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Patent Wars and Technology Transfer Agreements: Should the EU Rules Change?

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I. INTRODUCTION

The European Commission ("the Commission") has recently launched a consultation on whether the rules governing intellectual property licensing should be revised after April 2014, when the current Technology Transfer Block Exemption ("TTBER")[2] and Guidelines[3] will expire.

The Commission has not yet put any proposal for reform on the table, choosing instead to canvass stakeholders' opinions regarding the functioning of the TTBER and Guidelines in general. However, in order to stimulate the debate, the Commission has also commissioned an economic study on the interplay between Intellectual Property Rights ("IPRs") and competition policy, which is intended to contribute to the Commission's review of the TTBER and Guidelines.

The study, carried out by Professors Pierre Regibeau and Katharine Rockett ("Regibeau & Rockett"),[4] consists of an excellent review of the existing economic literature, supplemented at times by the authors' own economic models covering principally the areas of cross-licensing, patent pools, grant-backs, and pass-through. The extensive review of the literature is commendable, especially given the rapidly evolving nature of economic research in this field, and provides a very useful base for discussing the interaction of competition and IPR policy.

Regibeau & Rockett provides also a number of policy recommendations. In a nutshell, the study:

- appears skeptical with regard to the existence of a "patent-thicket problem;"
- advocates a stricter approach to cross-licensing agreements;
- suggests a more lenient approach to patent pools which include non-essential patents and have selective membership rules; and

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[2] Commission Regulation (EC) No 772/2004 of 27 April 2004 on the application of Article 81(3) of the Treaty to categories of technology transfer agreements, OJ No 123, 27.04.2004.

[3] Commission Notice - Guidelines on the application of Article 81 of the EC Treaty to technology transfer agreements OJ C 101, 27.04.2004.

[4] *See* P. Regibeau & K. Rockett, *Assessment of Potential Anticompetitive Conduct in the Field of Intellectual Property Rights and Assessment of the Interplay Between Competition Policy and IPR Protection*, prepared for the European Commission, (2011).

- advises that the current lenient treatment of grant-back should be reconsidered, especially in the case of non-severable innovations.

While we appreciate the authors' reasoned review of that relevant economic literature, we do not share all the recommendations of the study.

In fact, perhaps the main difference of opinions between Regibeau & Rockett and us is that we consider the patent thicket to be a real problem in many technology sectors, and one which leads to excessive strategic behavior and litigation. The seriousness of the patent thicket problem is exemplified by the current patent wars in the wireless/smartphone space. Thus, we believe that antitrust policy should facilitate negotiated solutions to the patent thicket problem, and recognize that cross-licensing agreements and patent pools are instrumental in solving this problem.

It is our view that the Commission's current enforcement stance is broadly correct, and that no tightening of the rules with regard to cross-licensing agreements and grant-backs is required. Like Regibeau & Rockett, we support a rule-of-reason approach to patent pools. However, we recommend a full effects-based analysis of the inclusion of substitute or non-essential patents in pools, as recent economic contributions have shown that the inclusion of such patents may have pro-competitive but also anticompetitive effects.

We discuss these points in more detail in the rest of the article. Before going into the details of each type of license agreement, we review in the next section some facts about patent thickets.

II. PATENT THICKETS

Understanding patent thickets is critical because both cross-licensing and patent pools are market-driven attempts at fixing the patent thickets problem. A complete assessment of licensing agreements must therefore take into account how patent thickets affect innovation, and how cross-licensing and patent pools allow companies to cut through the thicket.

It is a well-known fact that more and more patents are being granted. Over the period 1980-2010 the number of patents granted in the United States has almost quadrupled. In 2010 alone, more than 240,000 patents have been granted by the United States Patent and Trademark Office ("USPTO"). Although data availability on European patents is more limited, Europe seems to have followed the same pattern, with the number of patents almost doubling from 2001 to 2010. Such patent explosions have been particularly pronounced in high-tech sectors, with the number of European patents doubling in semiconductors, tripling in biotechnology, and increasing nine-fold in digital communication.[5]

[5] This increase in patenting rate has many explanations. First of all, a strengthening of patent protection has produced an increase in the number of infringement suits filed and an increase in the success rate of these infringement suits (*see* W.M. Cohen, R.R. Nelson, & J.P. Walsh, *Protecting their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)*, NBER Working Paper 7552 (2000); A.B. JAFFE & J. LERNER, INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT (2004). This increase has provided companies with an extra incentive for patenting. Second, patentability requirements have decreased over time; the percentage of successful European patents applications (i.e. the number of patents granted over the number of patent applications) has increased from

