic Analysis*, 76 YALE L.J. 267 (1966).

⁶³ Ward Bowman, *Tying Arrangements and the Leverage Problem*, 67 YALE L.J. 19 (1957).

the buyer's willingness to pay for the package remains the same, no matter how the prices in the package are allocated. On this view, tying cannot extract any greater payment than could be extracted in the absence of tying.

Tying arrangements have instead been argued to constitute beneficial licensing mechanisms to allow metering and price discrimination.⁶⁴ Drawing an example from the famous, perhaps infamous, protracted IBM antitrust litigation, a seller or licensor of a mainframe computer system might occasion the license on an exclusive agreement for the licensee to purchase punch cards from the computer vendor.⁶⁵ Punch cards were used in earlier computer systems as a means of encoding data or programs; information would be physically read by the computer hardware from holes in the card. Punch card usage thus provided a metric for monitoring equipment usage; the more punch cards that were being used, the more data that was being processed by the licensee. Licensees who used more punch cards were using the licensed equipment more, presumably valued it more, and could be charged a higher price, either directly as a payment for the computer system, or indirectly by means of punch card sales.

On this view of price discrimination, tying certain complementary products, or certain inputs, to a patent license in order to facilitate monitoring may in some cases facilitate optimal firm size. Firms downsize and outsource when market conditions are favorable. Uncertainty over price, and protracted strategic posturing over licensing terms, can contribute to the costs of market transactions, inhibiting outsourcing. Negotiations in the marketplace may be hampered by uncertainty over a licensee's valuation of the license; licensees may even strategically attempt to obscure their actual valuation. Conversely, better pricing information would lower the cost of licensing, potentially decreasing firm size. Firms would be better able to outsource productive activity if they are better able to gauge the correct price or royalty stream for a product. Tying products together in order to facilitate monitoring may make the value of a license to a licensee more transparent, or at least allows the licensor to defer the valuation problem to the future, where it will be revealed by the licensee's behavior.

However, tying ancillary goods for monitoring purposes may be a complex factor in determining firm size. Price discrimination allows firms to increase their revenue, by identifying the willingness to pay of different groups of customers, and extracting the maximum price from that group, rather than taking an average price from all groups.⁶⁶ This increased revenue, in turn, may facilitate the addition of more in-house production capacity. Firms may grow inefficiently in response to revenue increases, wastefully building in-house capacity when overall welfare would benefit from more outsourcing. Thus, in some cases, it may be that price discrimination affects firm size ambiguously, or even detrimentally.

Quality control

⁶⁴ *Id.* at 24; Alan J. Meese, *Tying Meets the New Institutional Economics: Farewell to the Chimera of Forcing*, 146 U. PA. L. REV. 1, 59-66 (1997).

⁶⁵ *IBM Corp. v. United States*, 298 U.S. 131 (1936).

⁶⁶ See PINDYCK & RUBINFELD, *supra* note 28 at 372; see also Michael J. Meurer, *Price Discrimination, Personal Use and Piracy: Copy right Protection of Digital Works*, 45 BUFF. L. REV. 845 (1997) (describing price discrimination in copyright).

Antitrust analysis of tying has suggested additional compelling and legitimate reasons for the producers of primary goods to wish to control the provision of complementary goods. In particular, the producer of the primary good may wish to ensure that the complementary goods meet certain quality standards.⁶⁷ Substandard complements may in some cases cause poor operation or failure of the primary good, and if such malfunctions become associated with the primary good, the reputation of the primary good producer may be impaired. At a minimum, the primary good producer may expend resources dealing with customer support and complaints over malfunctions. The best way to avoid such difficulties may be to closely oversee and control the production of complementary goods – possibly through licensing, or possibly through direct production by the primary producer. Either option requires eliminating other unsupervised sources of the complements from the market.

Of course firms might instead publish or provide to other firms specifications for complementary devices, but this strategy may be unavailing in a variety of situations.⁶⁸ First, a number of commentators have noted that certain types of knowledge may be “sticky,” which is to say difficult to transfer or codify for publication.⁶⁹ This type of knowledge tends to remain tacit, that is, carried by persons as skills or in personal memory.⁷⁰ If the production of complementary products is dependent on this type of knowledge, provision of specifications may be incomplete, leading to sub-optimal complements. Here the “specially made or adapted” criterion for contributory infringement becomes important. If a component is specially made or adapted for use with the patented device, then there is a much higher likelihood that the patent owner possesses information, perhaps tacit, or “sticky,” or proprietary, regarding the proper specification of that component. There is far less reason to believe this is the case for staple articles of commerce that have dual or even multiple uses, which could be known or divined by multiple producers.

