Competition Policy and Intellectual Property: Insights from Developed Country Experience

Faculty Research Working Paper Series

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February 2014
RWP14-013

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Feburary 2014 Revision

To encourage technological innovation and the international transfer of technology on a harmonized basis, the Agreement Establishing the World Trade Organization (WTO), adopted at Marrakesh in April 1994, included a TRIPS agreement (i.e., agreement on the trade-related aspects of intellectual property rights). TRIPS contains rules on how nations should protect, utilize, and enforce intellectual property rights (IPRs) and articulates measures to prevent the abuse of IPRs. Before TRIPS was negotiated, some WTO members already had active policies to combat IPR abuses, among other things, under their patent and competition policy laws. For most newly developing nations, however, the TRIPS abuse provisions necessitate policy innovations, including the development of criteria to identify actionable abuses and to formulate appropriate remedies. As a guide to nations that must evolve their own policies and practices *de novo*, this paper reviews the history of abuse mitigation measures implemented by jurisdictions with the most extensive relevant experience and supplements those insights with an analysis of policies adopted in particularly patent-sensitive fields of technology.

Background

TRIPS recognized that harmonized and strengthened intellectual property rights -- e.g., patents, trademarks, copyright, trade secrecy rules, and similar legal provisions -- could be abused as well as performing their economically laudatory functions. It therefore stipulated in Article 8.2 that appropriate measures, otherwise consistent with the broader agreement, could be taken to prevent the abuse of IPRs through practices by rights holders that restrain trade or adversely affect the international transfer of technology. Our focus here is competition law, although abuses might also occur in other substantive areas of relevant law.

More specifically, TRIPS recognized in Article 40.1 that some competition-restraining IPR licensing practices or conditions might have an adverse effect on trade or impede the transfer of new technology. TRIPS therefore permits in Article 40.2 participating governments to take measures to prevent or control abuses, provided that the measures are otherwise consistent with the TRIPS agreement. However, there was an early difference of opinion among TRIPS negotiators. Developing countries preferred administratively convenient *per se* rules like the 14 rules recognized in the defunct UNCTAD draft Code of Conduct for the Transfer of Technology. Actions inconsistent with the rules were presumed to constitute abuse. Developed nations tended to prefer a so-called "rule of reason" approach, where abuse was inferred on a case-by-case basis following appropriate documentation and analysis of monopolistic

effects. In the end, the TRIPS agreement was adopted with ambiguous language, allowing WTO members to specify in their national laws, and take measures to prevent or control, licensing practices or conditions that might in particular cases be deemed an abuse of IPRs with an adverse effect on competition in relevant markets.

Article 31 of the TRIPS agreement permits national authorities to issue mandatory licenses -- also called compulsory licenses -- permitting the domestic use of relevant IPRs by parties other than the original rights holder. Article 31(b) authorizes such licensing, subject to judicial review, for non-commercial governmental uses, in national emergencies, and when bargaining stalemates impede the implementation of economically significant technological advances. In addition, Article 31(k) allows compulsory licensing without satisfaction of those conditions in order to remedy practices determined through judicial or administrative processes to be anti-competitive, i.e., those addressed in Article 40. WTO members are left free to flesh out the details for such licensing, or other abuse remedies, in their national laws and practices.

Again, this paper seeks clues from competition policies adopted by developed countries in the past as to how developing nations might implement the authority granted them in Articles 40 and 31 of TRIPS.

Differing IPR Environments

It must be recognized preliminarily that the conditions under which intellectual property rights are exercised in developing countries often differ from those found in the more developed nations. In particular, one might expect differences in the sources of technical innovations and hence whether the patents or other rights applicable in a particular jurisdiction are of local origin or whether they originated elsewhere. We therefore begin by investigating the mix of resident vs. non-resident patents, and how it varies with the level of economic development and other relevant variables. To explore this question, we compiled a data base on patent applications for the year 2011, drawn from surveys by the World Intellectual Property Organisation.[1] It was linked to data on individual nations' population and gross domestic product per capita, drawn from the Pocket World in Figures 2013 edition published by The Economist newspaper. Links were established for 58 nations, ranging in population from Estonia to China and in GDP per capita from Bangladesh and Kenya (tied) to Singapore. Plainly, not all nations were covered, and the least-developed nations were under-represented. But the sample does cover a wide range of national conditions.

For the 57 nations on which 2011 patent applications were broken down between domestic residents and non-residents, residents filed on average 53.6 percent of total applications. However, there was a wide range, from 2.1 percent for Venezuela to 97.9 percent for Greece. Among the 15 sample nations with the lowest GDP per capita, resident applications averaged 21.6 percent -- significantly lower than the all-nation

1 . The source is www.wipo.int/ipstats/en/wipi/figures.html.

mean. Evidently, less-developed nations receive on average a disproportionately a high fraction of their patent applications from abroad -- e.g., from multinational enterprises.

For more insight into patterns, a multiple regression analysis was conducted, with either total patent applications TOTPAT or the percentage of domestic resident patent applications to the total PCTDOM as dependent variables. The explanatory variables were population POP (in millions), GDP per capita GDPCAP,[2] and a dummy variable RES with a value of 1 for nations with a high fraction of exports in the form of natural resources (e.g.., minerals and raw agricultural products) and 0 otherwise. With PCTDOM as dependent variable and t-ratios in subscripted parentheses, the regression is:

(1) PCTDOM = 56.96 + .38 GDPCAP - 11.47 Log POP - 31.6 RES;
(3.76) (2.60) (1.64) (2.82)

R^2 = 0.334.

Local inventors contribute a significantly higher share of home-jurisdiction patent applications in nations with higher GDP per capita and a smaller share in natural resource-intensive jurisdictions. There is a weak tendency for the locally originated share to be smaller in larger nations -- which are presumably more attractive targets for foreign multi-national corporations. With total patent applications (in logarithms) as the variable to be explained, the regression is:

(2) Log TOTPAT = 0.91 + 1.227 log POP + 0.018 GDPCAP + 0.07 RES;
(4.05) (11.84) (8.05) (0.41)

R^2 = 0.738

Not surprisingly, total patent applications exhibit a strong positive association with national population. The coefficient 1.227 can be interpreted as an elasticity. Since it is significantly greater than unity, it reveals that patenting rises more than proportionately with population. Nations with higher GDP per capita also draw significantly more patent applications, taking population into account too. The natural resources variable is statistically insignificant.[3]

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2 . The Pocket World in Figures indexes this variable relative to a U.S.A. value of 1.0.

3 . A parallel analysis focused on the OECD compilation of so-called "triadic" patents, i.e., those issued within three jurisdictions -- the European Union, Japan, and the United States, but originating in 37 diverse nations. See OECD, Compendium of Patent Statistics (2008). These data are of course quite different from those analyzed above, focusing on applications filed within 57 different national jurisdictions. The results in an analysis of the origins of the "triadic" patents were similar to those in text equation (2). The origin nations filed significantly more triadic patents, the larger their home population, the higher their gross domestic product per capita, and the lower their dependence on natural resource exports was. More detailed results are

Presumably, nations will enforce their competition policies mainly with respect to the use or abuse of patents issued within their home jurisdictions. For lower-income (i.e., developing) nations, this implies a possible asymmetry of litigating power (i.e., the ability to hire top-notch legal counsel and technical consultants). To compensate for that differential, developing nations may be well advised to emphasize relatively clear and simple, i.e., *per se*, rules and downplay complex rule of reason proceedings.

Exceptions may of course exist. An example known to the authors was a Taiwan proceeding with respect to Intel's U.S. microprocessor patents.[4] When Intel's rival Advanced Micro Devices (AMD) regained momentum following a delayed transition to 32-bit microprocessors, its initial strength was in processors using less electric power than Intel's offerings. This in turn permitted longer batter life -- an important advantage for laptop computer purchasers. Given this advantage, AMD chips were chosen to drive most of the laptop computers assembled in Taiwan -- at the time, the world's leading laptop computer source. By virtue of an early IBM sourcing decision and then a dispute arbitration, AMD had full licenses to Intel's microprocessor patents. But Intel attempted to block the importation of AMD-driven laptops into the United States by claiming that when the ultimate buyers of AMD chip-driven laptops invoked certain data processing operations, they (i.e., the U.S. purchasers) violated Intel's U.S. patents. The Taiwan Fair Trade Commission intervened in 1994. Although no formal decision record is retained by us, we know that Intel's attempts to block such imports were abandoned. The probable logic of the case was that by attempting to extend its patent rights to control purchasers one or more steps downstream from the first transaction between AMD and Taiwanese computer assemblers, Intel violated the internationally honored exhaustion of rights doctrine.[5] In earlier U.S. cases, domestic attempts by a dominant firm to enforce exhausted patent rights were viewed as an abuse of monopoly power.

Early Precedents: The U.S. Experience

Before the TRIPS agreement was accomplished, by far the most active program of abuse control through competition policy institutions existed in the United States. It is more accurate, however, to characterize U.S. experience in terms of four long cycles in its history as a nation. In the early decades of its existence, the United States strove inter alia to build its manufacturing capabilities, which had been suppressed during British colonial rule.[6] As one component of that strategy, non-residents were not

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available on request.

4 . Co-author Scherer testified on behalf of AMD before the Taiwan Fair Trade Commission in March 1994. Unfortunately, no documents from that case remain in our possession, nor were we able to find records of the TFTC's actions through an internet search.

5 . See e.g. Jayashree Watal, Intellectual Property Rights in the WTO and Developing Countries (Kluwer: 2001), pp. 294-295. Jayashree, check me on this. I couldn't find anything on exhaustion in the Robert Merges' patent law textbook.