Over-patenting has some undesired consequences that are likely to stifle rather than spur innovation. The most important of these consequences is the emergence of patent thickets in complex technology industries. A patent thicket is defined by Shapiro as "an overlapping set of patent rights requiring that those seeking to commercialize new technology obtain licenses from multiple patentees."[6] High tech industries are particularly prone to patent thickets. For example, in the software industry, the widely used MPEG-4 Visual video compression technology reads[7] on more than 246 U.S. patents belonging to 24 different patent holders.[8] This is not an isolated example and is not certainly the worst one: DVDs readers are covered by 178 U.S, patents,[9] the 3G standard for mobile wireless network is based on thousands of patented components,[10] and it is estimated that an average smartphone reads on more than 200,000 patents.[11]

Patent thickets in high-tech industries generate three major problems. First, they increase the probability of *hold-up*, i.e. the probability that a new product inadvertently infringes on a previous, patented invention. Hold-up is particularly dangerous for a company commercializing a new good. The patent holder claiming infringement is usually in a strong bargaining position since the manufacturer of the new product has already sustained irreversible costs to develop and commercialize the new product. Once the new product is on the market, the patent holder may thus threaten the manufacturer to stop production and sale. This produces an edge between what the manufacturer is willing to pay not to be held up and the true value of the patent. The true value of the patent is the price the manufacturer would have been willing to pay in a hypothetical *ex-ante* negotiation with the patent holder: i.e. when the manufacturer had not yet incurred any irreversible cost, and could invent around the patent or exclude the patented technology from its new product. The case of *NTP Inc. vs Research in Motion* ("RIM") is the most oft-quoted case of a patent holder "holding up" a manufacturer.[12]

When a new product is based on thousands of previous patented inventions, it is virtually impossible for the manufacturer to know in advance what patents the new product might

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20 percent in 2001 to 25 percent in 2010. Third, there has been an extension on what is patentable: for instance, in the United States, patents were extended to life forms in 1980 (see *Diamond v. Chakrabarty*), to software in 1981 (see *Diamond v. Diehr*), and to business methods in 1998 (see *State Street Bank and Trust Company v. Signature Financial Group, Inc.*). Fourth, since the Bayh–Dole Act of 1980 universities and other research institutions can be granted patents in the United States.

[6] C. Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting*, INNOVATION POLICY AND THE ECONOMY, VOL. 1 (A. Jaffe, J. Lerner, & S. Stern eds., 2001).

[7] A product or a process reads on a patent when it falls within the claims of that patent.

[8] *See* http://www.mpegla.com/main/programs/M4V/Pages/PatentList.aspx.

[9] *See* http://www.dvd6cla.com/patentlist_01.html.

[10] *See* D.J. Goodman & R. A. Myers, *3G Cellular Standards and Patents*, Proceedings of IEEE WirelessCom (2005).

[11] See *The Android Patent War*, W.S.J. (December 5, 2011).

[12] In 2006 NTP Inc. asserted a patent reading on a technology used in the Blackberry wireless email system, and sued Blackberry's manufacturer Research In Motion (RIM) for damages. The jury awarded $33.5 million in damages to NTP, where damages were intended as the larger quantity between lost profits or reasonable royalties. The court also issued an injunction preventing RIM to keep infringing the patent (NTP, Inc. v. Research in Motion, Ltd., No. 3:01-cv-767 (E.D. Va. 2006)). RIM, faced with the possibility that Blackberry email services would be shut down, settled with NTP and paid $612.5 million to license the patented technology. The difference between the $612.5 million and the $33.5 million represents the cost of hold-up for RIM.

infringe on. As Shapiro puts it, manufacturers of new high tech products risk stepping on a land mine every time they release a new product.[13] Lamley & Shapiro explain that, when the thicket is made of complementary components, some of which belong to the manufacturer, the hold-up problem is magnified.[14] In this case, the bargaining position of any of the patent holders is even stronger because the manufacturer is unable to separate the infringed patents from the non-infringed ones.

