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Are the IEEE Proposed Changes to IPR Policy Innovation Friendly?

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A. Introduction

In this note, I review and comment upon certain economic aspects of the IEEE proposals for revising its policy with respect to standards essential patents.

In evaluating and commenting on the IEEE proposals for change, I believe that context is critical. Accordingly, I will first discuss the standards setting process and its role in promoting innovation and technical progress. I will then discuss the role that SSO's intellectual property rights ("IPR") policies play in the standards setting process more generally.

B. Economic Principles

Compatibility standards facilitate the ability of multiple firms to produce products that are compatible or interoperable with one another (*e.g.*, cellphones from different makers are compatible with one another and with base stations provided by base station suppliers), and thus foster competition in product markets. It is widely recognized that the standards setting process is most important when it comes to setting standards for next-generation products, which rely heavily on new technology. Without innovation and the associated change, our world would not need to engage in standard setting activities on an ongoing basis. One would simply decide upon standards for current products and then wind up the standard setting machinery as it would no longer be needed. With innovation, there will be the need for new standards to incorporate new technologies that enable new products and services to be developed in such a way that products from different firms are compatible with one another so as to promote competition within the standard by different implementers developing and marketing standards-compliant products.

This suggests that it is first necessary to ask: what are the primary public policy goals that are (or should be) embedded in the rules governing standard setting and in FRAND licensing? At its core, the answer I believe is to support the standard setting process, and more fundamentally, the underlying innovation itself.

The importance of standards setting became amplified thirty years ago with the arrival of digital electronics, allowing and requiring a plethora of new standards. The public policy issue is to set governance and policies so as to support a properly functioning independent standard setting system that encourages the development, implementation, and widespread adoption of standards which facilitate innovation and technical progress and adoption.

The success of standard setting has been amply demonstrated over the last thirty years. This is particularly evident in the smartphone world where standards have been developed and adopted which have enabled a global mobile communications revolution. I'm not aware of complaints that innovation in that sector has been too rapid, except perhaps by certain incumbent network providers who have had their landlines revenues significantly and irreversibly eroded. The overwhelming sentiment of consumers and policy makers has been that this development has been very beneficial to society, especially in the developing world. The revolution has followed from innovation itself enabled by infrastructure providers, and network service providers. Behind device innovation has been billions of dollars of investment in R&D to develop supporting and enabling technologies across the entire ecosystem.

Any review and assessment of the standard setting process must have as the benchmark the development and adoption of technological platforms which create the opportunities for new systems, products, and process that deliver economic and social benefits to society. To the extent that SSOs became involved, through supporting and/or shaping business practices (including licensing business practices) then the goal ought to be to ensure that the business practices supported by the SSOs are consistent with maintaining a regime of rapid technological innovation in all the relevant domains of the ecosystem i.e. upstream and downstream, lateral and horizontal. But in order to maintain such a vibrant regime, it is necessary to ensure that successful innovators (including the developers of patented technology incorporated in new technological standards) can receive a return adequate to encourage them both to develop the technology in the first place and to make it available to be incorporated into standards, rather than being kept for the innovator's own private use.

With this in mind, I focus in particular on FRAND and FRAND licensing. It follows from the framework outlined above that the "Fair" and "Reasonable" criterion must mesh with society's (and the SSOs') industrial and public policy objectives. Assuming this includes maintaining or accelerating innovation, then FRAND/RAND necessarily translates, at least conceptually, to **setting royalties on SEPs sufficient to draw forth the investment required to sustain innovation at the levels that policy makers deem are appropriate to meet society's goals.** This in turn implies that **IPR policies that are likely to reduce returns to innovation should be viewed with skepticism.**

Framed this way, FRAND rate determination is best left for negotiation amongst the parties; but if the SSO deems it necessary and desirable through its policies to provide guidance on rates (or principles for rate determination) it must do so paying close attention to the above criteria.