6 . In this, it was implementing policies advocated in Alexander Hamilton's 1791 Report on

allowed to receive U.S. invention patents until 1836, and between 1836 and 1861, they had to pay higher patent registration fees than U.S. residents.[7] There followed a long period in which intellectual property (IP) holders, domestic and foreign, were allowed substantial leeway in the exercise of their government-granted rights as long as they conformed to the relevant U.S. patent laws. Beginning in the late 1930s and continuing into the 1970s, however, U.S. competition policy agencies and the courts adopted a much tougher line toward the permissible boundaries of patent utilization for both domestic and foreign patent holders. A second reversal occurred during the 1980s with shifts toward more conservative Federal government administrations and judicial appointments.

To illustrate the limits of what competition policies have sought to achieve, we focus in this section mainly on enforcement between the 1930s and 1970s, describing in a later section the subsequent reversion but noting the seeds of reversion in earlier cases. The great depression of the 1930s precipitated soul-searching about the relationships between government and business, crystallized in extensive investigations undertaken by the so-called Temporary National Economic Committee (TNEC).[8] Among other things, it was believed that business firms might be retarding emergence from the economic slump through patent-based cartel price-raising activities and the suppression of inventions.

One consequence was the initiation of numerous law suits alleging violation of the U.S. antitrust (i.e., competition policy) laws. New legal precedents were articulated, and more than 100 enforcement actions led between 1941 and January 1959 to the issuance of compulsory patent (and sometimes know-how) licensing decrees.[9] The number of patents licensed under these decrees has been estimated at between 40,000 and 50,000, or approximately 7.5 percent of all patents in force in any given year during that period. To differentiate the U.S. experience from that which smaller, less-developed nations are likely to face, it is important to recognize that among the 107 decrees tabulated in a definitive U.S. Senate report, only six were directed expressly toward foreign, as opposed to U.S.-resident, corporations, with two additional cases (involving foreign corporations' U.S. subsidiaries) counting as ambiguous. Two other

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the Subject of Manufactures and opposed by Adam Smith. See F. M. Scherer, "General Hamilton and Dr. Smith," John F. Kennedy School of Government working paper no. RWP12-029, Harvard University, 2012.

7 . Foreign residents were not permitted to obtain U.S. copyright (or enforce their home-base copyright in the United States) until 1891.

8 . The work of the "TNEC" is reviewed inter alia in a special supplement to the American Economic Review, "Papers Relating to the Temporary National Economic Committee," vol. 32, June 1942.

9 . U.S. Senate, Committee on the Judiciary, Subcommittee on Patents, Trademarks, and Copyrights, Staff Report, Compulsory Licensing under Antitrust Judgments (Washington: 1960). A muck-raking survey of the substance underlying challenged patent abuses is found in Floyd L. Vaughan, The United States Patent System (University of Oklahoma Press: 1956).

facts must be recognized. For one, most of the compulsory licensing orders were so-called "consent decrees," issued not as the result of fully-litigated adversary proceedings in court, but receiving judicial approval after they were negotiated as a voluntary settlement of pending antitrust disputes without a formal court judgment affirming anti-competitive conduct. Of the 107 decrees described above, only 13 emerged from fully litigated cases. Consent settlement is much less costly for all parties to a litigation and may for accused violators be seen as a means of avoiding harsher penalties. Second, patents were not always the prime initial focus of antitrust cases that led to these settlements. In a substantial number of instances, compulsory patent licensing was seen as the most effective available remedy for more broad-based anti-competitive conduct or market structure.

An important ground for some patent-based antitrust actions was the use of patent licenses and cross-licenses to orchestrate cartels that raised prices, restricted the output of individual producers, and inhibited the entry of imports and new domestic producers. A leading case entailed the activities of the Hartford-Empire Company, at the time a developer of glass bottle-forming machinery, and the market-leading bottle producer, Owens-Illinois.[10] Through internal development, acquisitions, and restrictive licenses, those two companies dominated U.S. bottle-making machinery patent holdings, choosing to license production under them or not so as to reduce the number of machines available when business was slack and hence to maintain prices, even in the face of the worst economic depression in U.S. history. Testifying before the TNEC,[11] Hartford-Empire's president argued that his company's judgment was better than that of a competitive market "to protect the present manufacturers, to make money, and to produce milk bottles cheaper.... Who is better able to say whether we shall have 1,000 licensees or 500 or 50? We know the trade...." Assessing the TNEC record, (later Nobel laureate) George J. Stigler saw the cartelization of the glass container industry by Hartford-Empire as "an eloquent example of an evil demanding correction."[12] Hartford-Empire and Owens-Illinois were required in the resulting judicial decisions to cease their cartelizing activities and to license their extensive patent portfolios at reasonable royalties to all would-be takers.

Other prominent targets of the early patent-based antitrust actions was the General Electric Co. and Westinghouse Electric, the leading manufacturers of electric light bulbs in the United States. Those cases revealed more clearly than others the drastic changes in what was allowed and not allowed with respect to patents and competition policy.[13] General Electric was formed on a foundation of Thomas Edison's electric lamp patents, but solidified its position by acquiring rival firms and their patents

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10 . U.S. v. Hartford-Empire Co. et al., 323 U.S. 386 and 324 U.S. 570 (1947).

11 . Hearings Before the TNEC, Part 2, pp. 412-413 (1939).

12 . George J. Stigler, "The Extent and Bases of Monopoly," American Economic Review, June 1942 Supplement, p. 14.

13 . See F. M. Scherer, "Technological Innovation and Monopolization," in Issues in Competition Law and Policy (American Bar Association Section of Antitrust Law: 2008), vol. II, pp. 1039-1042.

and entering into highly restrictive licenses with remaining rivals, fixing prices, allocating customers, and issuing market share quotas. Among other things, it negotiated licenses with foreign manufacturers that effectively prevented them from selling in the U.S. market. An early antitrust decision holding that GE and Westinghouse could not set the prices at which their wholesalers and retailers resold lamps was circumvented. Another action allowed the circumvention, but more important for precedential reasons, it confronted squarely the question of whether GE could prescribe licensee Westinghouse's ex-factory prices. It ended in defeat for the government when the U.S. Supreme Court ruled that such restrictive actions were acceptable when they were "normally and reasonably adapted to secure pecuniary reward for the patentee's monopoly."[14] However, with the change in perspectives accompanying the TNEC hearings, new antitrust complaints were lodged, leading to rejection of that early precedent. Assessing the evidence, the judge in the court of first instance ruled that:[15]

> ... [T]here can be no doubt that [General Electric] paced its industrial achievements with efforts to insulate itself from competition. It developed a tremendous patent framework and sought to stretch the monopoly acquired by patents far beyond the intendment of those grants. It constructed a great network of agreements and licenses, national and international in scope, which had the effect of locking the door of the United States to any challenge to its supremacy in the incandescent electric lamp industry ... Its domestic licenses gave fiat to a few licensees whose growth was carefully limited to fixed percentages of its own production and expansion so that over the years its share of the business was not materially diminished and its dominant proportion was never exposed to any hazard...

Most of the 1940-1970 decrees imposing compulsory patent licensing allowed patent holders to receive "reasonable royalties" for the use of their technology. However, finding that General Electric was "mounted upon an arsenal of a huge body of patents that can easily overwhelm and defeat competition by small firms," Judge Forman required that the General Electric patents be available to all would-be licensees royalty-free.[16]

Not all restrictive actions by dominant patent holders led to legal sanctions, however. One of the most prominent setbacks for U.S. government antitrust enforcers came in a case charging du Pont with monopolizing cellophane production in the United States. Du Pont obtained its original cellophane patent licenses from a French company and then expanded its portfolio through internal development. It licensed only one domestic competitor and kept that licensee, Sylvania, in check by elevating the

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14 . U.S. v. General Electric Co., 272 U.S. 476, 489-490 (1926).

15 . U.S. v. General Electric Co. et al., 82 F. Supp. 753, 905 (1949) (Judge Philip Forman).

16 . There is reason to believe that at the negotiations leading to TRIPS, U.S. representatives observed that if a compulsory license is issued to remedy an anticompetitive practice, royalty-free licensing could be consistent with TRIPS.

royalty rate from 2 percent to 30 percent if Sylvania exceeded the roughly 25 percent market share stipulated by du Pont. Imports were kept out of the market by inducing the U.S. Congress to set tariffs as high as 60 percent. In 1953 a Wilmington, Delaware, judge accepted du Pont's defense that it had been a progressive cellophane producer and also ruled that du Pont was not a monopolist in the sense of competition law because it faced competition from other flexible packaging materials such as waxed paper, polyethylene, and Saran-wrap. The market definition decision, sustained on appeal to the U.S. Supreme Court, was sharply criticized by economists and characterized as "the cellophane fallacy."[17] This defeat for the antitrust enforcers foreshadowed later doctrines holding that to find abuse of monopoly power through patent restrictions, it was necessary that the market for the patented items be meaningfully defined following sound economic principles.

A quite different abuse that led to some compulsory licensing remedies is what is called "tying," although even before competition policy principles were applied to patent cases, it could be a cause of patent revocation or denial of infringement claims under what was called the "misuse" doctrine -- i.e., extending the scope of a patent to place restrictions on the purchase of unpatented items.[18] A typical tying arrangement is one in which a firm holds patents on some machine and then requires purchasers of the machine to buy exclusively from the machine-maker unpatented materials processed in the machine. In 1988 the U.S. Congress amended patent law to allow a finding of illegal tying or misuse only if the patent holder requiring the concomitant purchase of unpatented products was shown to have monopoly power in selling the patented product, i.e., that price-constraining substitutes were either absent or ineffective.[19] An independent producer of ink that functioned effectively with a patented package-labelling machine whose maker had insisted that its own unpatented ink be used was thereupon rebuffed in an important Supreme Court decision.[20] Relying on earlier precedents, the independent ink maker had not presented evidence assessing the patent holder's monopoly power, so the case was remanded to lower courts for possible further consideration.

