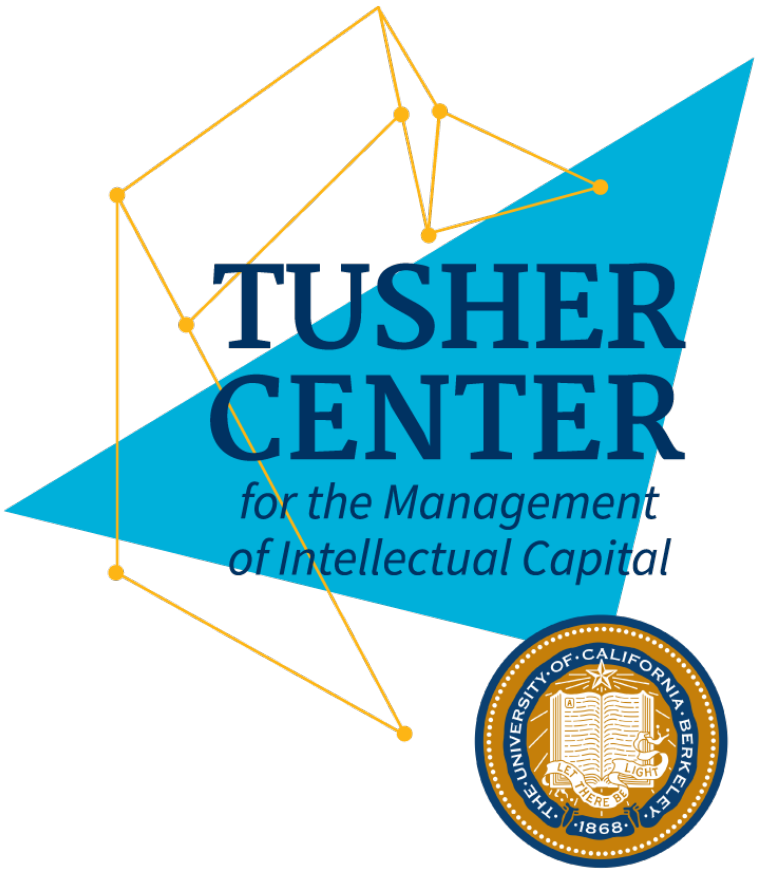

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Licensing and Standards Setting: The Multiple Meanings of "Ex Ante" Negotiations and Implications for Public Policy

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I. INTRODUCTION

The issue of *ex ante* licensing has been widely discussed in connection with standards setting and patents that are subject to a commitment to the standards-setting organization ("SSO") by the patent holder that it will make an "unlimited" number of licenses to its standards-essential patents ("SEPs") available on "reasonable and non-discriminatory" ("RAND") or "fair, reasonable, and non-discriminatory" ("FRAND") terms. Some have suggested that, when evaluating royalties for FRAND-encumbered patents, one should consider the rates that would have been agreed to in *ex ante* license negotiations.

The phrase *ex ante* means "before." That raises the obvious question: "before" what event? There are numerous possible alternatives, and they have significantly different implications.

Real-world *ex ante* license negotiations are quite rare. Using the concept as a "thought experiment" we evaluate FRAND licensing issues and identify a number of conceptual problems with *ex ante* approaches. We also discuss certain conceptual and pragmatic difficulties with the Swanson-Baumol "*ex ante* auction" approach.

II. HYPOTHETICAL NEGOTIATIONS AND ACTUAL NEGOTIATIONS

As a pragmatic matter, we are not aware of any instances (in the real world) of *ex ante* licenses in the sense of "prior to the technology being incorporated into the standard."[3] That does not preclude one from considering a "thought experiment" considering a "hypothetical negotiation" over such conceptual licenses, akin to the "hypothetical negotiation" construct used in *Georgia-Pacific* Factor #15 when assessing "reasonable royalty" damages in patent infringement cases. Such "thought experiments" do not suffer from many of the pragmatic difficulties associated with actual license negotiations; but there nevertheless differences between the hypothetical world of Georgia-Pacific and actual license negotiations.