Second, even if firms are able to fully codify the specifications of complementary products, they may be reluctant to do so due to issues of trade secrecy.⁷¹ Proper provision of complementary products may require access to proprietary information, either regarding the complementary product or regarding the primary product itself. Open publication of the standards would in this instance be either incomplete, or would require disclosure, and so loss, of the information’s proprietary status. In order to maintain the status of the trade secrets, confidentially licensed disclosure would be required. While it is certainly possible to pursue this alternative, successful trade secret licensing tends to be a highly cumbersome process, with potentially adverse effects on the size and structure of the licensing firm, as we have discussed at some length in previous work.⁷²

⁶⁷ Herbert Hovenkamp, *Harvard, Chicago, and Transaction Cost Economics in Antitrust Analysis*, 55 ANTITRUST BULL. 613 (2010).

⁶⁸ Herbert Hovenkamp, *Tying Arrangements and Lawful Alternatives: Transaction Cost Considerations*, <http://ssrn.com/abstract=1763386>,

⁶⁹ See Eric Von Hippel, “*Sticky Information*” and the Locus of Problem Solving: Implications for Innovation, 40 MANAGEMENT SCI. 429 (1994).

⁷⁰ Dan L. Burk, *The Role of Patent Law in Knowledge Codification*, 23 BERKELEY L.J. 1009 (2008).

⁷¹ See Hovenkamp, *supra* note 67.

⁷² Burk & McDonnell, *The Goldilocks Hypothesis*, *supra* note 3 at 608-09.

Third, and perhaps most significantly, even if provided with full specifications for the complementary products, unsupervised third party providers may be tempted to scrimp on the quality, support, or maintenance of complementary products. This type of curtailment can most likely be expected where the failure or defect in the complementary product will tend to reflect on, or be attributed to the primary product. Third-party producers have no particular investment in the reputation or viability of the primary product's producer, and may in effect free-ride off the primary producer by shifting the costs of diminished quality, while accruing the savings from substandard production.

The problem of low quality complements may be exacerbated in situations where the cost of the failure does not fall on the purchaser of the goods.⁷³ If failures or incompatibility caused by low-quality complements can be blamed on the primary product, or the cost of failure may be borne by the primary producer due to warranty, leasing, or policies to maintain customer satisfaction, then the purchaser may either have little incentive to search for high quality complements. Or, depending on the comparative cost and inconvenience of the failure, the end user may actually have some incentive to procure low-cost complements. When the cost of replacement or repair can be shifted to the primary good producer, low-cost complements may be attractive even if they may prove sub-optimal or substandard, and third-party producers will of course be eager to supply them.

Primary producers may sometimes have the ability to contractually ameliorate such problems, for example by providing that the warranty is voided if unauthorized complements are used in conjunction with the product, or specifying that complements must be procured from particular sources – typically, either those supervised by the primary producer, or from the primary producer itself. These types of requirements may be the subject of anti-trust tying scrutiny.⁷⁴ Without delving at length into the detailed standards for such review, it is enough to note for our current analysis that there has in the past been considerable hostility to such arrangements, particularly in the patent context, although they now receive relatively charitable treatment.⁷⁵ In the case of patent contributory infringement, the ability to tie the primary product to complementary products has received the statutory imprimatur of Congressional approval⁷⁶, but tying in general has become subject to a rule of reason analysis that would accept a showing of plausible grounds for tying.

Even under circumstances lending themselves to favorable anti-trust scrutiny, the problem of incompleteness may frustrate contractual solutions. Ancillary rights may provide an important default component in ameliorating such perverse incentives, either to ensure that high quality complements are available in compliance with the warranty, or to control the availability and quality of complements where a warranty or explicit contract is not part of the primary product purchase transaction. The potential for quality control afforded by ancillary rights may encourage firms to license out production of complements; firms may be smaller and complements may be produced by specialized firms.