Long before the intensification of antitrust actions against alleged abuses of patent grants, it was viewed as illegal to extend the control of a patented item's prices or

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17 . George Stocking and Willard Mueller, "The Cellophane Case and the New Competition," American Economic Review, vol. 45 (March 1955), pp. 29-63. In "Technological Innovation and Monopolization," supra note 14, co-author Scherer argues that from a longer-run perspective the no-monopoly inference may have been justified.

18 . See e.g. Herbert Hovencamp, "The Intellectual Property - Antitrust Interface," and Janet McDavid et al., "Patents and Tying Arrangements," in American Bar Association, Issues in Competition Law and Policy, supra note 14, vol. III, pp. 1983-1995 and 2037-2059.

19 . 37 U.S.C. para. 271(d).

20 . Illinois Tool Works vs. Independent Ink, 547 U.S. 28 (2006). We were unsuccessful in attempts to learn from Independent Ink's management whether it followed the Supreme Court's judgment with further actions alleging that Illinois Tool had a monopolistic market position.

other aspects of consumption to any but the first purchaser of the patented item. For example, when General Electric sold light bulbs to retailers, it was found to violate the U.S. Clayton Antitrust Act when it specified the prices the retailers had to charge selling to third-party customers. For many decades such "resale price maintenance" was declared to be illegal per se, that is, without further investigation of broader impacts on the vigor of competition. However, a "rule of reason" approach to evaluating resale price maintenance was adopted at the expense of this per se approach by the U.S. Supreme Court in 2007.[21] Under the new rule, a full consideration of how competition and consumer welfare are affected by restraints must be undertaken -- presumably, at considerably greater litigating cost. Applications to the pricing of patented articles are likely to come.

Strong patent positions can be attained through a company's own research and development efforts, the purchase of other inventors' patents or other intellectual property, or some combination of the two. In an early case, the U.S. Supreme Court observed as a probable obiter dictum that "The mere accumulation of patents, no matter how many, is not in and of itself illegal."[22] When monopolistic market structures have been challenged under the U.S. patent laws, the specific contributions made by diversely acquired patents may have played a subtle role in the courts' decision-making, although no hard and fast rules for separating the causal effect of patent accumulation from other business policies have emerged.

One way patent positions may be strengthened is through mergers and acquisitions. Since 1950, the United States has aggressively challenged mergers that "tend substantially to lessen competition." In a number of cases under which mergers have been found to violate the U.S. anti-merger law, and especially in the pharmaceutical and biological fields, remedial efforts to restore effective competition have sometimes included the compulsory licensing or sale of patents in the relevant overlapping lines of business.[23]

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21 . Leegin Creative Leather Products vs. PSKS, 551 U.S. 877 (2007). The case did not involve patented items.

22 . Automatic Radio Manufacturing Co. v. Hazeltine Research, 339 U.S. 827, 834 (1950). The Supreme Court recognized that Hazeltine produced no radios, but merely supplied under license the designs and other technology described in its 570 patents. Without patents, therefore, it would have been difficult for Hazeltine to obtain remuneration for its R&D efforts. But the Supreme Court attempted no explicit tradeoff between the special circumstances of Hazeltine's situation and its patent accumulation. The situation of Hartford-Empire in the 1930s was similar, although after it was required to license its bottle-forming machinery patents, it began manufacturing and selling machines of its own design. See the U.S. Senate committee report, supra note 10, at pp. 19-20.

23 . See for example In re Ciba-Geigy Ltd., 123 F.T.C. Reports 842 (1997), under which Ciba-Geigy was required to license at modest royalties its gene therapy patents. In "The Effects of Patent Relief on the Incentive to Invest and the Incentive to Disclose," unpublished S.J.D. dissertation, Harvard Law School (2005), pp. 108-109, Ziv M. Preis lists 21 cases between 1980

The most extensive compulsory licensing order in U.S. antitrust history, involving the dominant national telecommunications provider, AT&T, came in a consent settlement. Toward the end of the 19th Century and the beginning of the 20th Century, AT&T's dominant position was built in part by aggressive patent acquisition, restrictive cross licensing, and tough-minded pursuit of alleged patent infringers. But then AT&T changed its business policies, submitting to governmental price and entry regulation, allowing smaller local rivals to use its inter-city transmission facilities, and advancing telephone technology largely through the efforts of its Bell Telephone Laboratories (correctly said by Fortune magazine in November 1958 to be "the world's greatest industrial laboratory"). Its patent policy in later decades was exemplary. For example, following its breakthrough discovery of the transistor effect, it conducted symposia to explain the product and process technology and licensed all interested applicants to its semiconductor patents at modest royalties.[24] It did however take aggressive advantage of its regulated position in a variety of ways to hold back rival expansion, buy equipment mainly from its own manufacturing affiliate (Western Electric), and adopt or authorize only its own preferred improvements in telecommunications service.[25] A consensus favoring vigorous antitrust action grew in the 1950s. An antitrust complaint sought divestiture and fragmentation of Western Electric. With important components of the U.S. government hierarchy opposing the breakup, a consent settlement was negotiated calling for compulsory licensing, mostly without royalties, of Bell's roughly 9,000 patents and a ban on most Western Electric sales to customers other than the government and AT&T affiliates (which probably changed the way the semiconductor industry evolved).[26]

Quite possibly the last "great" compulsory licensing order under U.S. antitrust occurred with respect to Xerox in 1975.[27] Xerox had for more than a decade sustained a virtual monopoly of plain-paper copying machines, protected mainly by a portfolio eventually including some 900 patents. It chose to grant rivals licenses only to patents covering more expensive coated paper copying processes. Patent acquisition played an early but trivial role in the company's growth. The original patents issued to inventor Chester Carlson were transferred to the Battelle Research Institute which, with no manufacturing capacity, transferred them to a small firm that invested heavily to develop copying technology and enjoyed extraordinary market success from the time of its first general-purpose copier introduction in 1959. By 1975, its monopoly had endured for 16 years and was likely to continue because of Xerox's internally-generated improvement patents. Xerox pursued a variety of policies to derive advantage from its monopoly position, e.g., deploying machines at first only on a leased basis, which supported its

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and 1999, eight of them involving pharmaceuticals, in which merger challenges were resolved inter alia by compulsory patent licensing.

24 . See John Tilton, International Diffusion of Technology: The Case of Semiconductors (Brookings Institution: 1971), pp. 73-77.

25 . See Scherer, "Technological Innovation and Monopolization," supra note 14.

26 . CCH Trade Cases Para. 68,246 (1956).

27 . In the matter of Xerox Corporation, 86 F.T.C. 363 (1975).

ability to use profit-maximizing price discrimination, and informally tying the purchase of toner (priced so high it was called "black gold" by company insiders) to the lease of Xerox machines.[28] Had the case been fully litigated, it would have been a close call, perhaps establishing new precedents as to what a dominant patent holder can do. But to minimize ongoing legal costs and risks and those anticipated when other firms tried to enter the market and triggered new patent infringement suits, Xerox chose to negotiate a settlement. A principal provision was the non-discriminatory licensing of Xerox's entire patent portfolio, the first three patents royalty-free for any licensee, the next three at 0.5 percent ad valorem royalty each, and the remainder at zero incremental royalty.

Consequences of U.S. Compulsory Licensing Actions

The widespread compulsory patent licensing ordered under U.S. antitrust decrees evoked fears that incentives for innovation would be jeopardized. Following the 1956 AT&T order and a parallel one covering IBM's large patent portfolio, the Wall Street Journal warned:[29]

> So it may turn out that these are dangerous victories the Government boasts about. The settlements in these cases indicate a belief that everybody's patents should be everybody else's. But this is a philosophy that strikes at incentive; new ideas and new inventions may be lost. Such Government victories may turn out to be far more costly for the nation than for the companies.

The actual impact turned out to be more complex but decidedly less dire. Spurred by the Wall Street Journal editorial quoted here, a group of nine Harvard Business School students fanned out across the nation to ask companies, including those subjected to major compulsory patent licensing decrees, how such licensing, actual or prospective, affected their incentives to invest in research and development. The results were astonishing, at least to the student group. The decrees were found to have very little negative effect on R&D incentives, although companies covered by the decrees did reduce their patenting, especially with respect to process inventions that could be kept secret.[30] More general responses about the role patents played in research and development decision-making were equally surprising. With limited exceptions, R&D investments were little affected by the expectation or lack thereof of patent protection. Much more important in company decision-makers'

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28 . The best available analysis of Xerox' strategies is Erwin Blackstone, "The Copying Machine Industry: A Case Study," Ph.D. dissertation, University of Michigan, 1968.

29 . "Dangerous Victory," Wall Street Journal, January 22, 1956, p. 6.

30 . F. M. Scherer et al., Patents and the Corporation (Privately published, 1958, 2nd ed. 1959). It is noteworthy too that the extensive compulsory licensing during the 1940s and 1950s did not prevent a substantial "technology gap" from emerging between the United States as technological leader and otherwise comparable but lagging OECD member nations. See Organization for Economic Co-Operation and Development, Gaps in Technology: Comparisons between Member Countries (Paris: 1970).

analyses were the advantages of a head start, the power of established marketing channels to reach consumers, and very importantly, the pressure of actual and potential rivals threatening market positions with their own innovations. A follow-up study found that variably many years after compulsory patent licensing decrees had been imposed, the subject companies on average spent more on R&D relative to their sales than rival companies not operating under such decrees.[31]

These inferences were replicated in diverse later studies using interview and questionnaire methodologies. For a sample of firms in Great Britain, Taylor and Silberston found that companies subjected to hypothesized worldwide compulsory patent licensing at "reasonable" royalties would reduce their R&D expenditures by 8 percent on average.[32] From 100 companies in the United States, Edwin Mansfield and associates found that the impact of having no expected patent protection would be a 14 percent decrease in the number of innovations actually introduced.[33] Pharmaceutical companies were an exception in both studies, with reductions of 64 percent in the United Kingdom and 60 percent in the United States. Several other surveys using different questionnaire methodologies found that the expectation of patent protection was relatively unimportant compared to other means of capturing the benefits from technological innovations.[34]

Several reasons help explain why the expectation of weak or unavailable patent protection does not significantly impede investment in industrial invention and innovation. All fall under the category of "first mover advantages" achieved through first or early innovative entry into markets. For one, it usually takes would-be imitators time to observe the first mover's innovation, to recognize its commercial attractiveness, and to carry out the R&D needed to field a competing innovation. Relatedly, when would-be

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31 . F.M. Scherer, The Economic Effects of Compulsory Patent Licensing (New York University Graduate School of Business Administration monograph: 1977), p. 73.