One key difference between such "hypothetical licenses" for patent infringement damages purposes and actual real-world licenses is that real-world licenses, the parties may disagree as to patent validity and infringement issues, and generally negotiate licenses for what we call "untested" patents (patents for which issues of validity and infringement have not been resolved, and are often disputed). Because patent infringement damages will only be awarded if the patent holder prevails on validity and infringement (of at least one claim of the Asserted Patents), the "hypothetical license" contemplated by *Georgia Pacific* assumes that the parties agree that the patent holder will prevail on validity and infringement of at least one patent claim. As such, real-world license terms typically have to be adjusted upwards to reflect this conceptual difference between the rates that are agreed to for "untested" patents and the rates that would be agreed to or appropriate for proven-valid-and-infringed patents.[4]

[3] In some instances, the patent holder may have licensed the technology for use in other contexts. But because value is context-dependent, the relevance of such other-context licenses in the context of a particular standard is questionable.

[4] See Sherry and Teece, "Royalties, evolving patent rights, and the value of innovation," 33 *Research Policy* 171-191 (2004).

This higher royalty is sometimes referred to as "an infringer's policy". Now let's put the issue of infringers royalty to the side and focus on the key question of "exante", and what it might mean.

II.a. DETERMINING ROYALTIES BEFORE IMPLEMENTERS' INVESTMENTS (Sense 1)

Many commentators have talked about assessing FRAND royalties in light of the royalties that would have ostensibly been agreed to in what they term *ex ante* licensing of patented technology incorporated into a standard, by which they mean licensing that occurs *after* the technology exists *and* has been selected for incorporation in a standard, but *before* particular implementers have made investments in developing and marketing standards-compliant products incorporating the patented technology.[5] Licensing in this (first) sense can only occur after the technology has been developed and selected for incorporation in the standard, which is necessarily after the innovator has invested the necessary costly and risky R&D to develop the technology in the first place. That is, such negotiations take place after the innovators have made the sunk investments in developing the technology to the point that it is sufficiently well developed that it can be evaluated for incorporation into the proposed standard.[6]

II.b DETERMINING ROYALTIES BEFORE STANDARDIZATION (Sense 2)

A second sense of *ex ante* is "prior to the technology being incorporated into the standard," at a time when it is possible to change the proposed standard to incorporate an alternative technology. That is logically prior to the preceding "before implementer investment" sense, but is still after the technology has been developed to the point that it can be evaluated for incorporation (and thus logically after the innovator has made the sunk investments in developing the technology to that point).

The key pragmatic difference between these two senses is that, in the latter "before standardization" sense, there is still the possibility of *collective* action (by the SSO) to "change its mind" and adopt a *different* technology for incorporation into the standard, whereas in the former "before implementer investment" sense, the standard is assumed to be "fixed" and the implementer has the choice between (a) making standards-compliant products (using the patented technology), (b) making non-standards-compliant products (whether using the patented technology or not), or (c) not making products at all. Because in many industries there is little or no market for non-standards-compliant products, the second of these alternatives is often not a commercially viable alternative.

The conceptual rationale for considering such (actual or hypothetical) "before standardization" licensing is that, if the SSO members discover that the patent holder will demand royalties that exceed the value of its technology, the SSO members can influence the SSO to choose an alternative technology to be incorporated into the standard instead.

II.b.1 The Swanson Baumol Hypothetical Ex Ante Auction

[5] See, *e.g.*, Lemley and Shapiro, "Patent Hold-Up and Royalty Stacking," 85 *Texas L. Rev.* 2163-2174 (2007).
[6] This does not necessarily mean that, at that point, the technology has been fully developed. There may still be significant engineering details to be worked out as to precisely how to implement the technology in practice. But it will have been developed to the point of being sufficiently well specified to be able to be evaluated for incorporation into the proposed standard.

Swanson and Baumol[7] proposed a hypothetical *ex ante* auction, whereby innovators submit "bids" stating the (non-discriminatory) royalties they will seek from implementers if and when their technologies are incorporated into a standard, with the SSO choosing which technology to incorporate into the standard on the basis of the performance, non-royalty-related costs, and proposed royalties associated with each alternative.[8] To our knowledge, no SSO actually conducts anything like such an auction, and we doubt they ever will. Swanson and Baumol did not specify how such an auction would have been conducted. Clearly, the pragmatic difficulties of actually conducting such an auction would be considerable, as discussed at greater length below. The SSO would have to specify in advance how bids would be compared against one another in order to determine the "winning bid" in order for patent holders to have any realistic prospect of submitting efficient informed bids.