The prospect of holding-up a new successful technology may also give rise to opportunistic behaviors of patent holders in the form of patent ambushes. A patent ambush takes place when a company (sometimes called a "patent troll") waits until a product has become successful to reveal it owns relevant IPRs on that product and then requires high royalties. An oft-cited example is that of Rambus, who was found to have intentionally hidden its pending patent application on SDRAM memory chips when SDRAM was being considered, among other technologies, for becoming a standard for memory chips. After SDRAM was declared the industry standard to be used in laptops, desktops, and servers, Rambus was found to have held up the industry by setting unreasonably high license fees.[15]

A second problem of patent thickets is that they usually involve significant *transaction costs* for the manufacturers due to negotiating license fees with many patent holders. Even a trivial transaction cost might, in fact, become unsustainable if it is incurred for each of the thousands of patents reading on the new product.

A third problem of patent thickets is that of *royalty stacking*. Patent holders often hold complementary monopolies (i.e. different patents are all needed in order to manufacture a product). It is a well-known result in economics that the cost of buying two or more complementary inputs from two or more different monopolists is higher than the cost of buying the same complementary inputs when they are supplied by a single monopolist. Likewise with patent thickets. the total royalty is higher the larger the number of patent holders involved.[16]

For the reasons listed above, there is a—in our view justified—concern among industry participants and regulators that patent thickets may discourage innovation. Companies in high-tech sectors have tried to cut through the thickets by widely adopting cross-licenses and patent pools. Antitrust regulators' stances towards these agreements depend crucially on whether patent thickets are considered a significant problem.

Regibeau & Rockett appears to be skeptical as to the extent to which patent thickets are a real threat to innovative activity. In particular, it argues that the economic literature is

[13] *See* Shapiro, *supra* note 5.

[14] *See* M. Lemley & C. Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEXAS L. REV. (2007).

[15] *See* European Commission Case COMP/38.636 — Rambus.

[16] Imagine a manufacturer of a new product pays a royalty to two different patent holders, A and B, for each unit of the new product sold. If A increases the price of its patent, it also increases the marginal cost of the new product. If the new product is sold at marginal cost, or at a fixed mark-up over the marginal cost, its price increases and fewer consumers buy it. The reduced demand for the new product translates into fewer royalties for patent holder B, and therefore reduces B's profits. In summary, an increase in the price of A's patent reduces the profits of patent holder B. This can be thought of as an externality: If the two patents belonged to the same patent holder, this patent holder would take into account the effect of the price of one patent on the demand for the other patent, and would therefore have an incentive to keep prices lower.

inconclusive on the size of the inefficiencies stemming from patent thickets, and it is therefore difficult to measure the welfare gains from cross-licensing and patent pools.

Yet, the empirical economic literature reviewed by Regibeau & Rockett produced solid evidence on the existence of patent thickets, even though this evidence is limited to certain high-technology sectors that are more prone to cumulative innovation.[17] Also, the theoretical literature on complementary monopoly and patent thickets show that patent thickets may completely eliminate the incentives to innovate or to manufacture a new product.[18]

That patent thickets are an important problem is also borne out by the recent "patent wars" in the wireless/smartphone space. The most important patent war is probably taking place in the smartphone industry where giants as Apple, Google, Microsoft, Motorola, and RIM have entered into extensive patent litigation, and are arming themselves with literally thousands of patents while at the same time closing strategic alliances.

In January 2010 Oracle acquired Sun Microsystem and its Java operating system platform for $7.4 billion. Oracle then sued Google claiming that Google's Android OS for tablets and smartphones was infringing upon the Java operating system. [19]

In December 2010, Microsoft, Apple, Oracle, and EMC announced their plan to set up a consortium (CPTN) to acquire 882 Novell patents, also related to the Android OS, for $450 million.[20] Finally, Rockstar Bidco, a consortium created by Apple, Microsoft, and RIM, acquired over 6,000 Nortel patents for $4.5 billion.[21] Nortel's patents were important to Google as evident from Google's last bid of over $4 billion from an initial bid of $900 million.[22] Google responded in 2012 by acquiring Motorola Mobility and its portfolio of 17,000 patents for $12.5 billion.[23]

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[17] *See*, e.g., Cohen et al., *supra* note 4; B.H. Hall & R. H. Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979–1995*, 32(1) RAND J. ECON (2001); M. Noel & M. Schankerman, *Strategic Patenting and Software Innovation,* CEPR Discussion Paper 5701 (2008); or G. Von Graevenitz, S. Wagner, & D. Harhoff, *Incidence and Growth of Patent Thickets—The Impact of Technological Opportunities and Complexity*, J. INDUS. ECON. (Forthcoming).