⁷³ See Hovenkamp, *supra* note 67.

⁷⁴ See HOVENKAMP et al, *supra* note 27 at § 21.1.

⁷⁵ See Burchfiel, *supra* note 63.

⁷⁶ See 35 U.S.C. § 271(d)(4).

In the absence of an ancillary right – and assuming favorable anti-trust circumstances that would allow bundling of product and complement⁷⁷ – firms facing quality control problems might be forced to combat the quality control incentives outlined above by centralizing production of complements in-house, under direct supervision. Complementary products could be produced to specification without difficult knowledge transfer, cumbersome licensing, or disclosure of trade secrets. However, to do so firms might be building in-house production capacity when that capacity were better licensed out.

Scienter effects

The statutory definition of contributory infringement limits the doctrine to purveyors of technologies lacking a substantial non-infringing use. The Supreme Court has added an additional legal requirement that serves to buffer such actors from liability. According to the Supreme Court, the statute must be read to require not simply a product specially adapted for use with the patented invention, but also a degree of knowledge regarding the patent, and of the potential of the complementary product to infringe.⁷⁸ Given that the doctrine applies only to products that have no substantial use *other* than use with the patented item, awareness of the patent seems likely in most cases. But knowledge of infringement creates a higher barrier; some end users may be authorized to use the product⁷⁹, in which case no direct infringement will occur and so no contributory infringement can occur either.

The Supreme Court's standard requires some knowledge as to which end users will be direct infringers and which will not in order for contributory infringement to attach. Thus, firms that intend to produce specially adapted products would seem to have an incentive not to find out about the infringement status of their customers. In some cases, firms may be able to defer the awareness necessary to trigger contributory liability until the time that they receive a cease and desist letter from the patent owner.

Jonathan Masur has pointed out the strategic choice that this aspect of the doctrine has on a firm's options regarding project-specific investments.⁸⁰ In some situations, firms producing complementary products may have little incentive to identify circumstances of potential contributory infringement, depending on the specificity of production assets. If the firm gains the necessary knowledge of the patent by means of an infringement notice from the patent holder, they will be in a poor bargaining position; any investment placed into project specific production capacity will be at risk of an injunction. If the investment in specific assets is relatively low, or if the assets can be converted to another, non-infringing use, then the producer may choose to invest relatively little in determining its freedom to operate. It may be rational to produce the complement unless and until served with the notice that would create knowledge of contributory infringement, then convert the assets to a different use.

⁷⁷ Hovenkamp has demonstrated that under current antitrust standards, the quality control circumstances discussed here will tend to justify tying. *See* Hovenkamp, *supra* note 67.

⁷⁸ *See* A. Samuel Oddi, *Contributory Infringement/Patent Misuse: Metaphysics and Metamorphosis*, 44 U. PITT. L. REV. 73, 77 (1982).

⁷⁹ For example, as famously held by the Supreme Court, some owners of the claimed invention may have either an implied or explicit license to use specially made components to repair their embodiment of the device. *Aro Mfg. Co. v. Convertible Top Co.*, 377 U.S.176 (1964).

⁸⁰ Jonathan Masur, *Patent Liability Rules as Search Rules*, 78 U. CHI L. REV. 187 (2011)

In a similar vein, Langinier and Marcoul have developed a formal model suggesting that formation of networks of suppliers may be deterred due to the contributory infringement rule.⁸¹ Contributory liability depends on some level of knowledge⁸², so depending on the suppliers' level of knowledge, contributory liability may be triggered once direct infringement on the part of the producer is shown. In the face of such potential contributory liability, contractual relationships will form between a producer and suppliers only when the suppliers' expected returns exceed the likely cost of infringement damages.⁸³ Suppliers will avoid contractual relationships that might expose them to excessive indirect liability.⁸⁴ The implications of this model are striking. Although our primary focus has been application of the theory of the firm to intellectual property *owners*, this model suggests – perhaps not surprisingly -- that the provision of intellectual property rights affects not only the size and structure of rights holding firms, but of competing or supplying firms that are potential infringers. In particular, one social cost of the contributory infringement rule may be to prevent potential infringers from outsourcing some productive activity – pushing them instead toward integration and development of internal capacity.