The key difference between the Swanson-Baumol-type auction and individual bilateral pre-standardization license negotiations is that the former is a *collective* process, conducted by the SSO, while the latter are decentralized. The outcome of a Swanson-Baumol-type auction, if one were ever to be conducted, would be the collective selection of a "winning bid" by a collectively-specified auction mechanism. Because different proposed technologies will have different non-royalty-related costs and different performance, it is not simply a matter of choosing the bid with the lowest royalty rate; instead, the SSO would presumably want to choose the bid with the best cost/benefit performance (including royalty costs). By contrast, individuated (bilateral) pre-standardization license negotiations may result in different licensees having different license terms. In this world, individual SSO members vote on their preferred technology for incorporation in the standard on the basis of their individual assessments of the benefits and costs (including royalty costs) of the various alternative technologies. If the SSO members each vote on which technology to incorporate into the proposed standard on the basis of their assessments of (*inter alia*) license terms, then to predict how the SSO will decide, one needs to know, not merely how license terms affect members' votes (which may vary from member to member), but also how the collective decision process operates (e.g., is it majority rule? A supermajority or "consensus" system? How are disputes resolved if not by majority rule?)

Moreover, the criteria by which individual members evaluate possible alternatives can vary across different members, whereas the Swanson-Baumol auction approach envisages that the parties have (somehow) collectively agreed on a set of criteria for evaluating bids in order to select the "winning" bid. The difficulties associated in moving from a set of individuated evaluation criteria to a collective mechanism for evaluating multi-dimensional alternatives are well-known in the social choice literature, both in the form of the Arrow Impossibility Theorem[9] and in other contexts.[10] We will discuss further ramifications of the Swanson-Baumol approach below.

Conceptually, in order to decide on which technology to vote for for incorporation into the standard on the basis (*inter alia*) of the royalty rates that alternative technology providers will seek,

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[7] Daniel G. Swanson and William J. Baumol, "Reasonable and Nondiscriminatory (RAND) Royalties, Standards Selection, and Control of Market Power," 73 *Antitrust Law Journal* 1, 51–56 (2005).

[8] This process need not be societally optimal. From an economic perspective, to a good first approximation (ignoring dead-weight-loss effects associated with royalties), royalties are not true *social* costs, but transfer payments from licensees to licensors, and thus from a societal perspective they are largely a "wash" and should be ignored. See Teece and Sherry, "Standards Setting and Antitrust," 87 Minnesota L. Rev. 1913 (June 2004). But they are treated as a private cost by licensees.

[9] K. J. Arrow, *Social Choice and Individual Values* (2d Ed., 1961).

[10] See R. Keeney and H. Raiffa, *Decisions With Multiple Objective: Preferences and Value Tradeoffs* (1993).

potential implementers will have to negotiate key license terms (at least the royalty rate and base) with all of the providers of the various alternative technologies being considered for incorporation into some particular aspect of the standard. They will not have a "crystal ball" telling them which technology will ultimately be chosen, to enable them to negotiate only with the ultimate winner. Instead, if N alternative technologies are being considered for inclusion in some particular aspect of the standard, implementers will need to negotiate license terms with all N competing technology providers (in addition, of course, to negotiating similar licenses with all of the suppliers of alternatives to complementary technologies used in other aspects of the standard).

Since license negotiations are costly and time consuming, it is clear that such *ex ante* license negotiations will result in significantly higher transaction costs than would be the case if the parties were to wait until after some particular technology is chosen for standardization, so that only one license would have to be negotiated for any given aspect of the standard.

Of course, if one is conducting the analysis as a "thought experiment," one can ignore some or all of the practical pragmatic difficulties associated with actual *ex ante* negotiations. But even then, in order to determine how SSO members would have voted *had* they conducted actual *ex ante* negotiations, it is still necessary to conduct multiple "thought experiments" about potential licensing terms for each of the alternative technologies under consideration for each separate aspect of the standard.) To our knowledge, no advocate of *ex ante* negotiations (actual or hypothetical) has noted the excessively complex and impossibly burdensome nature of the proposal.