Needless to say, the framework sketched above is quite general. Behind it are several premises, none of which I believe are all that controversial:

1. The innovation process requires investment in R&D which is often costly and always risky. Failure is the norm; projects which are successful must therefore generate revenues to cover their own costs, as well as the cost of "dry holes" and other innovation failures (not necessarily for each innovation, but for the system as a whole).
2. The social returns to technological innovation are generally many times the private returns, because of the positive spillovers.² Consumers usually capture many of the spillovers. Complementary and follow-on innovations do too. Hence, if one is going to err with respect to rewarding invention, then it is better to do it on the high side.
3. The spillovers from innovation are likely to be greater the more fundamental the innovation, and the more it is based on basic and applied research. This is because appropriability mechanisms are stronger as one moves downstream towards the marketplace. Also, the patent exhaustion doctrine constrains what licensors can collect downstream generally [i.e. device makers have a better shot at capturing value than component providers]

² Mansfield, E. et al, "Social and Private Rates of Return From Industrial Innovations," The Quarterly Journal of Economics, Vol. 91, No. 2 (1977).

4. Constraining business model choices by mandating the licensing of SEP (as FRAND requires) in and of itself constrains an innovator and limits not just their business model, but their bargaining power. This should be recognized, and suggests the need to compensate patent owners.
5. It is also true that including a technology in a standard helps its market acceptance; but its inclusion in a standard (after thorough vetting) supports the presumption that the technology selected for the standard was the best available at the time. It is true that compared to circumstances in which an SSO is not involved, the “winner” (in those limited cases where these are good technological alternatives) benefits from the SSO (in instances where the standard effectively blocks other technologies).
6. Context matters. There are a multiplicity of different technologies and standards. There are also a number of different entities developing and promulgating standards. Participation in an SSO is voluntary. An SSO that adopts a policy that discourages participation by key stakeholders runs the risk that it will be bypassed in the development of new standards.
7. 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* implementers have made investments in developing and marketing standards-compliant products incorporating the patented technology. But such licensing 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.³
8. If licensing rates are to be determined on a “look back” *ex ante* basis, it should be truly *ex ante* i.e. before any of the parties have invested in technology or product development, though I fully acknowledge that there would be significant pragmatic difficulties in actually conducting such truly *ex ante* negotiations (if for no other reason than that, until the technology has been developed, one cannot know what is being licensed). It is perverse to recommend a focus on interim negotiations that are *ex ante* for one party and not the other.
9. To determine rates in a pseudo “*ex ante*” (interim) world (i.e. after one party has invested but before the other one has) is inconsistent with economic principles.
10. *Ex post* royalty determination for both licensor and licensee, while not perfect, is at least conceptually symmetric.
11. Artificial constraints on the identity of relevant benchmarks (e.g. policies mandating the use of pool rates; rates determined absent the shadow of injunctive relief) make no sense without a

³ 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. The phrase *ex ante* means “before,” but such licensing negotiations 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.

determination that patent owners are receiving excessive returns relative to the return necessary to draw forth the investment needed to support rapid innovation.

12. Concerns that implementers may be paying “too much” need to be tempered with analysis that the private rates of return for patent holders as a whole are excessive relative to the rates necessary to support investment in innovation. Such analysis has to my knowledge, not been provided. It is a commonplace that implementers always prefer lower royalty rates; the fact that implementers do not like existing rates is no indication that they are excessive.
13. Complaints from implementers that they cannot “afford” FRAND rates should be supported with an assessment of whether any profit squeeze on potential licensees is due to the fact that they are competing against unlicensed implementers.
14. Broad based portfolio licensing and cross-licensing should be encouraged as it is transactionally efficient.
15. Patent hold-up is rarely observed; patent hold-out is common.
16. There is no compelling reason to suggest that the benefits of standardizations should not be shared by inventors and the implementers of these inventions alike. The proper criterion is whether the returns generated by particular royalty rates are consistent with a sustainable and desirable rate of technological innovation.

The implications of these principles are considerable, even if the operationalization of them is complicated. In particular, the following would appear to be correct.

1. Negotiation between licensors and licensees is the best way to set FRAND rates.
2. The primary criterion for evaluating the effectiveness of IPR policies regarding standardization (including policies relating to FRAND rates for SEPs) should be making sure that outcomes are innovation friendly. This means, as noted, that returns should be sufficient to draw forth the necessary investment long run. Treating the investment in innovation as “sunk” (i.e. taking invention for granted) makes no economic sense. It is particularly important to note that early stage R&D generates greater externalities than innovation focused merely on new combinations of existing technologies, which is often what the device world is all about.