B. Intra-firm Costs

Our analytic framework relates the relative magnitude of transaction costs across the boundary of the firm, considering the effects of intellectual property on both inter-firm and intra-firm transactions.⁸⁵ Having reviewed some likely effects of ancillary rights on external transaction costs, we now turn to considering effects on internal transaction costs, particularly the effects regarding employees. We expect that ancillary rights may have a significant effect on the incentives and deterrents to employee departure.

Here again, as in our discussion of inter-firm transaction costs, trade secrecy provides an important backdrop. Employee departure from the firm is one of the fundamental concerns of trade secrecy, which serves as a bulwark against employees leaving the firm with valuable proprietary knowledge, perhaps taking it to a competitor or using it to found a new firm. But under some circumstances, it may be advantageous to a firm to have a departing employee develop a spin-out company that supplies the needed input, or a complementary good. The departing employee knows the structure, processes, and culture of the parent firm. A former employee, familiar with the methods and internal operations of the firm, is likely in the best position to create a new firm that can supply the needs of the firm. No one is better equipped to develop and supply inputs that will meet the firm's needs, not only technically, but organizationally and socially. Firm managers will be aware of these potential synergies, and may encourage entrepreneurial employees to develop spin-outs. Such employees might leave with the firm's blessing, indeed, on occasion with the firm's financial or technical backing.

⁸¹ Corinne Langinier & Philippe Marcoul, *Contributory Infringement Rule and Patents*, 70 J. ECON. BEHAVIOR & ORG. 296(2008).

⁸² See *supra* note 77 and accompanying text.

⁸³ *Id.*

⁸⁴ Langinier & Marcoul, *supra* note 80.

⁸⁵ See Burk & McDonnell, *The Goldilocks Hypothesis*, *supra* note 3.

From the standpoint of the parent firm, this strategy combines certain advantages of in-house production with the advantages of outsourcing production. Rather than having to monitor the employee against shirking, allowing the knowledgeable employee to found a spin-out encourages her best efforts via the “high powered incentives” inherent in smaller firms.⁸⁶ The fortunes of the departing entrepreneur are closely tied to those of the new firm, in all likelihood more so than to they were to those of the firm she is departing, and this alignment of interests will tend to promote full engagement. The old firm may also be able to offload other costs of the start-up, such as capital and infrastructure financing, that it would have to undertake itself if the new firm’s production capability were developed in-house.

At the same time, the departure of the knowledgeable employee is a two-edged sword. Placing the employee outside the monitoring and disciplinary mechanisms of the firm creates some savings, but also entails potential costs. The interests of the new entrepreneur may be strongly aligned with those of the new firm, but are not necessarily continually aligned with those of the old firm. The newly independent entrepreneur may be in a better position to behave strategically. Among other considerations, he is certainly in a position to divert firm-specific assets intended for the new venture to other purposes, perhaps supplying the input to competitors or developing other products altogether.

The firm can to some extent adopt corporate structures to maintain control over the spin-out, for example, by incorporating it as a spin-off subsidiary. But tying the new firm too closely to the managerial control of the old firm may dampen the “high powered incentives” that could inspire the new entrepreneur.⁸⁷ Alternatively, the firm might, of course, attempt to forestall defection by means of contract. Certainly the procurement agreement with the new supplier may say something about the uses to which insider information may be put. Likely the departing employee’s personal employment contract says something conditioning the subsequent use of confidential information obtained while working at the firm. But such agreements are not always enforceable, either as a legal or a practical matter. And, since, as we have outlined above, contracts are inevitably incomplete, they will not cover every contingency that may emerge.⁸⁸

Similar limitations may impede the firm’s ability to restrict the activity of former employees via non-competition agreements. Some jurisdictions, such as California, famously refuse to enforce such agreements at all.⁸⁹ The law in jurisdictions where such agreements are enforced varies, but hampering a departing employee from her livelihood is always a concern. Frequently the standard for enforcement hinges on whether the restrictions are “reasonable” in duration, geographic scope, and subject matter.⁹⁰ Non-competition agreements that are too broad in any of these dimensions may be invalidated. A non-competition agreement that prohibits an employee from directly competing with the former employer may be considered reasonable, but an agreement that prohibits a former employee from working anywhere in an industry – for

⁸⁶ See Sanford J. Grossman & Oliver D. Hart, *The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration*, 94 J. POL. ECON. 691, 716 (1986).