It is extremely rare (indeed, we are not aware of any examples) that holders of SEPs and implementers actually negotiate licenses (at least in the same technological context[11]) prior to a standard being adopted – i.e., that there are actual *ex ante* licenses in this second "before standardization" sense. This again does not preclude the possibility of considering such hypothetical licensing as a "thought experiment, although we believe it is treacherous grounds, given how little is likely to be known to the courtroom about the relevant tradeoffs."

One further and very pragmatic difficulty is that both standards and technology tend to evolve over time, so that the simple dichotomy between "before standardization" and "after standardization" often blurs and may not be particularly helpful, especially when later versions of a standard seek to be backwards compatible with earlier versions. For example, there have been numerous generations of the IEEE 802.11 "Wi-Fi" standard, including 802.11a, b, g, n, and ac (to focus just on those versions that resulted in significant sales of commercial products) adopted over a multi-year period from 1999 to 2013, some (but not all) of which have been backwards-compatible with earlier versions. But in theory, each new version of the standard gives the SSO the option of "changing its mind" and switching to an alternative technology, especially if (as is sometimes the case) the SSO and/or its members are aware of the royalties sought by the patent holder for the use of its technology in earlier versions of the standard.

II. b.2. Additional Complications Of The Swanson-Baumol Ex Ante Auction

To our knowledge, no SSO actually conducts anything like a formal Swanson-Baumol-type "auction" before choosing what technologies to incorporate into a pending standard. Thus their proposal can best be thought of as a "thought experiment" illustrating the types of considerations that

[11] The technology may have previously been licensed for use in other contexts. But since value is context-dependent, any guidance given by such licenses is questionable.

might apply. One difficulty with conducting thought experiments is that one should make sure that the thought experiment is well-specified and accurately reflects what one is interested in, or any insights gleaned from the thought experiment might lead one astray.

The rules of the auction will also generally affect the parties' bidding strategies. Hence, it is important to understand whether the auction is going to be an "open outcry" auction (like the traditional English ascending-bid auction) or a sealed-bid auction. Is the auction a first-price auction (in which the winning bidder pays the amount of its own, highest,[12] bid) or a second-price auction (in which the winning bidder pays the amount of the second-highest bid)? Is there a fee for submitting a bid, or does one pay only if one wins the auction? Different types of auctions yield different bidding strategies.

Auctions are conducted under rules specifying how winning bids are to be selected. Conducting an auction is relatively straightforward if what is being auctioned off is homogeneous, so that it is easy to determine the "winning" bid. The situation is much more difficult if what is being auctioned is not homogeneous, so that it is necessary to weigh cost/price (including both royalties and non-royalty-related costs) against performance in order to determine the winning bid.

Because what is being "auctioned" in the Swanson-Baumol auction is the SSO's decision as to which technologies to include in some pending standard, different patent holders are "bidding" the royalty rate (and base) they propose to charge (on a "non-discriminatory" basis) to implementers for the use of their technology if and when their technology is incorporated into the standard. Because the various technologies under consideration will differ with respect to performance and non-royalty-related costs as well as with the royalties sought (that is, the offerings of the various patent holder/bidders are not homogeneous), the SSO needs to choose how it will evaluate proposed bids (on a cost/performance basis, including any royalties) in order to be able to determine the "winning" bid. Similarly, in order for bidders to be able to make rational decisions on how much to bid, they need to understand how the SSO will evaluate the bids in determining the "winning" bid. Specifying the criteria (*e.g.*, the weighting factors) that will be used to evaluate different bids in order to determine the winning bid is a very complex process, much more difficult than simply evaluating the bids actually submitted and choosing a winning bid without specifying in advance the weights that will be used to evaluate possible alternative bids. Because different technologies under consideration may vary along a number of dimensions, specifying such weights is not an easy process.

By way of analogy, consider the military procurement context, where different aircraft manufacturers are submitting proposals for a next-generation fighter aircraft. Because different fighters from different suppliers will vary (in terms of various dimensions of performance such as maneuverability, range, fuel consumption, maximum speed, avionics, payload, armament, etc.) , specifying in advance how the various performance characteristics would be weighed against each other and against price is a complex task.

[12] The SSO is likely to select the bid that it thinks is best from a cost/performance basis, which (holding the other factors constant) will be the *lowest* bid (i.e. lowest royalty charged).