32 . C.T. Taylor and Z. A. Silberston, The Economic Impact of the Patent System (Cambridge University Press: 1973).

33 . Edwin Mansfield, "Patents and Innovation: An Empirical Study," Management Science vol. 32 (1986), pp. 173-181.

34 . Richard Levin et al., "Appropriating the Returns from Industrial Research and Development," Brookings Papers on Economic Activity (1987), pp. 783-832; Wesley Cohen et al., "Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)," National Bureau of Economics Research Working Paper no. 7552 (2000); and Stuart J. H. Graham et al., "High Technology Entrepreneurs and the Patent System," Berkeley Technology Law Journal, vol. 24 (2010), pp. 1255-1327. In the third of these studies, patent protection was found to be more important for startup companies, especially in the biotechnology field, than for well-established firms.

On other nations' experience, see Andres Lopez, "Innovation and Appropriability," in the World Intellectual Property Organisation compendium, The Economics of Intellectual Property, www.wipo.int/export/sites/www/freepublications/en/economics/1012/wipo_pub_1012.podf.

imitators observe the innovation's success, the research and development required to replicate the pioneer's contribution often takes both time and a substantial fraction of the expense the pioneer required.[35] Third, imitation can be delayed, especially for process innovations, when secrecy is feasible. Fourth, and very importantly, the first mover with a product innovation often gains in the minds of consumers an image advantage that allows it for at least a considerable time period to hold prices well above costs while maintaining a substantial market share.[36] In industries amenable to production cost savings through learning-by-doing, the first mover often gains significant (even if temporary) cost advantages over later imitators. And finally, the fear that rivals will introduce their own innovations at an early date and preempt substantial market shares -- i.e., what is often called following Joseph A. Schumpeter's conception "creative destruction" -- forces firms to undertake their own defensive R&D activities.

The second of these reasons applies poorly in the pharmaceutical industry, suggesting why pharmaceutical innovation has been found to be exceptionally dependent upon patent protection. For one, patents on pharmaceuticals often delineate with particular clarity the molecule that has been invented. But more importantly, under modern systems for regulating entry into pharmaceutical markets, most of the innovator's substantial expense (in the hundreds of millions of dollars) is incurred for clinical testing to prove that a new molecule is both safe and efficacious in human subjects. Once that information is attained, it becomes in effect a pure public good, available (absent regulatory constraints) at minimal cost to would-be generic imitators. When regulations allow, all the generic imitator needs to do is invest a few million dollars in process design and proof of bioequivalence. Thus, in pharmaceuticals, there is an especially great asymmetry between innovation costs and imitation costs, leaving an important role for patents to fill the gap.[37]

The Xerox settlement in 1975 illuminates the role creative destruction can play. The company's officers anticipated that the main new competitors to Xerox would be Eastman Kodak and IBM, but in fact, the compulsory licensing decree was followed by a wave of successful entry into the U.S. market by Japanese firms. Xerox's response to this new competition might be surprising: Xerox intensified its product improvement efforts. In his memoirs, Xerox chief executive officer David Kearns describes how his predecessor saw the company's position in 1977:[38]

> [McColough delivered] a blunt appraisal of the marketplace and Xerox's

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35 . See Levin et al., supra note 34, at p. 809.

36 . For early recognition, see F. M. Scherer, Industrial Market Structure and Economic Performance (2nd ed., Rand McNally: 1980), pp. 378-385 and 446-447; and Richard Schmalensee, "Product Differentiation Advantages of Pioneering Brands," American Economic Review, June 1982, pp. 349-365.

37 . Under current U.S. regulatory rules, agricultural pesticides and herbicides are similar.

38 . David Kearns and David Nadler, Prophets in the Dark: How Xerox Reinvented Itself and Beat Back the Japanese (Harper: 1992), p. 100.

> position in it. In no uncertain terms, he made it clear that Xerox was being "out-marketed, out-engineered, outwitted in major segments of our market." He underscored the fact that Xerox would never have it the way it did when it was protected by its patents, when it could take its sweet time developing and marketing products and when it made no difference how much it cost to make something because the company could charge almost whatever it wanted.... "We are now faced with the urgent need for change within this company."

Mr. Kearns continues in his own words:[39]

> The real problems that afflicted us ... were that we had lost touch with our customers, had the wrong cost base, and had inadequate products.... The monopoly environment that Xerox thrived in encouraged internal competition, but not external. We would measure the quality of a new Xerox machine according to the specifications of older Xerox copiers. Those specifications didn't mean very much if other companies were producing something altogether better.

A possible implication of these findings is that an ideal patent system should be fine-tuned to differing environmental circumstances -- e.g., by varying the length of time for which patents can inhibit imitation. But it is doubtful whether national patent office staffs and jurists have the information and insight needed to implement such a flexible approach competently. And for individual patents (but not patent families), TRIPS requires that the term be 20 years from the date when the initial application is filed.

The Change in U.S. Policies

The 1970s saw the culmination of tough U.S. antitrust enforcement with respect to patents. Reflecting on what had been accomplished, the second-ranking official in the U.S. Antitrust Division articulated in 1972 what came to be known as the "nine no-nos" in the licensing of patents:[40]

1) It is unlawful to require a licensee to purchase unpatented materials from the licensor [i.e., tying].

2) It is unlawful for a patentee to require a licensee to assign to the patentee any patent which may be issued to the licensee after the licensing arrangement is executed [i.e., an exclusive grantback provision].

3) It is unlawful to attempt to restrict a purchaser of a patented product in the resale of that product.

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39 . Ibid. pp 68, 123.

40 . Remarks of Bruce B. Wilson before the Michigan State Bar Antitrust Law Section on September 21, 1972, reproduced in the current documents binder of the Trade Regulation Reporter, para. 13,126 (1972).

4) A patentee may not restrict his licensee's freedom to deal in products or services not within the scope of the patent.

5) It is unlawful for a patentee to agree with his licensee that he will not, without the licensee's consent, grant further licenses to any other person.

6) Mandatory or coercive package licensing [i.e., of groups of patents] is an unlawful extension of the patent grant.

7) It is unlawful for a patentee to insist, as a condition of the license, that his licensee pay royalties in an amount not reasonably related to the licensee's sales of products covered by the product. (Examples included assessing a royalty on sales of all relevant products, unpatented as well as patented).

8) The law may be overstepped when the owner of a process patent places restrictions on the licensee's sales of products made using the patented process.

9) It is unlawful for a patentee to require a licensee to adhere to any specified or minimum price with respect to the licensee's sale of the licensed products.

These suggested rules have the ring of per se prohibitions, although Deputy Assistant Attorney General Wilson clarified that the conduct of licensors and licensees was to be judged under a rule of reason.

The regulatory framework began to change markedly in the 1980s. In 1982, a new patent-friendly court was created to hear patent case appeals. And more conservative president Ronald Reagan ensured from the time of his inauguration in 1981 that business-friendly officials were appointed to key policy positions. Soon thereafter, a newly-appointed Antitrust Division leader asserted than the nine no-nos "contain more error than accuracy."[41] The federal antitrust agencies prosecuted restrictive patent licensing practices less aggressively, and in 1995, i.e., under William Clinton's Democratic administration, new Antitrust Guidelines for the Licensing of Intellectual Property were published jointly by the Department of Justice and Federal Trade Commission. The guidelines articulated general principles holding inter alia that "intellectual property licensing allows firms to combine complementary factors of production and is generally procompetitive" and that the antitrust agencies would not presume without analysis that intellectual property creates market power (i.e., monopoly pricing power). Rather, meaningful markets had to be defined, as in other antitrust cases.

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41 . See on this and related themes F. M. Scherer, "The Political Economy of Patent Policy Reform in the United States," Journal of Telecommunications & High Technology Law, Spring 2009, especially pp. 176-179, 186-195, and 199-207.

In effect, a rule of reason framework was embraced, requiring the analysis of how much pricing power patent holdings actually confer and weighing whatever anticompetitive effects license restrictions might have against their benefits in terms of stronger incentives for innovation, wider technology diffusion, and reduced research and production costs. In principle, this approach is eminently sensible. But implementing it depends upon the mental predisposition brought to the task by competition policy enforcers. And on that, doubts emerge -- most notably, because the Guidelines and an interpretive report published by the two agencies in 2007 fail almost entirely to acknowledge the accumulated research showing that in most instances, patent protection is not the principal means by which innovators recoup sufficient profits to reimburse their risky investments in research and development.[42] The difficult task of enforcing laws whose laudable objective is technological progress is likely to be misguided if enforcers embrace faulty premises about the mix of incentives favorable to innovation.

Other Jurisdictions Modify Their Competition Laws

Although other countries were less aggressive than the United States during the 1940s and 1950s in targeting intellectual property abuses, many have evolved their own approaches to the competition policy interaction.

European Community

We begin with the European Community. Its innovative doctrinal approach first gained prominence in copyright rather than patent matters. A leading precedent was the so-called Magill case.[43] In Ireland during the early 1980s, there was no comprehensive weekly publication to guide television viewers in selecting among alternative broadcasts. Three publications, two owned by broadcasters, provided coverage of only subsets of offerings. Magill offered a unified guide, drawing inter alia upon the copyrighted materials in the more selective publications. The latter refused to grant permission, claiming the exclusive right from their copyright. The European Court of Justice ruled in 1995 that Magill could assert competition law to license the three publishers' materials, ruling that they were dominant providers in their own respective program guide domains and that the information they published was an essential input into providing a new product for which there was potential consumer demand. The resulting precedent is widely known as the essential facility doctrine.