[18] *See* A. COURNOT, RESEARCHES INTO THE MATHEMATICAL PRINCIPLES OF THE THEORY OF WEALTH (1838), *Irwin* (1963); T. C. Bergstrom, *Cournot Equilibrium in Factor Markets*, University of Michigan working paper (2004); Shapiro, *supra* note 6; J. Lerner & J. Tirole, *Efficient patent pools*, AMER. ECON. REV 94 (2004); M. Boldrin & D. K. Levine, *The Economics of Ideas and Intellectual Property*, Proceedings of the National Academy of Sciences 102 (2005); G. Llanes & S. Trento, *Patent Policy, Patent Pools, and the Accumulation of Claims in Sequential Innovation*, ECON. THEORY (2010); G. Llanes & S. Trento, *Anticommons and Optimal Patent Policy in a Model of Sequential Innovation*, 11(1) B.E. J. OF ECON. ANALYSIS & POL'Y (2011).

[19] *See, Oracle files suit over Android's use of Java*, available at http://tech.fortune.cnn.com/2010/08/12/oracle-files-suit-over-androids-use-of-java/.

[20] *See, Apple, Oracle and EMC Part of Microsoft-led Patent LLC*, available at http://www.pcworld.com/businesscenter/article/213924/apple_oracle_and_emc_part_of_microsoftled_patent_llc.html.

[21] *See*, *Nortel patents sold for $4.5bn*, available at http://www.guardian.co.uk/technology/2011/jul/01/nortel-patents-sold-apple-sony-microsoft.

[22] *See, Google needs more firepower in raging patent wars*, available at http://www.ft.com/cms/s/0/c4aa233a-ada8-11e0-9038-00144feabdc0.html#axzz1sPBKBF7f.

[23] *See, Google's $12 Billion Apple Defense Tested by Patent Cases*, available at http://www.bloomberg.com/news/2012-04-20/google-s-12-billion-apple-defense-tested-by-patent-cases.html

Patent wars in smartphones and other industries are inefficiencies generated by patent thickets. In the next two sections we discuss the two main commercial solutions to the patent thicket problem: cross-licenses and patent pools, and the competition issues they may raise.

III. CROSS-LICENSING

Cross-licensing is an agreement among two or more patent holders, whereby each patent holder is allowed to use some or all of the patents of the others, and at the same time it allows others to use some or all of its patents.

Cross-licensing makes it easier for integrated firms (i.e. those both owning IPRs and manufacturing a given technology) to cut through a patent thicket. Some of the big integrated firms such as IBM, Apple, Nokia, Samsung, and others have such massive patent portfolios[24] that it would be virtually impossible for any of them to innovate without infringing on each others' patents. Cross-licensing agreements among these companies greatly reduce the inefficiencies of patent thickets: companies know they are free to innovate without being held-up by patent holders with which they have cross-licensing agreements. Also, transaction costs are reduced as companies only need to reach a broad agreement on large sets of patents. Finally, in the common case in which cross-licensing is on a royalty-free basis, royalty stacking is obviously eliminated.

As Jaffe & Lerner[25] point out, cross-licensing is especially important in the context of technology standards. A technology standard establishes uniform engineering or technical criteria and thus allows inter-operability between the products of different manufacturers adhering to the standard. Technology standards are at the basis of many products such as DVDs, HD televisions, wireless technology, computer memory chips, USB drives, fax machines, etc. Since compatibility requires that products of different suppliers share at least some common core technology, cross-licensing ensures that all manufacturers can access this common technology.

Regibeau & Rockett is concerned about possible anticompetitive effects of cross-licensing and propose that the Commission takes a more conservative approach towards this type of agreements. One such concern is that—when it is not on royalty-free basis—cross-licensing may be used as a tool to artificially raise patent holders' marginal cost of producing the technology. Imagine two patent holders, A and B, which both own a patent on a downstream technology they also happen to manufacture. Setting high royalties on those patents is an anticompetitive and profitable strategy for both companies. It is anticompetitive because it is equivalent to setting a price floor.[26] It is profitable because A makes positive profits each time B sells a unit of the product, and vice versa.[27] In other words, each of the patent holders is able to sustain a collusive level of profits by inflating each others' cost through high-royalty cross-licenses.