The task is made even more complex in the standards setting context when a standard proposes to incorporate different complementary technology owned by different patent holders. Particular technologies under consideration may work better with certain complementary technologies than with others. This implies that the value that implementers receive from using a given patented technology depends on what complementary technologies are included in the standard. In such a situation, each patent holder's optimal bid will depend, not merely on the royalty rate it is seeking for the use of its own technology, but the royalty rates that the holders of complementary patents are seeking for the use of their complementary technology.[13]

Specifying the criteria used to evaluate bids is difficult enough if all SSO members *agree* what those criteria should be. What happens when different SSO members *disagree* as to what those costs and benefits are, or how trade-offs should be made? How are such disagreements to be resolved into a decision criterion for collectively evaluating bids? Swanson and Baumol's article is silent as to such issues, but they are significant.

Moreover, standards often incorporate multiple complementary technologies. This raises further questions about what one should assume about the way that holders of complementary technologies choose their "bids." This is very different from the traditional *Georgia Pacific* (GP) hypothetical negotiation for determining infringement damages.

Moreover, in order to predict the likely outcome of a Swanson-Baumol-type auction, one needs a theory of how patent holders select their offer "bids." Does one assume that rival patent holders engage in Bertrand pricing, or some other mechanism? In some types of auction, each bidder learns something about the other's bids during the bidding process (*e.g.*, in a traditional English ascending-bid auction, bidders can observe when other bidders drop out of the bidding), but in other auctions (such as a sealed bid auction), there is no such learning. It is possible that a patent holder will have what game theorists term a "dominant strategy," selecting some bid irregardless of the bids submitted by their rivals. But more commonly, bidders do not have such a "dominant strategy": the best bid for a patent holder to submit depends on the bids that it believes that other patent holders will submit, and *vice versa*. The usual assumption is that one can limit one's attention to Nash equilibrium bidding strategies, but that assumption rests on some rather strong assumptions about what information each bidder has on the likely bidding strategies of the other bidders for competing and complementary technology, as well as information about how the SSO will evaluate alternative bids to select the "winning" bid(s). Swanson and Baumol do not address these sorts of difficulties, but they are considerable.

[13] Returning to the aircraft procurement analogy, the total cost of an aircraft has several components. Suppose for simplicity that two key components are the airframe and the engine, which typically are made by different firms. An aircraft will typically be designed around a particular engine. The price and performance of the aircraft will depend on both components. In order to choose its own bid, the airframe manufacturer needs to know what the engine manufacturer will charge, and vice-versa. (This is why airframe manufacturers and engine manufacturers typically work together to propose a joint design with a joint bid.) Similarly, the overall performance of a standard will depend on the way that the chosen technologies for various aspects of the standard interoperate with one another, so that the patent holder for one technology generally cannot determine what royalty rate to seek for its own technology unless it knows what royalties are being sought by suppliers of complementary technologies (and *vice versa*),

II.b.3 "Interim" (Or Pseudo Ex Ante) Negotiations

The "before standardization" sense along with the "before implementation sense" (i.e. sense one & sense two) are sometimes termed *ex ante* negotiations. But in reality, they are more appropriately termed "interim" negotiations – negotiations *after* the innovator has made *its* sunk investments in developing the technology to the point where it can be incorporated into the standard, but *before* implementers have made their sunk investments in developing and marketing standards-compliant products. In other words, a focus on such ostensibly "*ex ante*" (actually interim) negotiations inherently treats the innovator's investments in developing the technology in the first place and the implementer's subsequent investments in developing standards-compliant products *asymmetrically*, basically treating the former investments as "sunk" but treating the latter investments as though they have not yet been made.

Proponents of such "interim" negotiations have not, to our knowledge, adequately explained why they believe such an asymmetric approach is appropriate or desirable from an economic or public policy perspective.