It was developed further inter alia in the IMS case.[44] IMS was (and is) the

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42 . U.S. Department of Justice and Federal Trade Commission, Antitrust Enforcement and Intellectual Property Rights: Promoting Innovation and Competition (April 2007).

43 . Radio Telefis Eireann v. European Commission, joined cases C-241/01 and C-242/91 (1991).

44 . IMS Health Case v. NDC Health, case C-418/01 (2004). A year after the EC decision, NDC was acquired by another firm, Per Se Technologies, which in turn was acquired by

dominant provider of detailed information on the prices and quantities of individual pharmaceutical products sold in narrowly-defined geographic territories. It obtains the information through surveys of a large sample of individual pharmacies. Its data for Germany, sold to pharmaceutical manufacturers (which used them in their marketing) and also distributed free to health insurers, were aggregated into 1,860 geographic areas that it called "bricks." IMS filed for copyright on its brick structure. NDC Health began conducting its own surveys and providing reports by geographic area. Its customers preferred to have the data for areas comparable to those used by IMS. When NDC Health thereupon adopted a brick structure very close to that of IMS, IMS alleged breach of copyright. Supervening a 2002 German judicial decision, the European Commission ruled that the 1860-brick market definition scheme was an "indispensable" input for competition in supplying the desired sales data and that IMS' refusal to enter into a licensing agreement was an abuse of its dominant position under Article 82 of the European Community Treaty. By way of clarification, the European Court of Justice ruled that:[45]

> [R]efusal to grant a license for the use of an intangible asset protected by copyright entails an abuse of a dominant position ... where (a) there are no objective justifications for such refusal; [and] (b) use of the intangible asset is essential for operating on a secondary market with the consequence that ... such refusal would ultimately eliminate all competition on the market.

The judge qualified these conditions, however, to require that the firm seeking a license "intends to produce goods or services of a different nature which, although in competition with those of the owner of right, answer specific consumer requirements not satisfied by existing goods or services."[46] Anticipating issues we shall discuss later, the judge also ruled that the collaboration of pharmaceutical manufacturers in establishing the brick structure led in effect to the establishment of a de facto standard, which in turn warranted licensing. Surprisingly not considered in the European Court's analysis was the likelihood that assembling detailed data on retail sales entailed fixed costs so high that the activity was what economists call a natural monopoly. There was no evident tradeoff between the higher cost of dividing the compilation and sale of such data between two sources and the benefits (e.g., reduction of sampling errors) associated with having two sources.

An important exercise of the dominant firm abuse principle closer to the realm of high technology occurred in the European Commission's 2004 decision and subsequent enforcement actions with respect to Microsoft's dominant Windows operating system.[47]

McKesson Corporation in 2007. The principal remaining competitor to IMS in prescription data gathering, Symphony Health Solutions, was itself the result of a four-way merger.

45 . Opinion of Advocate General Tizzano (October 2, 2003).

46 . Ibid.

47 . European Commission decision in COMP/C-3/37.792 (2004). See also F. M. Scherer, "Abuse of Dominance by High-Technology Enterprises: A Comparison of U.S. and E.C.

Microsoft had diversified from desktop computer operating systems to sell server systems too. It claimed that because of its superior knowledge of ubiquitous desktop computers' software code, its servers "interoperated" with Windows code better than other companies' servers. Following a complaint from Sun Microsystems, the European Commission successfully prosecuted an abuse of dominance complaint. When Commission consultants reported that Microsoft had not disclosed sufficient information (claimed by Microsoft to be unpatented trade secrets) to allow smooth interoperability, as it had been ordered to do, fines escalating by 2 million Euros daily were assessed. Eventually a settlement was reached. For licensing its code information, Microsoft initially demanded a royalty of 5.95 percent on the value of the data-using equipment. As daily fines were mounting, Microsoft settled for a royalty of 0.4 percent.

Actually, the Microsoft case was not the first European Commission intervention into the computer interface information issue. Beginning with the introduction of System 360 in the mid-1960s, IBM offered a computer architecture under which peripheral functions such as add-on memory, printers, and the like plugged into a common central processing unit connection interface. This prompted the rapid emergence of "plug-compatible" peripheral equipment manufacturers (who eroded IBM's substantial profits from leasing its own devices). IBM pursued a variety of actions to thwart such competition. Following an unsuccessful U.S. government suit, the European Commission began its own investigation, leading to a 1984 "undertaking" (in U.S. terms, a consent decree) between the Commission and IBM under which IBM agreed to disclose within 120 days of a new System 370 computer's introduction all interface information required to allow all hardware and software producers to attach their offerings to IBM mainframes. A follow-up survey revealed mixed views on the agreement's efficacy. One important plug-compatible memory device manufacturer reported that the disclosures were "absolutely essential to our ability to compete," whereas another said that interfaces had been sufficiently standardized that the agreement added little vital information.[48]

In 2004 the European Commission adopted formal regulations (amending earlier 1965 and 1996 statements) that clarified what intellectual property licensing and technology transfer practices are deemed consistent with European competition policies.[49] Declaring that technology transfer agreements "usually improve economic efficiency ... as they can reduce duplication of research and development ... and strengthen the incentive for the initial research and development," the regulation provides for them what as a first approximation is a "block exemption" or safe harbor

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Approaches," Economia e Politica Industriale, vol. 38 (March 2011), pp. 39-62.

48 . F. M. Scherer, "Microsoft and IBM in Europe," Antitrust and Trade Regulation Reporter (January 24, 2003), p. 65.

49 . Commission Regulation No. 772/2004, published in the Official Journal of the European Union, April 27, 2004. The regulation was scheduled to expire in April 2014. Preliminary indications at the time this paper was written suggest that the regulation would be renewed with only marginal changes.

from competition policy prohibitions.[50] However, the regulation then articulates market share thresholds and lists specific license restrictions that could be subjected to what is in effect per se prohibition. For technology transfer agreements between firms with a combined relevant market share less than 20 percent, or including parties with individual shares of distinct markets less than 30 percent each, it is presumed that agreements are pro-competitive. The regulation then identifies what it calls "hardcore restrictions" that can countervail the presumption of legality. These include restrictions on the parties' independent price-setting for products covered by the agreement; reciprocal output limitations; the delineation of exclusive product markets, geographic territories, or technical fields; obligations accepted not to license the technology to parties other than the agreement's active partners; and provisions allowing a licensee to produce a covered product only for its own use. Other restrictions that can nullify an exemption include mandates for a licensee to license or grant back to the licensor exclusive rights to any improvement inventions in the relevant field of technology. The regulation does not mention other restrictions that would make it fully consistent with the U.S. "nine no-nos" such as tying and resale price maintenance.

Japan

Japan's policies with respect to intellectual property also exhibit a considerable evolution over time. A competition law was imposed unilaterally upon Japan in 1947 by the post-World War II occupation authorities (notably, the United States). The intent of the occupation authorities was mainly twofold: to prevent Japanese firms' participation in international cartels and (consistent with sentiments current in the United States at the time) to limit the economic power of the Zaibatsu conglomerates dominating the Japanese economy. After that, the law was amended several times as Japan made spectacular progress toward becoming one of the world's most technologically adept nations.[51]

Japan's economic development strategy emphasized absorbing foreign technology as rapidly as possible and incorporating it into the capabilities of domestic enterprises, building those firms' export potential, and conserving the nation's initially scarce foreign exchange reserves through a system of payments controls implemented by the Ministry of Finance. As part of the technology absorption strategy, license agreements with foreign firms were encouraged, but the royalties paid under those agreements were kept down by the Finance Ministry's recalcitrant dispensation of foreign exchange allocations. At first, domestic companies were required to report to government authorities cross-border technology transfer agreements before they could be implemented. After 1968, such agreements only had to be reported after-the-fact,

50 . The block exemption approach follows earlier United Kingdom precedents with respect to price fixing and similar agreements.

51 . This discussion relies heavily upon Hiroka Yamane, "Competition Analysis of Licensing Agreements: Japan's Developmental Perspectives and Micromanagent of License Protection," manuscript (2012).

and when they came into conflict with competition rules, the Fair Trade Commission could intervene to limit or repeal them.

With a focus on building their nation's technological capabilities, the Japanese authorities placed special emphasis on two main kinds of patent or know-how license restrictions: clauses that required the Japanese license recipients to grant back to the licensors licenses to any improvement inventions that might subsequently be made; and clauses that prevented the Japanese licencees from competing through exports in the licensor's home markets or export markets. The rationale of the grantback constraints was this: If Japanese companies were required to concede rights to any technological improvements they made, their incentives to make those improvements might be limited. And of course, preventing them from competing with licensors would also inhibit demand-pull incentives and their progress toward becoming world-class suppliers. Among the approximately 315 cases in which the Japanese authorities intervened (i.e., provided "administrative guidance") concerning international technology transfer agreements between 1975 and 1990, 64 percent of the objections were raised against one-way rights grantback provisions (i.e., from Japanese licensee to foreign licensor but not vice versa) and 27 percent against agreements not to compete in the licensors' markets.[52] Other interventions against nine practices singled out for scrutiny in a 1968 statement by the Japanese Fair Trade Commission (anticipating the U.S. "nine no-nos") were much less frequent -- e.g., against tie-in sales, resale price maintenance, and other limitations concerning distribution channels. From a 1982 survey, it appears that 39 percent of the international license interventions pertained to patents, 47 percent to know-how, and 44 to technical assistance agreements.

Policies in Noteworthy Industries

Although one could extend our analysis at length by examining the relevant competition policies of other countries, we proceed best by exploring in some detail the precedents evolved in two particularly patent-sensitive fields of commerce: pharmaceuticals and information technology. From them we can see what has been accomplished, what has failed, and what major challenges still exist.