This potential anticompetitive practice can be prevented by requiring the adoption of *netting out*. Netting out means that patent holders compare the width and relevance of the patent

[24] IBM alone owns more than 40,000 patents. *See* A. Layne-Farrar, *The Brothers Grimm Book of Business Models: A Survey of Literature and Developments in Patent Acquisition and Litigation*, manuscript (2012).

[25] *See* Jaffe & Lerner, *supra* note 5.

[26] Royalties are part of the marginal cost, and the marginal cost is the minimum price a company is willing to supply for.

[27] *See* M. Katz & C. Shapiro, *On the Licensing of Innovations*, RAND J. ECON. (Winter 1985).

portfolios they agree to cross license. If these patent portfolios are similar then no payment is due; if the portfolio of patent holder A is wider or it includes more valuable patents, then B makes some payment to A, but A does not make any payment to B.

Another anticompetitive effect of cross-licensing, in the view of Regibeau & Rockett, is that it might act as a barrier to entry for companies with few or no patents to offer in exchange. If an industry is characterized by a few large companies with a wide patent portfolio, and which engage in cross-licensing, an entrant with a limited patent portfolio might find it difficult to reach a cross-licensing deal with the incumbents. It might, instead, be forced to pay a license fee to each of them. However we do not think this is a problem specific to cross-licensing agreements, as small firms would face the same entry cost (the cost of paying royalties) even if the cross-licensing agreement was not in place.[28]

Regibeau & Rockett is not sympathetic to cross-licensing agreements. Some of the conclusions appear based on a skepticism with regard to the existence of a patent thicket problem. On the premise that the benefits of cutting through the thicket are uncertain, the study concludes that: (i) a more lenient approach to cross-licensing than in the Guidelines is not justified; in fact (ii) cross-licensing can have similar anticompetitive effects as research joint ventures ("RJVs") and should be treated more strictly than RJVs (and thus more strictly than in the current Guidelines); and (iii) cross-licensing can put smaller firms at a disadvantage.

We disagree with these conclusions. We believe that patent thickets are a significant problem and that, overall, the pro-competitive effects of cross-licensing far outweigh its anticompetitive effects, and such license agreements should therefore be treated leniently by the Commission. This is true especially given that the potential anticompetitive effect of cross-licensing creating a price floor can easily be eliminated by imposing *netting out* or upfront payments. Finally, we agree with Regibeau & Rockett when it points out that cross-licensing can't have anticompetitive effects when it involves essential patents and royalty-free licenses (as it often does).

IV. PATENT POOLS

A patent pool is an agreement among patent holders to license a subset of their patents together, as a bundle. Examples of patent pools include IPRs on airplanes, on radios, on DVDs, on 3G mobile phone technology, and on many others. Patent pools are somehow related to cross-licensing since they also allow for the simultaneous licensing of multiple IPRs. A difference from cross-licensing, however, is that patent pools are also licensed to third parties.

Compared with cross-licensing, assessing the competitive effects of patent pools is more complex, and there are many contributions in the economic literature highlighting various different effects. However, as also indicated by Regibeau & Rockett, the economic literature on patent pools has reached two generally accepted conclusions:

[28] While it may be possible that the relative cost position of an entrant without a significant patent portfolio may be worse when other players have royalty-free cross-licences, this would be due to the efficiency that the parties attain through royalty-free cross-licensing, rather than to an increase of the entrant's costs. As such, this "worsening" of the entrant's relative cost position would not be anticompetitive.

1) A patent pool is pro-competitive if it is made of essential patents (i.e. patents that are necessary to produce a technology as a result of their inclusion into a technology standard). Essential patents do not, by definition, admit substitutes. On the other hand, patent pools are anticompetitive when made up of substitute patents.[29]

2) Members of the pool should be free to also license their patents outside the pool, in addition to licensing them through the pool. Allowing for independent licensing has proven to be always pro-competitive.[30]

A patent pool of essential patents is pro-competitive for many reasons. First, a manufacturer of a new technology (such as a manufacturer of 3G devices) knows what patents it needs to pay for. By increasing awareness of which IPRs are essential to the new product, a patent pool reduces or prevents[31] hold-up. Second, by allowing one-stop licensing, it minimizes transaction costs. Third, since license fees of complementary patents are set cooperatively, patent pools eliminate the royalty stacking (complementary monopoly) problem.

Regibeau & Rockett provides a very good assessment of the economic literature on patent pools, and recognizes their ability to solve the patent thicket (and royalty stacking) problem, and thus their pro-competitive effects.