With these considerations in mind, I offer the following comments containing my reaction to a number of economic issues raised in the IEEE’s proposed changes to its IPR policy.

C. Importance of Standardization and IPR Policies

The issue of standardization, the use of patented technology in standards, and the request by most standards-setting organizations (“SSOs”) that patent holders whose technology is incorporated into standards agree to make licenses available to all interested parties on “reasonable and non-discriminatory” (“RAND”) or “fair, reasonable and non-discriminatory” (“FRAND”) terms before they will incorporate that technology into a proposed standard has received a lot of attention from courts, commentators and government agencies in recent years. Numerous commentators have noted that the intellectual property rights (“IPR”) policies of many SSOs have historically provided very little in the way of guidance as to what FRAND means.

I am aware that the Institute of Electrical and Electronics Engineers (“the IEEE”), one major SSO, has recently been considering changes to its IPR policies that would provide some details as to what the IEEE means by FRAND. In particular, the IEEE has made a number of specific proposals which in my opinion amount to a substantial change in its IPR Policy.⁴ They include:

1. The proposal that “*Reasonable Rate*” shall mean “appropriate compensation to the patent holder for the practice of an Essential Patent Claim *excluding the value*, if any, resulting from the inclusion of that Essential Patent Claim’s technology in the IEEE Standard.” (emphasis added)
2. The suggestion that the assessment of “Reasonable Rates” “should include, but need not be limited to, the consideration of:
 - a. The value that the functionality of the claimed invention or inventive feature within the Essential Patent Claim contributes to the value of the relevant functionality of the *smallest saleable* Compliant Implementation [of the standard] that practices the Essential Patent Claim,” (emphasis added), coupled with the assertion that a “Compliant Implementation” can be a “component” or “sub-assembly” that practices the standard.”
 - b. The value that the Essential Patent Claim contributes to the smallest saleable Compliant Implementation that practices that claim, *in light of the value* contributed by *all* Essential Patent Claims for the same IEEE Standard practiced in that Compliant Implementation (emphasis added).
 - c. Existing licenses covering use of the Essential Patent Claim, *where such licenses were not obtained under the explicit or implicit threat of a Prohibitive Order*, and where the circumstances and resulting licenses are otherwise sufficiently comparable to the circumstances of the contemplated license.” (emphasis added)
3. The proposal that “*Reciprocal Licensing*” shall mean that the Submitter of an [Letter of Authorization, aka a FRAND commitment] has conditioned its granting of a license for its Essential Patent Claims upon the Applicant’s agreement to grant a license to the Submitter with Reasonable Rates and other reasonable licensing terms and conditions to the Applicant’s Essential Patent Claims, if any, for the referenced IEEE Standard, including any amendments, corrigenda, editions, and revisions.” In other words, a FRAND commitment may be made conditional on the licensee agreeing to “reciprocate” by making licenses available for its own essential patented technology, but only for the *same* IEEE standard.\
4. The suggestion that the IEEE “shall provide procedures stating when and the extent to which patent licensing terms may be discussed.” To my knowledge, no such “procedures” have yet been articulated.
5. The proposal that an accepted ... [RAND licensing commitment] ... *precludes seeking, or seeking to enforce, a prohibitive order* except as provided in this policy.” (emphasis added), where “as provided in this policy” means:

⁴ The proposed revised IEEE IPR policy (in redline format, showing changes from the current IPR policy) is available at http://grouper.ieee.org/groups/pp-dialog/drafts_comments/SBBylaws_100614_redline_current.pdf.

"The submitter of ... [a RAND licensing commitment]... agrees that *it shall neither seek nor seek to enforce a prohibitive order ...unless the implementer fails to participate in, or to comply with the outcome of an adjudication, including an affirming first-level appellate review, if sought by any party within applicable deadlines, in that jurisdiction* by one or more courts that have the authority to ... determine Reasonable Rates and other reasonable terms and conditions; adjudicate patent validity, enforceability, essentiality, and infringement; award monetary damages; and resolve any defenses and counterclaims." (emphasis added).

6. A suggestion made by PatCom in response to a submission that it is a "mistake" to believe that patent holders that have made RAND commitments are permitted to license on a portfolio basis, rather than on a patent-claim-by-patent-claim basis.