From an economic perspective, we believe that it is perverse to recommend a focus on interim negotiations that treat the parties' investments *asymmetrically*, that are *ex ante* for one party and not the other. Models of the negotiation process that do so, such as the Lemley-Shapiro model,[14] simply *assume* that the technology already exists (and that the innovator's investments in developing the technology are sunk) are inherently asymmetric in this sense. Elhague[15] has pointed out that such models, by assuming that the parties split the *ex post* gains from trade, risks either undercompensating innovators or foregoing societally-desirable innovations.[16]

Elhague's point is correct as far as it goes, but it understates the problem. The economic cost of developing a particular technology goes beyond the cost of a successful project. One must look at the portfolio of investment innovators make. The R&D process is replete with uncertainties. Failure is the norm. Hence, for every successful R&D project that yields technology useful to a standard, there are undoubtedly failures too. Hence, the relevant cost is the cost of the portfolio of both successful and unsuccessful projects, and the benefits are the portfolio benefits measured at the societal level. Mansfield has established that the social rates of return to innovation are many times the private rates of return. [17] Undercompensating innovators is something to avoid, as it will crimp investment that yields societal returns that far exceed the private returns of the investor.

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[14] Lemley and Shapiro, "Patent Hold-Up and Royalty Stacking," 85 *Texas L. Rev.* 2163-2174 (2007).

[15] Elhague, E. (2008) "Do Patent Hold-up and Royalty Stacking Lead To Systematically Excessive Royalties?," *Journal of Competition Law and Economics*, Vol. 4 No. 3, pp. 535-570.

[16] The economic intuition is that, if the innovator receives only a fraction $\beta < 1$ of the societal gains G, it runs the risk of being undercompensated if the cost C of developing the technology in the first place is more than β times those gains. That is, when the innovator expects to receive a share β G of the societal gains and incurs expected costs $C > \beta G$, either the innovator will not make the investment (which is societally inefficient so long as $G > C$) or will not recoup its costs. Elhague's point is that only if $\beta = 1$ are the innovator's incentives to invest in making the innovation fully aligned with society's interests in having such investments made.

[17] Edwin Mansfield et al "Social and Private return from Industrial Innovation," *Quarterly Journal of Economics*, May 1977.

It is also worth considering what role, if any, the fact that implementers have not committed to *taking* licenses and to *paying* royalties plays in the analysis. The asymmetry between patent holders (who have committed to making licenses available on FRAND terms) and implementer (who have not made similar commitments to *take* licenses[18]) strikes us as economically significant, though it has rarely been mentioned by commentators.

II.C. DETERMINING ROYALTIES BEFORE ANY INVESTMENTS (Sense 3)

Before new technology is available for consideration, in a standard setting context, R&D and related activities need to occur. Millions, if not billions of dollars are sometimes expended to develop technology which subsequently gets incorporated in standards, as the R&D spending on cellular communications technology demonstrates.

Accordingly, a third possible sense of *ex ante* is "prior to either party making an investment in developing *or* implementing the technology." Such an approach would at least treat the two parties' investments symmetrically, and would be truly *ex ante*.

As a practical matter, there would be significant pragmatic difficulties in conducting such truly *ex ante* negotiations (whether in reality or as a "thought experiment"), if for no other reason than that, until the technology has been developed, one cannot know what is being licensed.

II.D. DETERMINING ROYALTIES BEFORE VS. AFTER PATENT ISSUANCE (Sense 4)

The patent prosecution process takes time. Many firms develop technology, apply for patents, and agree to make it available for use in a standard before any patent ultimately issues. Indeed, the standard may have issued, and implementers may have begun making standards-compliant products, well before any patent issues. In such a situation, another *ex ante vs. ex post* distinction is: before the patent(s) issues vs. after the patent(s) issues.

Given that the claims in patent applications (though not the written description/specification) of the invention often evolve significantly between initial application and issuance, in ways that are difficult to predict, and given that, until the patent issues, the applicant has no legal power to exclude others from using the invention, at what point in the process does one want to evaluate potential licensing/royalties?

Though technology licensing for patent-pending technology sometimes happens (especially in the pharmaceutical and biotech fields[19]), in our experience it is rare in other industries (notably electronics, computers and communications) for licenses to be negotiated until after the patent issues,

[18] Some argue that implementers need to make standards-compliant products and thus have little choice but to take licenses for any patents that are actually essential in order to practice the standard. This ignores the fact that many implementers make standards-compliant products without first taking licenses, forcing holders of SEPs to sue them in order to get paid.