We agree with six recommendations by Regibeau & Rockett: (i) keep the safe harbor for essential patents; (ii) encourage pool members' independent licensing outside of the pool; (iii) selective membership should not be considered anticompetitive *per se*; (iv) high levels of royalties are not *per se* anticompetitive; (v) the presence of non-integrated members does not *per se* make the pool anticompetitive; and (vi) rules that trigger the demise of the pool in the presence of defections help pool formation and are therefore pro-competitive.

However, we are less convinced by Regibeau & Rockett's suggestion that the inclusion of non-essential patents in a pool should, in general, be considered as pro-competitive. We think that the study's recommendation may derive from the existing confusion in the literature and the policy debate between non-essential and substitute patents. While essential patents are complements by definition, non-essential patents can be substitutes or complements. Thus the concepts of essentiality and substitutability are distinct.

Patent pools that only include *essential* patents are unambiguously pro-competitive. Patent pools that include *non-essential*, *substitute* patents are unambiguously anticompetitive. But, as demonstrated by some recent economic contributions, patent pools that include *non-essential*, *independent, or complementary* patents may be pro- or anticompetitive depending on whether there are substitute patents outside the pool.[32]

This is because patent pools including non-essential patents may have two different anticompetitive effects. First, they might facilitate collusion if they include substitute patents. Second, bundling non-essential patents that have a substitute outside the pool (even if not within the pool) together with essential patents reduces or eliminates competition between the non-

[29] *See* Shapiro, *supra* note 6; Lerner & Tirole, *supra* note 18.
[30] *See* Lerner & Tirole, *supra* note 18.
[31] Hold-up is prevented when all the required essential patents are in the patent pool.
[32] *See* D. Quint, *Pooling With Essential And Nonessential Patents*, manuscript (2012).

essential patents in the pool and their substitutes outside—the user of the technology would, in fact, purchase the patents in the pool (inclusive of the non-essential patents) and not the substitute, separate patents.

Independent licensing solves the first problem (i.e., collusion between substitute patents), as non-essential patents would be in competition with substitute patents outside the pool. However, independent licensing does not solve the second (bundling) problem because technology users still need to buy the patent pool (inclusive of the non-essential patents) in order to obtain the essential patents and be able to use the technology. The non-essential patent would, in other words, free-ride on the essential patents, while the substitute patents would be put at a competitive disadvantage, even in the presence of independent licensing. Therefore independent licensing, even if *per se* it is pro-competitive, does not make up for the lack of essentiality.

It is important to consider, however, that it may sometimes be difficult to determine which patents are essential, and thus some inclusion of non-essential patents may be justified by reasons of legal certainty or by the presence of other transaction costs.

We therefore think that the Commission should adopt a full effects-based analysis to assess the competitive effects of including non-essential patents in the pool, as the economic literature does not support the idea that such inclusion is in general pro-competitive.

V. GRANT-BACKS

A grant-back is a clause in a licensing contract that requires the licensee, in case it improves upon the patent, to license back the improvement to the licensor. They are fairly common in licensing agreements and are generally thought to be pro-competitive, especially if the innovation is non-severable (i.e. cannot be exploited by the licensee without the licensor's permission).[33]

The Regibeau & Rockett study notes that the economic literature on this topic is scant, and therefore the authors develop their own, very interesting model to assess the competitive effects of grant-backs. A discussion of that model, which warrants further consideration, is beyond the scope of this article, but suffice here to say that the authors appear to be skeptical as to the benefits of grant-backs and suggest that grant-backs may reduce innovation incentives.

This conclusion seems to put more weight on the licensee's rather than on the licensor's incentives to innovate. Since the licensee needs to grant-back a hypothetical incremental innovation to the licensor, its incentives to innovate are reduced. On the other hand, the prospect of licensing its innovation with a grant-back provision increases the licensor's expected profits from innovating in the first place. These two forces pull in opposite directions, and the net effects of grant-backs depend on which is stronger. Also, grant-backs unambiguously foster competition in the product market.

[33] Commission Notice - Guidelines on the application of Article 81 of the EC Treaty to technology transfer agreements OJ C 101, 27.04.2004, ¶ 109.