D. Overview of Concerns

I am concerned that the proposed changes will change the balance of interests in favor of implementers of standards and against the interests of patent holders who have contributed their technology for use in standards. I am concerned that the proposed changes will reduce the returns that patent holders are likely to be able to earn on their patented inventions that are incorporated into standards. Given the importance of innovation as a key driver of economic growth and given empirical studies that patent holders receive only a small fraction of the social benefits associated with their innovations, any proposal that would have the effect of reducing the returns to innovation would risk adversely affecting the innovation ecosystem in societally-undesirable ways. I am also concerned that the proposed changes will reduce the economic incentives to contribute technology to standardization efforts and may reduce the incentives to develop the technology in the first place, to the detriment of technological progress and of society as a whole. In my opinion, given the success of the historical standardization efforts of the IEEE, the proposed changes represent a significant backward step, by reducing innovators' incentives both to invest in the effort to develop technology in the first place and to contribute their technology for use in standards.

D.I. Seeking Injunctive Relief

Patent holders generally have the right to *seek* (not necessarily *receive*) injunctive relief against those that are using their patented technology without permission. (In the U.S., courts apply a four-factor test, laid out in *eBay v. MercExchange*, in order to decide whether or not to *grant* such relief.)

The proposal that patent holders that have made FRAND commitments shall "neither seek nor seek to enforce" injunctive relief (including exclusion orders) unless the prospective licensee refuses to participate in a "full" court-centered litigation (including a first-level appeal) ignores the fundamental role that injunctive relief plays in inducing recalcitrant licensees to "come to the table" to settle patent disputes. By their nature, legal systems can only resolve disputes involving their country's patents, implying that a patent holder may have to bring multiple patent lawsuits in multiple jurisdictions in order to resolve disputes. Moreover, a given patent dispute will only involve a selected subset of the implementer's current products, so the patent holder may have to bring multiple seriatim infringement suits in a given country if the implementer's product line changes over time and the implementer denies that the then-current products infringe. But a rational patent holder may want to obtain long-lived "patent

peace” covering multiple generations of products in multiple jurisdictions, and may seek “design freedom” and “freedom to operate” that may require it to obtain licenses to the other party’s patents (including not only the other party’s SEPs for a given standard, but also non-essential patents and patents relating to other standards). Getting an injunction in a commercially-significant jurisdiction may be the most effective mechanism to drag the other party to the bargaining table to negotiate a broad patent cross-license. Limiting the patent holder’s right to seek injunctive relief, as the IEEE proposes, amounts to significantly changing the “balance of power” in the direction of implementers and away from patent holders.⁵

Some have suggested that the fact that a patent holder has made a FRAND commitment implies that the patent holder will be “adequately compensated” if it receives royalties from those who use its technology, so that a patent holder would not suffer “irreparable harm” if it were denied injunctive relief. Whatever the merits of that assertion, it has nothing to do with the IEEE’s proposed changes, which would deny to patent holders the right to even *seek* injunctive relief unless and until an implementer has exhausted its rights to a first-level appellate decision by a court.

It is worth emphasizing that, unlike suppliers of tangible inputs, patent holders cannot physically withhold their technology from those who are using it without permission. Instead, they have to rely on the legal process to enforce their rights. Litigation is costly, time-consuming and risky. Allowing implementers to continue to use patented technology without paying for it unless and until forced to do so not only deprives patent holders of compensation during the interim (potentially at least partially offset by an award of prejudgment interest), but puts their licensees at a competitive disadvantage vis-à-vis such unlicensed users, discouraging others from taking licenses. Implementers may be able to play a “heads I win, tails I break even” game: if they litigate and are not found to infringe one or more valid claims of the patents in suit, they pay nothing (the “heads I win” aspect); if they litigate and lose, they may have to pay only the rates that others who agreed to took licenses pay (the “tails I break even” aspect).

The IEEE’s proposal amounts to ignoring the possibility that an implementer will engage in what some have termed “hold out,” refusing to pay royalties and possibly even refusing to negotiate in good faith for a license until forced by an expensive, time consuming and risky litigation process to take a license. That creates a strong economic incentive to litigate rather than license, exacerbating the “hold out” problem.