Pharmaceuticals

Patents were a key element in one of the most closely contested antitrust actions in U.S. history, the so-called tetracycline cases.[53] During the 1960s tetracycline was the most widely-prescribed of the so-called broad-spectrum "wonder drugs" invented to fill therapeutic gaps left by the pioneering antibiotic penicillin (introduced during World War II). In separate antitrust complaints pursued in parallel by the U.S. Federal Trade

52 . Computed from Yamane, Tables I and II.

53 . For a more extensive discussion of the cases with legal citations, see F. M. Scherer, "The F.T.C., Oligopoly, and Shared Monopoly," forthcoming in the Review of Industrial Organization (2014).

Commission and (with criminal charges) the Department of Justice, it was alleged that drug-makers Pfizer, American Cyanamid, and Bristol-Myers had conspired to ensure that a patent priority dispute in which they were immersed was settled amicably in favor of Pfizer, that they collusively suppressed information which would have prevented issuance of the product patent on tetracycline, and that they colluded to set uniformly high and non-competitive prices (e.g., of $30.60 per 100 capsules at wholesale) when their production costs averaged approximately $2.50.

In the Department of Justice case, these charges were presented before a jury in New York City. Prosecuters implied inter alia that the "unreasonable" prices charged by defendants were evidence of collusion. Company executives denied under oath that they had colluded to fix prices or agreed to limit the number of patent licensees. Instructing the jury, Judge Frankel stated:

> I think you will find it helpful to translate the word "unreasonable" to mean "unusual" or "artificial" or "extra-ordinary." By these suggested definitions I am trying to convey the thought that the idea of unreasonableness in the present context is meaningful only if it is understood to refer to kinds of price behavior or price levels which appear to be divorced from variations and differences in available supply or demand or cost or other economic factors that may normally be expected to cause variations or changes in the prices charged in a competitive market. To put the thought in another and slightly shorter way, the charge of unreasonableness in this case is material only insofar as it poses the issue of whether the prices involved exhibited qualities or peculiarities of a type that could be deemed evidence that such prices resulted from agreement rather than competition.

The jury voted for conviction on all counts, but on appeal, the judgment was reversed in a 2-1 split decision, largely because in devoting substantial attention to such "inflammatory issues" as patents, pricing, and profits, Judge Frankel had failed to focus the jury's attention on the key issue of what agreements, if any, were reached among company executives. The Supreme Court divided 3-3 on whether to overturn the appellate court reversal. A new trial, held six years after the original trial, led to a bench judgment that the prosecution had not conclusively shown collusive restraints.

Meanwhile the Federal Trade Commission case was experiencing similar reverses. The hearing officer ruled that collusion had not been proven, but the Commission as a whole reversed his decision and ordered that the tetracycline patent and two tetracycline salt patents be licensed at a royalty rate of 2.5 percent. The Commission's decision was voided on procedural grounds, and a new hearing was ordered. It focused only on the question of whether the companies suppressed information that tetracycline had emerged by natural causes as a co-product in the manufacture of a predecessor antibiotic, chlortetracycline (Aureomycin). The hearing officer concluded that information which would have invalidated the patent was in fact suppressed, and in 1972 the Commission as a whole again ordered compulsory

licensing, this time only of the key tetracycline patent. But the decree probably had little direct effect, because several other companies had entered without licenses into tetracycline production, and prices had fallen substantially. The new entrants presumably inferred that they could enter the market without fear of infringement suits because the patent holder -- in this case, Pfizer -- knew from the wide publicity about alleged suppression of co-production that it could not succeed in legal efforts to sustain its patent and block entrants' sales.

In the early 1970s, the tranquilizer Valium (diazapoxide) was the most frequently prescribed drug in West Germany.[54] It and a molecularly similar drug Librium were developed in the U.S. laboratories of Switzerland's Hoffmann-LaRoche Company during the late 1950s. The two drugs' combined peak share of the market for benzodiazepine tranquilizers in Germany was 91.6 percent in 1965, with the earlier of the two, Librium, holding a majority position at first but losing its favored position during the 1970s to Valium. Both molecules were patented, and both were sold in Germany (as in many other nations) at prices far in excess of production costs, even when average company R&D costs were considered. As part of a multi-pronged effort to combat inflation, the German Federal Cartel Office (Bundeskartellamt) brought an action against Hoffmann-LaRoche in 1974. It did not attack Roche's patents per se, but sought to curb the company's monopoly power by compelling price reductions -- in it first 1974 order, by 60 percent for Valium and 65 percent for Librium. As in the tetracycline case, the case bounced back and forth among judicial authorities for six years -- twice to the Berlin Court of Appeals (Kammergericht) and twice to the German Republic's supreme court. In the end, the Cartel Office's attempts failed. The key issue was the definition of an "as if" price, i.e., the price that would be charged if the markets for Valium and Librium were effectively competitive, but taking account also the existence of patent protection. At first the Cartel Office attempted to use prices in Italy as a benchmark, but that approach was rejected by higher courts because in Italy, unlike Germany, drugs could not be patented, and because Italy had pervasive price controls even for its unpatented drugs. The focus then turned to prices charged by Centrafarm, a generic supplier in Netherlands. This comparison was rejected by the Federal Supreme Court, in part because Centrafarm obtained its supplies in bulk from Italy (where they were unpatented) and England, and in the end mainly because Centrafarm's Valium sales were so small, even at home in the Netherlands, that they provided an insufficient basis for competitive comparison. As a result, according to Erich Kaufer,[55] "... the zealous efforts of the FCA to use Sec. 22 as an instrument of price control in order to fight inflation, or to lower the general level of drug prices, have been halted." Instead of using competition laws as a price control mechanism, nations have attempted to limit

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54 . This account relies upon Erich Kaufer, "The Control of the Abuse of Market Power by Market-Dominant Firms under the German Law Against Restraints of Competition," Zeitschrift fuer die gesamte Staatswissenschaft, September 1980, pp. 510-531; and Ingo Schmidt, "Different Approaches and Problems in Dealing with Control of Market Power," Antitrust Bulletin, Summer 1983, pp. 417-460.

55 . Supra note 54 at p. 529.

monopoly pricing power through price controls implemented as part of a more general pharmaceutical regulation system[56] or by invoking the more flexible compulsory licensing provisions of TRIPS Agreement Section 31.

South Africa was a pioneer in combining the TRIPS provisions with its own competition laws to improve the supply of retrovirals effective against HIV/AIDS, with which it was severely afflicted.[57] By 2003, it had become known that a so-called "triple therapy," including three different anti-retroviral drugs, was the most effective way to treat AIDS. Three-drug therapy was more effective in abetting the frequent mutations that could render individual therapeutic molecules impotent, and combining three molecules in one twice-daily pill was a superior way to ensure daily compliance, again reducing the danger of mutation. But patents covering one of the drugs (AZT) were held by GlaxoSmithKline (successor to Burroughs-Wellcome) and those for two other key ingredients were held by the German firm Boehringer-Ingelheim. All three drugs were sold by those firms in South Africa at prices far above their production costs. The two firms declined to cross-license each other, so no single-pill therapy was available. An action by the South African Competition Commission aided by CPTECH, an offspring of Ralph Nader's U.S. consumer advocacy organization, induced the firms to offer compulsory licenses, first to a South African generic supplier, Aspen Pharmacare, and then to foreign (e.g. Indian) suppliers.[58] New triple therapies became available at unprecedentedly low prices.

A dispute over when applicable patent rights have expired, allowing the generic production of the broad-spectrum antibiotic cefaclor, provided a key test of Canada's Intellectual Property Enforcement Guidelines, issued in 2000. On p. 8, the Guidelines state that "A transfer of IP rights that lessens or prevents competition is a further example of a situation in which competitive harm results from something more than the mere exercise of the IP right to refuse." And on pp. 6-7, the Guidelines assert that "In assessing whether a particular licensing arrangement raises a competition issue, the Bureau examines whether the terms of the license serve to create, enhance or maintain the market power of either the licensor or the licensee. The Bureau will not consider licensing agreements involving IP to be anti-competitive unless they reduce competition substantially or unduly relative to that which would have likely existed in the absence of the license."

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56 . See Patricia Danzon, Pharmaceutical Price Regulation (AEI Press, 1997).

57 . This paragraph is drawn from F. M. Scherer, "Patents, Monopoly Power, and the Pricing of Pharmaceuticals in Low-Income Nations," in Daniele Archibugi and Andrea Filipetti, eds. The Handbook of Global Science, Technology and Innovation (forthcoming in 2014 from Wiley-Blackwell). We are indebted to Jamie Love, who led the CPTECH effort, for background materials.

58 . The settlement was essentially by consent, with no formal judicial decision. But see Competition Commission of South Africa, "GSK and BI Issue Anti-retroviral Licenses," Competition News, March 2004, pp. 1-2; and "Agreement Expands Generic Drugs in South Africa to Fight AIDS," New York Times, December 11, 2003, p. A24.