The (sparse) economic literature focuses more on the effects of grant-backs on the licensor's incentives to innovate and on competition in the product market.[34] Generally speaking, grant-backs increase the probability that a patent holder licenses its IPRs and therefore enhances technology diffusion. Grant-backs are especially important in high-tech sectors where innovation is sequential, meaning that innovations build upon each other.[35] This is because in those sectors a patent holder would be less willing to license its technology under the threat that the licensee improves upon it and makes the licensor's technology obsolete.

Grant-backs also have an efficiency justification related to how profits are shared between subsequent innovators; since the improvement could not exist without the original licensed technology, it is efficient that the licensor reaps some of the benefits from the improvement.[36] Grant-backs allow such a transfer of benefits.

In general we agree with Gilbert & Shapiro[37] that antitrust concerns should be minimal and limited to cases where the licensor is the dominant source of future innovation.

In summary, we do not share Regibeau & Rockett's view that the current policy stance towards grant-backs is too lenient, as we believe that the pro-competitive effects of grant-backs tend to be stronger than the potential anticompetitive effects.

VI. CONCLUSION

The current TTBER and Guidelines will expire in 2014 and the European Commission has started canvassing views on whether the current rules should be changed. As part of this debate, the Commission commissioned an economic study on the interplay between IPRs and competition policy.

This economic study provides an excellent review of the existing economic literature on cross-licensing, patent pools, and grant-backs. However, we do not share all the recommendations of the study and, in particular, we do not agree with the authors' suggestion that the current policy with regard to cross-licensing and grant-backs may be too lenient.

The main difference of opinion is that we consider the patent thicket to be a real problem in many technology sectors, which leads to excessive strategic behavior and litigation. Thus, we believe that antitrust policy should facilitate negotiated solutions to the patent thicket problem,

[34] *See* N.T. Gallini & B. D., Wright, *Technology Transfer under Asymmetric Information*, 21(1) RAND J. ECON. (Spring 1990); T. van Dijk, *Licence contracts, future exchange clauses, and technological competition*, 44(8) EUR. ECON, REV. (2000); and J.P. Choi, *A Dynamic Analysis of Licensing: The Boomerang Effect and Grant-Back Clauses*, 43(3) Int'l Econ. Rev., (2002).

[35] *See* S. Scotchmer, *Standing on the Shoulders of Giants: Cumulative Research and the Patent Law,* J. ECON. PERSPECTIVES, 5 (1991).

[36] *See* Scotchmer *supra* note 35; J.R. Green & S. Scotchmer, *On the Division of Profit in Sequential Innovation*, RAND J. ECON, 26 (1995); H.F. Chang, *Patent Scope, Antitrust Policy, and Cumulative Innovation*, RAND J. ECON, 26 (1995); S. Scotchmer, *Protecting Early Innovators: Should Second-Generation Products be Patentable?,* RAND J. ECON, 27 (1996); H. Hopenhayn, G. Llobet, & M. Mitchell, *Rewarding Sequential Innovators: Prizes, Patents, and Buyouts*, J. POL. ECON. 114 (2006).

[37] R. J. Gilbert & C. Shapiro, *Antitrust Issues in the Licensing of Intellectual Property: The Nine No-No's Meet the Nineties*, Brookings Papers: Microeconomics (1997).

and recognize that cross-licensing agreements and patent pools are instrumental in solving this problem.

We believe that the Commission's current enforcement stance is broadly correct, and that no tightening of the rules with regard to cross-licensing agreements and grant-backs is required. Like Regibeau & Rockett, we support a rule-of-reason approach to patent pools. However, we recommend a full effects-based analysis of the inclusion of substitute or non-essential patents in patent pools, as recent economic contributions have shown that the inclusion of such patents may have pro-competitive but also anticompetitive effects.

We believe that antitrust authorities can follow simple rules to make sure that the pro-competitive effects of these licensing agreements outweigh their anticompetitive effects.

In particular, as to cross-licensing, the European Commission should encourage netting out or up-front payments to prevent companies to collude by artificially raising each other's marginal cost. As to patent pools, the Commission should encourage participants to license their patents independently outside the pool, and to only include non-essential patents in the pools in the presence of a (transactional or legal) justification. As to grant-backs the literature has not yet developed fully, but the efficiency rationales behind these agreements seem to be strong. Also, grant-backs only produce inefficiency under very peculiar circumstances.

In conclusion, we do not believe that a wholesale reform of the current framework is needed. The current approach seems broadly correct and all that is needed in our opinion is a fine-tuning of certain rules with regard to cross-licensing and patent pools.