The Ad Hoc Committee’s responses to various comments on the proposed changes state that “Negotiations between a Submitter [of an LOA] and a potential licensee *should* attempt to value the contribution of the Essential Patent Claim, *without considering the possibility* of a Prohibitive Order.”⁶ This goes far beyond the mere “precludes seeking, or seeking to enforce” language in the revised IPR Policy, as it appears to enshrine the “no injunction” rule into the principles underlying the negotiations for a “Reasonable Royalty” rate themselves. No justification or argument is given for such a position.

⁵ The IEEE’s proposal also amounts to eliminating the possibility of seeking streamlined enforcement (such as an ITC Section 337 exclusion order, which does not fall within the IEEE’s proposed revision, as the ITC is not a “court” and does not have jurisdiction to resolve various issues, such as damages). The IEEE provides no explanation why firms that have made FRAND commitments should be precluded from seeking such expedited relief, given that it is part of the U.S. patent enforcement system.

⁶ http://grouper.ieee.org/groups/pp-dialog/drafts_comments/PatCom_sort_by_comment_ID_0301214.pdf at p. 32 (emphasis added).

D.II. Gains from Standardization

The standards setting process is a collaborative effort, involving both patent holders and implementers. There are both private and social gains from that standardization effort. One source of such gains is the incorporation of superior technology into the standard. One task is to determine how the gains from standardization should be split as between patent holders, implementers and consumers. The terms of patent licenses affect that split. The total cash compensation received by patent holders can be thought of as the product of a royalty base and a royalty rate. From an economic perspective, the rate should be commensurate with the base.

Patent holders benefit from having their technology incorporated into a standard by what I term the “volume effect,” the fact that all standards-compliant products need to use their technology, and thus that the royalty *base* on which they can collect royalties will be greater than if there were no standard adopted. But in addition, patent holders may be able to benefit from what I would term the “price effect,” the proposition that the royalty *rate* could reflect some “fair share” of the value added by the fact that the technology was incorporated in the standard, especially if there are *synergies* across different patented technologies, so that the value of a standard incorporating multiple complementary patented technologies is *greater* than the sum of the individual values of the technologies considered separately, prior to standardization. Synergies across technologies, like synergies across products, are common in many industries.

But the IEEE’s suggestion that “reasonable rates” should “*exclude[e] the value, if any, resulting from the inclusion of that Essential Patent Claim’s technology in the IEEE Standard*” amounts to the proposal that patent holders should not receive any of the gains from standardization in the form of a “price effect” on the “reasonable royalty” *rate*. This essentially amounts to the proposition that *all* of the gains from standardization should flow to implementers and/or consumers, and none (except via the volume effect) to patent holders whose technology is incorporated into the standard. It effectively limits patent holders to the rates that would have been negotiated *ex ante*, prior to the technology being incorporated into the standard.

From an economic perspective, this is seriously questionable. There is no *a priori* reason why the gains from standardization (other than the volume effect) should all flow to implementers, and none to patent holders, given the collaborative cooperative welfare-enhancing nature of the standards setting process. Ordinarily, the parties to collaborative activities *split* the gains from collaboration among themselves. The IEEE has given no explanation why all of the gains (other than via the volume effect, a version of which also benefits implementers⁷) should flow to implementers (and/or consumers), and none to the firms whose technology is incorporated into the standard. Instead, when considering the collaborative value-enhancing nature of the standards-setting process, one would expect that patent holders would have a legitimate claim to a “fair share” of the gains from standardization.

⁷ Implementers benefit from a somewhat different “volume effect” caused by the presence of both “network externalities” (when the value to consumers of standards-compliant products is increased by the fact that other consumers likewise have standards-compliant products; for example, consumers’ willingness to pay for cellular telephone service is increased by the fact that other consumers have compatible cellphones) and economies of scale.

Admittedly, limiting patent holders to *ex ante* royalty rates would reduce the prospect of “hold-up.” But to insist that patent holders should receive *none* of “the value, if any, resulting from the inclusion of that Essential Patent Claim’s technology in the IEEE Standard” essentially amounts to denying patent holders from receiving any share of the gains from standardization (other than via the volume effect). In effect, the proposal amounts to a “slippery slope”-type argument that the only way to avoid going down the “slippery slope” toward hold-up is to prevent patent holders from receiving any of the gains from standardization (other than the volume effect), and denying them even a “fair share” of such gains.