A challenge soon emerged. By April 27, 1995, the main product patent covering Eli Lilly's highly profitable cefaclor antibiotic, brand-named Ceclor, had expired. On that day, two important events occurred.[59] The U.S. Food and Drug Agency approved the generic production of cefaclor, and Lilly purchased from a Japanese company, Shiongi, that company's U.S. and Canadian rights to two patents covering the principal alternative process (not encompassed by Lilly patents) for manufacturing the drug. Apotex of Canada imported bulk generic cefaclor from an Indian supplier allegedly using the Shionogi technology (although the facts on its use were disputed). Lilly sued Apotex for infringement, and Apotex countered by arguing that the exclusive agreement with Shionogi was an illegal conspiracy to monopolize the Canadian market. Apotex' appeal to the Federal Court of Appeals against a negative lower court decision was joined by the Canada Competition Bureau, which argued that the assignment of patents like Shionogi's could "have the potential to increase Lilly's market power beyond what was contemplated under [Canada's] Patent Act."[60] The Appeals Court ruled that such patent assignment agreements were not exempted from Canada's cartel law and noted that the Lilly-Shionogi transfer was inconsistent with Canada's Intellectual Property Guidelines. On remand to consider the facts, the court of first instance observed that many factual issues remained unresolved and that "The Court could not really do justice to all the issues raised."[61] Ruling against the plea of Apotex to deny Lilly's claims for infringement damages because of the monopoly-sustaining Lilly-Shionogi agreement, Federal Court Judge Gauthier concluded that "Put plainly, the anticompetitive consequences of an assignment of patent rights do not in and of themselves undermine or undo a lawful assignment of rights.[62] The Court found no reason to apply the Competition Bureau's Guidelines (para. 717) and said that if the Competition Bureau objected to the Shionogi-Lilly transfer, it should have brought its own Competition Act enforcement action (para. 724). Damages to be determined subsequently were ordered. Further appeals to the Appeals Court yielded no reversal.[63] Thus, in an extraordinarily long and profusely-contested case, the Competition Bureau's approach was in effect rejected.

The difficult question of when the generic production of a pharmaceutical can

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59 . On the same day Lilly sued to enjoin three companies authorized by the U.S. Food and Drug Administration to sell generic cefaclor, alleging infringement of the Shionogi patents. Judge Barker of Indianapolis denied the injunction. Co-author Scherer testified in the July 1995 proceedings and also prepared in 2003 an affidavit (apparently not filed) in the later Canadian Apotex case.

60 . See OECD, Competition, Patents and Innovation II, report of a conference in Paris in June 2009, pp. 91-92.

61 . Eli Lilly and Co. et al. v. Apotex Ltd et al., opinion of Justice Gauthier, October 1, 2009, para. 6-9.

62 . Ibid., para. 640.

63 . Report by Scott Foster for the Association of Corporate Counsel on 2010 FCA 2400, http://www.lexology.com/library/detail. aspx?g=d5a6b72f-4396-a13a-a149aa86ef62.

begin has evoked a much wider-ranging debate. As in the Ceclor cases, key patents may have expired and regulatory approval for generic entry may be secured, but other more peripheral improvement patents may remain in force. The U.S. Hatch-Waxman Act allows regulators to approve generic entry when the generic firms claim that the remaining patents are not binding. Then an asymmetry of motives often emerges. To illustrate, suppose that before generic entry begins, the original patent holder is selling its product and realizing a gross margin of $200 million per year, i.e., 80 percent of its $250 million sales. Because they lack first-mover reputation advantages, the first generic entrants usually sell their products at a substantial discount relative to the branded first mover -- e.g., at a 50 percent discount that then increases as additional generic competitors appear.[64] In the first years of generic entry, the entrants capture much less than all sales of the relevant product. Assume it is 30 percent in the first year of generic sale. Then the sales of generic entrants are approximately $250 million x .30 (the generic share) x .50 (recognizing the price discount) = $37.5 million, from which must be deducted production costs of $15 million (assuming generics' unit costs to be the same as those of the incumbent), leading to a generic gross margin of $22.5 million. If some relevant but marginal patents remain in force, the incumbent has an incentive to use them as the basis for a patent infringement suit, attempting to defend the $60 million gross margin it would lose because of entry. There is an asymmetry, however; the generic entrants stand to gain at most $22.5 million if they are successful. And they (like the incumbent) face substantial litigation costs with uncertain outcome. So there are incentives for a deal. The incumbent can offer the generic entrants $25 million per year for remaining out of its market, retaining on sales that otherwise would be ceded to generic competitors a gross margin of $35 million. The would-be generic entrants are at least as well off accepting this "pay for delay" offer as compared to entering at reduced margins and incurring litigation costs. The only losers are the consumers, who otherwise would have saved $37.5 million buying lower-priced generic drugs, and the lawyers who would have profited from costly litigation.

Many such "pay for delay" schemes, less pejoratively called "reverse payment" agreements, materialized during the 1990s, inducing the U.S. Federal Trade Commission to issue a report emphasizing their anti-competitive consequences.[65] Numerous Federal and private class action lawsuits alleging antitrust law violations were brought, and diverse lower courts disagreed in their posture toward reverse payments and the principles for judging their legality. In the first such case to reach the U.S. Supreme Court, the Court divided by five-to-three, but in the end the majority rejected the Federal Trade Commission's argument that such agreements be ruled "presumptively illegal," calling instead for a rule of reason analysis weighing anticompetitive effects against the possibility that the settlement was primarily a means

64 . See F. M. Scherer, "Pharmaceutical Innovation," in A. P. Cuyler and J. P. Newhouse, eds, Handbook of Health Economics (North-Holland, 2000), AROUND p. 1225.

65 . U.S. Federal Trade Commission, staff report, Generic Entry Prior to Patent Expiration (Washington: 2002).

of avoiding complex and costly patent validity litigation.[66] The Court's majority recognized that the U.S. Congress intended in passing generic drug legislation to promote competition, but it observed also that reverse payments might approximate the litigation expenses saved through settlement. The outcome of patent validity contests, both the majority and dissenting minority agreed, is uncertain.[67] The majority insisted that a rule of reason approach did not require the competition policy advocates to "litigate the patent's validity, empirically demonstrate the virtues or vices of the patent system, [or] present every possible supporting fact or refute every possible pro-defense theory."[68] But it left to the lower courts the task of "structuring the ... rule-of-reason antitrust litigation" to weigh conflicting theories and resolve the key issues. In other words, it dodged the hard question of determining whether reverse payments did or did not tend in the typical case to be anti-competitive.

Startlingly absent from the Supreme Court's analysis was any recognition of evidence published nearly two month's before the Court's decision in what is widely considered the leading journal of the physical sciences.[69] From a study of 277 challenges between original drug patent holders and would-be generic producers, authors Hemphill and Sampat found a striking difference between the cases focusing on patents covering main active ingredients and the so-called "secondary" patents, involving "ancillary aspects of drug innovation -- such as particular drug formulations and compositions -- beyond the core ... patent on a novel active ingredient." In the primary patent cases litigated to completion, patent holders won against alleged infringers by a ratio of 12 to 1. In the fully litigated and much more numerous secondary patent cases, however, the alleged infringers prevailed by a ratio of 2 to 1.[70] Such evidence could have suggested that at least in cases where the original chemical composition patents had expired and only later, secondary patents were at issue, a presumption might be endorsed viewing "pay for delay" payments as anticompetitive. But what is clear is that further costly litigation will follow.

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66 . Federal Trade Commission v. Actavis, Inc. et al., slip opinion, decided June 17, 2013, p. 20.

67 . As Chief Justice Roberts wrote in the dissent,

"[W]e're not quite certain if the patent is actually valid, or if the competitor is actually infringing it. But that is always the case, and is plainly a question of patent law."

68 . Majority opinion, slip opinion p. 21.

69 . C. Scott Hemphill and Bhaveen Sampat, "Drug Patents at the Supreme Court," Science, March 200, 2013, pp. 1886-1387.

70 . Out-of-court settlements not included in these ratios were more prevalent for secondary than for primary patents. The primary vs. secondary issue was also crucial in the Indian Supreme Court's decision in 2013 to reject a Novartis application for patent protection on Gleevec, an anti-cancer drug. The broad primary claim covering the molecular structure of Gleevec (U.S. patent 5521184) was ineligible for patenting at the time under India's pre-TRIPS patent law, and the claim rejected by the Indian Supreme court (U.S. patent 6894051) was clearly secondary and confined mainly to formulation variations.

"Pay for delay" agreements have also attracted the intense attention of European Union competition policy enforcers. In June 2013 the European Commission assessed fines of 94 million Euros against a Danish company, Lundbeck, and 52 million Euros on several generic producers as penalties for payments to delay or in one case rescind the marketing of generic substitutes for Lundbeck's Citalopram antidepressant. Lundbeck's basic product patent had expired, and several process patents provided only "more limited protection." Announcing the action, European competition policy head Joaquin Almunia stated flatly:[71]

> It is unacceptable that a company pays off its competitors to stay out of its market and delay the entry of cheaper medicines. Agreements of this type directly harm patients and national health systems, which are already under tight budgetary constraints. The Commission will not tolerate such anticompetitive practices.

Assuming no reversal on appeal to the European High Court, it appears that the European Commission has chosen to come much closer to a per se approach than the U.S. Supreme Court. In December 2013 a further decision concerning Novartis and Johnson & Johnson is expected.

Information Technology

Especially in the realm of information technology, standards must be established allowing devices such as computers and cellular telephones to encode, transmit, and interpret data in a form compatible with devices at all stages of the interoperating network. At first, for telegraph and telephone communications, the standard-setting body was quasi-governmental, notably, the eventually was called the International Telecommunication Union, located in Geneva. More recently standards have been set by committees representing interested parties. Problems can arise when a participant in the standard-setting process successfully advocates standard details that require the use of patented technology, e.g., in the form of integrated circuit layouts or software, without revealing that it controls relevant essential patents, and, once need is established through standard adoption, can demand high royalties to license the patents. The OECD staff has called such behavior a "patent ambush."[72]

The so-called Rambus case illustrates a prominent example.[73] A private committee set standards for computer memory chips. Representatives of Rambus, Inc. participated in committee meetings and advocated certain designs while deliberately concealing the fact that their employer had patents pending that covered those designs. Rambus then brought patent infringement suits against several producers of dynamic random access memory (DRAM) chips, demanding substantial royalties. Both the U.S.

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71 . European Commission Press Release, 19 June 2013.

72 . See Jeremy West, "Background Note," OECD document DAF/COMP(2009)22 (2009), pp. 16 ff.

73 . See West, loc. cit., pp. 35-36.