⁸⁷ See *id.*

⁸⁸ See Timothy J. Muris, *Opportunistic Behavior and the Law of Contracts*, 65 MINN. L.REV. 521 (1981).

⁸⁹ See CAL. BUS. & PROF. CODE § 16600 (West 2010).

⁹⁰ See RESTATEMENT (SECOND) OF CONTRACT § 188 (1981).

example, from working in the production of inputs or products complementary to those of the former employer – may be less likely to be upheld.

Instead, maintaining some residual property right in the new firm’s product may better serve to deter strategic behavior and prevent diversion of the old firm’s intellectual capital into unrelated projects. Ancillary rights will often give the original firm exactly such residual rights allowing them to exercise a degree of control over inputs or complementary goods produced by departing employees. By promoting specialized spin-outs, such rights may facilitate the development of not only the spin-out firms, but also smaller and more entrepreneurial parent firms.

Ancillary rights may also have similar effects in the case of unsanctioned employee departures. In many cases employees may have “insider information” on the newest and most valuable products being developed by the firm. Ancillary rights may help to curtail strategic use of such employee knowledge, particularly where employee obligations are unclear. In the United States, the default rule has been that an employee hired to work on a particular project is required to assign inventions related to the project to the employer.⁹¹ Employees hired for general research or development may be required to assign the invention depending upon factors that include the use of the employer’s resources and the relationship to the employer’s line of business.⁹² Employees not hired for research or invention may have no responsibility to assign the invention. Significantly, courts have tended to look to the actual activity and duties assigned to the employee after beginning work, rather than to representations made either before or at the time of hiring, to determine which of these categories applies in a given case.⁹³

Ancillary rights such as the contributory infringement rule may provide a property default where such common law duties or contract fail to define the terms for assignment. As one of us has suggested elsewhere, the employer has relatively little information about the new employee at the point of hiring, and may not be in the best position to anticipate how the employee’s time and talent may best be allocated within the firm.⁹⁴ This may result in placement of inventive employees in positions where the inventions do not accrue to the firm. Employees who become familiar with the nature and characteristics of the firm’s products may depart with valuable information about the development of complements. However, ancillary rights related to inventions held by the firm may allow control over complementary goods developed by employees, even in the absence of a right to assign.

But why impose such prohibitions on employee activity? Perhaps the best rationale for allowing such impediments may be a Kitchian coordination story, by which ancillary market control prevents the “tragedy” of duplicative or wasteful racing to exploit markets adjacent to the claimed invention.⁹⁵ The pre-allocation of the markets forestalls a race to colonize markets for specially made or adapted complements. On this theory, placing monolithic control of the mark in the hands of a single owner allows orderly exploitation of the primary market by

⁹¹ *United States v. Dublier Condenser Corp.*, 289 U.S.178 (1933).

⁹² *Id.*; *U.S. Colloid Mills v. Meyers*, 6 F.Supp. 283 (1934).

⁹³ 8 CHISUM ON PATENTS §22.03

⁹⁴ See Dan L. Burk, *Intellectual Property and the Firm*, 71 U. CHI. L. REV. 3, 17 (2004).

⁹⁵ See Edmund Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265 (1977).

synchronizing adjacent markets. Employees holding “insider” knowledge are the most likely candidates to launch a complement race.

Nonetheless, reserving ancillary markets to the patent owner is not an unmixed blessing from the standpoint of social welfare.⁹⁶ As in the case of insider securities trading, the prohibition on employee activity comes at a price, possibly a very high price. Established firms may be ponderously slow to respond to emerging market demands. Employees familiar with the characteristics of a forthcoming invention may be in the best position to benefit consumers in new markets; entrepreneurial opportunities outside the established firm might best harness the “high powered incentives” that would make new complements a reality. We suspect that the balance between social benefits and costs will be different in different market sectors, but it seems likely that in at least some cases, the benefits of coordination may be outweighed by the costs of lost entrepreneurship.

At the same time, in the absence of a contributory infringement default rule, the next best alternative for a firm to capture the value of complementary goods developed from “insider” information is via contract, deploying a panoply of assignment provisions, trailer clauses, and noncompetition agreements. These can be extremely off-putting to the creative employee, and may hamper firm growth by deterring desirable hiring. The contributory infringement rule may serve to ensure firms have a stake in complements with the clearest relationship to their patented inventions, without burdening hiring with excessive contractual negotiation costs.