[19] In our experience, such pre-patent-issuance licensing in those industries tends to take place on an exclusive basis: the licensee acquires the exclusive right to use the technology. That is generally not the case in the standards-setting context, where patent holders agree to make an "unlimited" number of non-exclusive licenses available on FRAND terms.

so that the parties know what legal rights (if any) to the technology the innovator has, and thus what rights are being licensed.

In theory, patent holders and implementers could negotiate *contingent* licenses before the patent issues, to come into effect if/when a patent issued. (They might have to negotiate multiple contingent licenses, with terms that depend on the scope of any ultimately-issued patents.) Or they could negotiate *un*conditional licenses, with royalty rates discounted to reflect the possibility that no patent will ever issue. (For example, suppose that they agreed that a patent, if issued, would command a 5% royalty, but that there was only a 60% chance that a patent would issue. Then they might negotiate a license calling for a 3% (60% of 5%) royalty, to be paid whether or not a patent issued.) Both prospects seem unlikely in many industries. (Such negotiations are especially difficult if the parties disagree about the likelihood that any patent will ultimately issue.)

Another possibility during the standards setting process (and damages) is to use the "Book of Wisdom" to conduct the "thought experiment," analyzing the situation as if the parties had "perfect foresight" as to how and when the patent will ultimately issue, using the presumption that the patent (a) will ultimately issue as it ultimately issues and (b) is valid and infringed, even if it was at best a patent application at the time the standard was adopted.

One obvious conceptual difficulty with such an approach (for standards setting) is that, despite the fact that the innovator has announced to the SSO that it may have patents or patent applications that, if granted, may cover the technology being considered for standardization, the SSO members may believe that no such patent will ever issue, or that the sope of any ultimately-issued patent grant may be narrow, and may elect to incorporate the technology into the pending standard in the belief that no royalties will ever be due or that such potential royalties may be disregarded. For example, JEDEC incorporated certain technology ultimately patented by Rambus into its SDRAM standards at a time when many JEDEC members either (a) believed that Rambus' patent applications over that technology were "stuck in the Patent Office" and would never issue, or (b) believed that Rambus's patent applications were limited to its proprietary RDRAM architecture and would never apply to SDRAMs.[20] Given such beliefs, negotiating a patent license for Rambus' technology for SDRAMs before the standard was adopted would have made little economic sense, given the transaction costs associated with such negotiations. Conducting the "thought experiment" by assuming "perfect foresight" or the "Book of Wisdom" ignores that possibility. Again, one needs to make sure that the "thought experiment" captures all of the key aspects of the situation; assuming (contrary to fact) that participants believe something that they did not in fact believe makes the "thought experiment" exercise both less compelling and less relevant.

This is especially significant because the usual *Georgia-Pacific* hypothetical negotiation is generally[21] assumed to take place at or around the date of first infringement. By definition, there can be no "infringement" until the patent issues, as before that date the patent holder did not have the right to

[20] See Initial Decision, In the Matter of Rambus, FTC Docket No. 9302 (February 23, 2004), available at http://www.ftc.gov/sites/default/files/documents/cases/2004/02/040223initialdecision.pdf .

[21] Some have argued that using the actual date of first infringement is inappropriate because by that time the implementer will have incurred significant costs in developing and manufacturing the infringing product, and such an approach does not allow the infringer the option of choosing not to infringe if the royalty rate sought is excessive. Those advocating this position generally recommend that the date of the hypothetical negotiation be taken as at or before the time that the infringer began to make the investments in developing the infringing product, even if that is before the patent issued.

seek to exclude others from using the (now-patented) technology. If the implementer makes and sells standards-compliant products prior to the patent issuing, a negotiation as of or around the date of patent issuance would be after the implementer's investments and thus not *ex ante* in either the "before implementer investment" sense or the "before standardization" sense.

III. EXISTING LICENSES AND THE *EX ANTE- EX POST* CONUNDRUM (REGARDING DAMAGES)

As a pragmatic matter, even though the *particular* parties to a patent infringement dispute have not negotiated an actual license, in some (but not all) contexts the patent holder will have negotiated licenses with similarly-situated firms for the same or comparable technology.