Federal Trade Commission and the European Commission filed challenges to Rambus' actions. The Federal Trade Commission found on appeal that "Rambus was able to distort the standard-setting process and engage in anticompetitive 'hold-up' of the computer memory industry" and found Rambus' conduct to contribute to the acquisition of unacceptable monopoly power.[74] It ordered Rambus to license the relevant patents for a royalty rate not exceeding 0.5 percent, dropping to zero after three years for standards-essential patents. In 2007 the European Commission filed its own statement of objections to Rambus' behavior, asserting that the company was demanding unreasonable royalties following its successful patent ambush.[75]

The problems in these and other standards patent ambush cases have led the European Community, the United States, and other jurisdictions to insist that companies holding standards-critical patents disclose their patent positions fully before standards are established (so that standards committees can circumvent the patents if the royalties demanded are too high) and that they commit in advance during the standards-setting process to license these patents to all applicants on "fair, reasonable, and non-discriminatory" terms. This has come to be known as the FRAND doctrine or (omitting the "fair") in the United States as the RAND doctrine. This position is not without controversy. Agreeing in industry-based committee proceedings to charge a particular royalty rate comes close to the coordinated setting of prices, which under other conditions is a clear violation against national and European price-fixing prohibitions.[76] A consensus appears to have emerged, however, that it is better to avoid patent ambushes when standards are necessary than to follow traditional competition policy doctrine rigidly -- in other words, to apply a rule of reason.

Acceptance of FRAND still requires that there be a means of establishing what royalty rate is "fair" or "reasonable."[77] This, U.S. appellate court Judge Richard Posner makes clear, is not easily accomplished and can be led astray by biased or incompetent

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74 . In the matter of Rambus, Inc., FTC docket 9302 (2006 and 2007). For additional cases, see Jeremy West, supra note 74; and Richard Gilbert and Alan Weinschel, "Competition Policy for Intellectual Property: Balancing Competition and Reward," in American Bar Association, Issues in Competition Law and Policy, supra note 14, vol. III, at pp. 2031-2033.

75 . West, supra note 74, at p. 36.

76 . See e.g. the statement of the American Antitrust Institute underlying testimony before the U.S. Senate Judiciary Committee in hearings on standard-essential patents, July 11, 2012.

77 . For some history and theory, see F. M. Scherer, The Economic Effects of Compulsory Patent Licensing, New York University Monograph Series in Finance and Economics, 1977, pp. 43-50; and F. M. Scherer and Jayashree Watal, "Post-TRIPS Options for Access to Patented Medicines in Developing Nations," Journal of International Law, December 2002, pp. 920-924.

In 2013, the Competition Commission of India was reported to be investigating excessive royalty demands by Ericsson of Sweden for the licensing of mobile phone patents -- i.e., applying royalty rates to the prices of whole telephones rather than to the value of the narrow patents licensed. "India: Patent Wars Head to India," Competition Policy International internet report, December 2, 2013.

expert witnesses.[78] At maximum, he observed, the royalty in such cases should not exceed the cost of inventing around the subject patent, which is also not readily ascertained. Arraying 15 alternatives proposed in an earlier U.S. royalty-setting case, Judge Posner agonizes, "[C]ould a judge or jury really balance 15 or more factors and come up with anything resembling an objective assessment?"[79] How FRAND royalties are set will continue to be a focus of controversy.

Implicit in the FRAND approach is the assumption that patent holders will license their patents for royalties and not seek to enjoin the sale of allegedly infringing products altogether. This assumption is widely accepted in all patent cases, not only standards cases, and consistent with a precedent-altering decision by the U.S. Supreme Court in 2006.[80] However, disputes continue, leading to both U.S. presidential and European Commission intervention into running patent claims and counter-claims advanced by Samsung, Apple, Google, and other internationally prominent enterprises in 2013.[81]

Information technology, perhaps more than other fields, has lent itself to the proliferation of many thousands of patents covering details of integrated circuits, microwave tubes, compression codes, transmission methods, and much else. A Fordham University study found that on "smart phones" alone, the number of U.S. patents issued was averaging nearly 3,000 per month in 2012.[82] With so many patents in force, most of them not deemed standard-essential, the risk of inadvertently infringing some is great. Developing new products has come to be like walking through a mine field, with a constant risk of serious consequences when one steps on an unobserved patent. An ambitious quantitative analysis of the U.S. patent experience suggests that in most fields, chemicals and pharmaceuticals excepted, the legal, infringement damage, and related costs associated with patent law suits began in the 1990s to exceed by increasing amounts the patents' worldwide incremental economic value to U.S. publicly-listed corporations.[83]

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78 . Opinion and order in Apple Inc. et al. v. Motorola Inc. et al., U.S. District Court for the Northern District of Illinois, Case no. 1:11-cv-08540 (June 22, 2012). As Judge Posner observed, inept testimony "invites guesswork. It won't do."

79 . Ibid., slip opinion p. 14. Judge Posner cites Georgia Pacific v. United States Plywood, 318 F. Supp. 1116, 1120 (1970).

80 . I.e., in eBay v. Merc Exchange, 547 U.S. 388 (2006). It stressed that injunctions should be issued only when irreparable injury from infringement has been proven, remedies such as the payment of damages are insufficient to compensate for the injury, and crucially, when the public interest is served by an injunction.

81 . See "Samsung in Talks To Settle EU Antitrust Case," Reuters dispatch by Foo Yunchee, June 25, 2013; Robert D. Stoner, "USTR Disapproves USITC 337 Ruling on Apple v. Samsung," Economists Ink, Fall 2013; and "A President Steps Between Apple and Samsung," Bloomberg Business Week, August 8, 2013, p. 14.

82 . Joel P. Reidenberg et al., "The Impact of the Acquisition and Use of Patents on the Smartphone Industry," draft report to the World Industrial Property Organisation, October 2012.

83 . James Bessen and Michael Meurer, Patent Failure: How Judges, Bureaucrats, and

A specialized facet of the patent accumulation problem deserves further consideration. Although the phenomenon has historical precedents, in recent years some companies, called "patent assertion entities" or more pejoratively, "patent trolls," have as their primary business model acquiring the patents assigned to other individuals and corporations and then finding deep-pocketed infringers against whom infringement suits can be launched. If the suit is successful, substantial damages may be obtained. But more likely, the costs of a law suit are so great that the target company will arrange a settlement by paying less than the expected litigation costs, taking into account also the not-insubstantial probability that error-prone trials will lead to a damages award. Joel Reidenberg and colleagues found that among 267 identifiable U.S. patent infringement suits involving cellular "smart phone" technology, at least 50 were brought by assertion entities, i.e., those that did not perform research and development or produce hardware themselves.[84] Assertion companies also represented from 30 to 40 percent of the most frequent litigants by number. Although one might argue that such companies help perfect markets for patents, in the main, their activities appear to have little redeeming social value.

The U.S. Federal Trade Commission began an investigation of the competitive consequences of patent troll activity in 2013, the results of which have not yet been released.[85] A task force operating directly under U.S. President Barack Obama focused attention on the issue in June 2013, suggesting mainly reforms at the U.S. Patent Office to issue patents of higher quality.[86] Draft bills before the U.S. Congress in 2013 would among other things allow presiding judges more scope in ordering patent suit plaintiffs to pay the legal fees of their targets when the plaintiffs lose.[87] Substantial companies have attempted to defend themselves from blackmail by asking the U.S. Patent Office to reconsider administratively on an accelerated schedule the validity of patents with which they have been attacked.[88] Not suggested by any official source, but also within the

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Lawyers Put Innovators at Risk (Princeton University Press: 2008), especially p. 138. Litigation costs were estimated by the change in stock market value occurring when patent law suits are announced. They include both legal costs and expected wealth transfers contingent upon successful judgments in favor of plaintiffs. The value of patents was estimated mainly through studies of how much companies are willing to pay to renew their patents.

84 . Supra note 84 at pp. 40-42.

85 . "F.T.C. Is Said to Plan Inquiry of Frivolous Patent Lawsuits," New York Times, June 20, 2013, p. 1.

86 . Brian Kahin, "Troll Economics: The White House Weighs In," www.patentprogress.org/2013/06/14/troll-economics-the-white-house-weighs-in (June 2013).

87 . "Congress Takes on Abusive Patent Suits," New York Times, editorial, Sunday Review, p. 10. See also Randall R. Rader et al., "Make Patent Trolls Pay in Court," op. ed. column, New York Times, June 5, 2013. The authors report that targets' legal costs were shifted to plaintiffs in only 20 out of roughly 3,000 patent cases filed in 2011. Rader was chief judge of the special U.S. appellate court hearing patent appeals.

88 . "A Cheaper Way to Defuse Patent Claims," Bloomberg Business Week, October 24, 2013, p. 41.

realm of possibility, would be retroactively applying the laws prohibiting anticompetitive mergers and acquisitions to challenge large-scale patent acquisitions by non-practicing entities that lead to law suits jeopardizing continued technological progress by enterprises actually producing goods and services.

Conclusion

In this paper we have surveyed the interface between competition policy and the use of patents and other intellectual property across an array of technologically advanced nations. It is clear that widely varying policy tradeoffs have been made. One must assume that national decision-makers were responding reasonably to the changing economic circumstances with which they were confronted and the diverse ideological beliefs they carried into their policy deliberations. Our analysis was conducted to inform developing countries faced with implementing TRIPS Articles 40 and 31 with respect to how intellectual property is used in their home jurisdictions. What our findings suggest is that developing countries, like the developed nations on which we have mainly focused, can reasonably choose among a broad menu of policy alternatives as their national interests dictate. Like Japan in its early postwar economic development phase, the developing countries need precedents that enable their firms to absorb on reasonable terms the technologies that will facilitate their growth. And they might be well advised to favor *per se* rules distilled from the experience of technologically advanced nations rather than adopting a rule of reason approach, with the attendant attorney and expert consultant costs and delays required to balance complex conflicting facts and values.