V. Conclusion

Our discussion of ancillary rights in this paper has been largely descriptive rather than proscriptive, in part because determining the efficiency effects of such rights is a tricky business. As should be apparent from the foregoing discussion, do not expect that a nuanced analysis of ancillary rights will easily allow them to be labelled a “good thing” or a “bad thing.” They appear to be a good thing in certain instances, and a bad thing in other instances. Consequently we conclude with a summary of the trade-offs and effects to be taken into account in assessing the overall efficiency and welfare effects of ancillary rights in a given instance.

First, the expected effects sometimes point in different directions, as we have pointed out in the case of price discrimination.⁹⁷ In general, scholars have tended to believe that outsourcing productive activities, leading to smaller dis-integrated firms, tends to be efficient; smaller firms are expected to be nimbler, more innovative, and more entrepreneurial. To the extent that ancillary patent rights secure residual rights that might be captured by contract, encouraging firms to outsource specially made or adapted components rather than integrating their production, these rights may promote efficient firm sizing. Similarly, to the extent that ancillary

⁹⁶ Cf Lemley & McKenna, *Owning Mark(et)s*, *supra* note 26 (questioning the utility of extending trademark owner control into ancillary markets).

⁹⁷ See *supra* note 65 and accompanying text.

rights encourage the type of employee spin-outs that we have described, these rights may tend to promote smaller and more innovative firms.

However, we have also pointed out above that ancillary rights may curtail some employee departures and some employee entrepreneurship. This effect may discourage employees from joining a firm where they know their future opportunities may be restricted, preventing the firm from growing to its optimal size. At the same time, lack of spin-out or other component suppliers may force the firm to integrate production of specially made or adapted components, pushing it toward becoming inefficiently large.

It is unclear which of these trends will dominate firm sizing, but we expect this will vary according to the innovation profiles of different industries.⁹⁸ Thus, in an industry where monitoring of licensed outsourcing is relatively and transparent, and transfer of technical information is relatively simple, the spin-out deterrent imposed by ancillary rights may exceed their its benefits. Such idiosyncratic effects militate in favor of a flexible ancillary rights regime rather than a uniform regime. Although exploration of such doctrinal accommodations is well beyond the scope of this paper, we note that legal oversight often does and should incorporate “policy levers” that can modulate the scope of the ancillary right – for example, the ability that we have described above for courts under section 271(d) of the American patent statute to take into account certain anti-competitive effects of rights related to contributory infringement.⁹⁹

Additionally, our analysis here has drawn on previous explanations for the provision of ancillary rights. Most of these justifications mirror various rationales advanced to justify core intellectual property rights, and so are subject to the same objections and caveats that bedevil the parallel arguments applied to rights in the core work: in general, the trade-off between the positive incentive effects of exclusive rights and the negative effects of restricted access to valuable innovation. The literature on these issues is substantial and growing, although we have not plumbed it here.¹⁰⁰ While we are sympathetic to concerns expressed regarding the current breadth of various ancillary IP rights, we have taken their existence as given, to explore how, regardless of their justifications, control over ancillary markets has important implications for the structuring of firms – ancillary rights may contribute to the integration or disintegration of firms, to their efficiency or inefficiency. And those implications may themselves offer justifications and concerns for the provision of rights in markets ancillary to core intellectual property.

Finally, we note that some industries rely primarily on intellectual property rights other than patents. In this paper we have focused on an example of ancillary rights within the patent system, but such ancillary rights appear in many parts of intellectual property law, not only the patent doctrine of contributory infringement, but copyright’s parallel doctrine of contributory infringement, copyright’s doctrine of derivative works, and trademark’s law of dilution. As we have begun to demonstrate here, such ancillary rights can also be expected to have implications similar to those we have discussed for the size and structure of firms that hold intellectual property.

⁹⁸ See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 79 VA. L. REV. 1575 (2003) (describing the innovation profiles of different industries).

⁹⁹ See *supra* notes 50-53 and accompanying text.

¹⁰⁰ See, e.g. Lemley & McKenna, *supra* note 26.