Such licenses may or may not have been negotiated between the parties in the "before implementer investment" *ex ante* sense discussed above – *i.e.*, after the standard was adopted, but before the licensee made any sunk investments in developing and marketing standards-compliant products. If they were, then they would seem to provide guidance as to what the terms of a "hypothetical *ex ante*" license would have been, bearing in mind the distinction above between licenses for proven-valid-and-infringed patents and for "untested" patents.

If the real-world licenses were *not* entered into *ex ante* in the "before implementer investment" sense, but were instead entered into after the implementer had made some investments in making standards-compliant products, the question becomes: how useful are they as guidance of what would have been agreed to in a "before implementer investment" *ex ante* license? They clearly provide some guidance, but how much is disputable.

How should one deal with the prospect that particular implementers may not actually make any investments until after they are aware that the patent holder is seeking royalties of a particular magnitude? Especially if the implementer knows that the patent holder has actually entered into licenses with other firms, and is generally aware of the terms of such licenses?

In those cases where there are no actual licenses, the question becomes: how would one go about assessing the terms of a hypothetical *ex ante* license, in either the "before implementer's investments" or "before standardization" sense? Again, one has to take account of the difference between the likely terms for such a license for "untested" patents and the likely terms of such a license for proven-valid-and-infringed patents. The case law focuses on the latter.

Conceptually, one would want to look at the value that the implementer gains from being able to use the patented technology, relative to the value that it would receive if it were to use the next-best non-infringing alternative instead. Assessing that involves an evaluation of what the next-best non-infringing alternative is and what impact (if any) it would have on price or cost. How one goes about assessing that value is a complex task, involving weighing of performance and cost comparisons between the alternatives. Different entities are likely to view both cost and performance differently, especially if such weighing is to be done before the implementer actually makes the investment needed to develop working products so that performance can be evaluated.

IV. THE "VALUE CHAIN," THE INNOVATORS CONTRIBUTION, AND PATENT EXHAUSTION

One important factor to be considered is that, in many industries, there is a "value chain" of industry segments, often occupied by different firms, that use the patented technology in their

products. In cellular communications, for example, the "value chain" runs from cellular chipsets, whose manufacturers sell chipsets to handset manufacturers, who in turn incorporate the chipsets into handsets which they sell either to retailers or to cellular service providers, who use the handsets (together with other equipment such as cellular base stations, switching equipment, and landlines) to provide cellular service.

The total value is the sum of the individual values at the different levels in the "value chain." "The value" of being able to use patented technology differs at different levels in the "value chain." Talk of "the value" of being able to use the patented technology obscures this important aspect of the situation, and can thus be misleading.

Another important consideration arises because of a legal doctrine known as the "patent exhaustion doctrine," which says (to simplify somewhat) that, once a patent holder has licensed one firm in the "value chain," it cannot collect further royalties from those "downstream" from its licensees in the "value chain." Patent holders can typically choose at what level in the "value chain" to license, but under the patent exhaustion doctrine they cannot "double dip" and collect multiple royalties from both "upstream" firms and their "downstream" customers.

This raises the complication: which firms would engage in the hypothetical *ex ante* license negotiations? An implementer does not need a license if someone "upstream" from it in the "value chain" has a license, so that the patent exhaustion doctrine applies. Given that the cumulative value of being able to use the patented technology increases as one moves "down" the "value chain," it is not surprising that patent holders often prefer to license at a "downstream" level.

A patent holder that has made a FRAND commitment agrees to offer an "unlimited" number of licenses. But that does not mean that it has an obligation to license at all levels of the "value chain." For example, the holder of a patent for cellular technology can offer an "unlimited" number of licenses to handset manufacturers, while electing not to license at the chipset level.

V. CONCLUSIONS

The phrase "*ex ante* licensing" can be used in a number of significantly different senses, with different meanings and implications, some involving actual license negotiations, others involving "thought experiments" about how such licensing might play out if it *were* to occur. In our view, some of them are more appropriately termed "interim" licensing, after one party (the innovator) has made its investments in developing the technology to the point where it can be considered for inclusion in a proposed standard, but before implementers make their investments in developing and marketing standards-compliant products.

The normative economic and public policy rationale for considering such asymmetric treatment of the parties' respective investments has in our view not been adequately articulated. At a minimum it

is clear that the adoption of ex ante approaches to FRAND royalty determination is fraught with hazards and likely to harm innovation.