D.III. Reliance on Licenses

The IEEE’s suggestion that other licenses can be considered in setting “Reasonable Rates” *only* if they were “not obtained under the explicit or implicit threat of a Prohibitive Order” (i.e., an injunction or an exclusion order) ignores the fact that *all* licenses are negotiated “in the shadow of the law” and thus under at least an *implicit* threat of injunctive relief if the implementer does not take a license, but continues to use the patented technology without paying for it. The IEEE’s proposal to disregard the terms of licenses that were “obtained under the explicit or implicit threat of a Prohibitive Order” essentially amounts to disregarding *all* licenses, despite their clear value in assessing reasonable royalties. It amounts to throwing away clearly relevant information, with no explanation of what information might replace it. A more nuanced response would be to acknowledge that the interpretation of terms in existing licenses could recognize the fact that such licenses were entered into under different circumstances.

D.IV. “Smallest Saleable Unit”⁸

The “smallest saleable unit” language derives from a legal doctrine developed in a number of U.S. patent infringement damages cases starting with *Cornell vs. Hewlett-Packard*,⁹ in which the court determined that “reasonable royalty” patent infringement *damages* should be calculated using a *damages* base calculated *as though* all of the infringer’s sales had been made of the “smallest saleable patent practicing unit,” which in that case the judge determined was the “processors” used in “CPU bricks” that were in turn used in large computers. (The defendant’s actual sales were predominantly made at the computer level, not the “processor” level.” Indeed, the defendant did not have either list or transaction prices for the majority of the different processors that it provided; the prices for the others had to be estimated using statistical techniques.)

The IEEE’s proposed policy is unclear in this regard. They may be suggesting (as the language appears to indicate) that the royalty *rate* should be assessed “as if” the implementer sold the products only at the “smallest saleable unit” level. Or they may be suggesting that both the rate *and* the base (in negotiated licenses) should be based on the “smallest saleable unit.” (The existing case law says that the damages base should be calculated as if the infringer sold all of its units at the “smallest saleable unit” level – *i.e.*, the case law goes to the damages base – but as I read the case law, it is not clear whether the rate should be set on the same premise.) This potential discrepancy between U.S. case law and the proposed IEEE IPR policy should be clarified before the proposal is adopted.

⁸ For a lengthy (and, in my view, persuasive) critique of the “smallest saleable unit” principle in patent infringement damages law, see Sidak, “The Proper Royalty Base for Patent Infringement Damages,” *J. Compet. Law and Econ.*

⁹ 609 F. Supp. 2d 279 (N.D. N.Y., 2009).

Implementers sell the products that they sell. Those sales are generally not of the “smallest saleable unit.” Using a royalty base *as if* the implementer had made all of its sales at the “smallest saleable unit” level tends to lead to numbers that are significantly smaller than the implementer’s actual revenues, earned from selling the mix of products that were sold. For example, in the *Cornell* case, the imputed damages base using the “smallest saleable unit” (the processors) was only 18.5%¹⁰ of the infringer’s actual revenues, earned selling a mixture of computers, CPU bricks and processors; in other words, the imputed damages base using the “smallest saleable unit” was significantly contrary to fact, discounting over 80% of the actual sales on a dollar basis. The actual amount of such distortion would vary depending on the factual situation in any given case, but that there would be some distortion is undisputed.

I have reviewed thousands of licenses from a wide variety of technical fields. I have seen only one license that calls for the licensee to pay royalties based on imputed revenues “as if” the licensee had made all of its sales at the “smallest saleable unit” level. That license recognized that the licensee made both complex and less complex devices incorporating the patented technology, and based the royalty due for more-complex devices on the selling price of the less-complex device, so long as the licensee continued to sell both products. (If the licensee stopped selling the less-complex product, the royalty base would be the selling price of the actual product sold.) To my knowledge, the IEEE has not explained why it believes that “reasonable royalty” licenses should be assessed as though the licensee had made all of its sales at the “smallest saleable unit” level, thereby transforming the situation where such licenses are extremely rare to a situation in which they are the norm. Such a policy is not “reasonable” in the sense of “commercially reasonable” – i.e., comporting with a common industry practice.

One rationale sometimes given for using the “smallest saleable unit” as the *damages* base when assessing “reasonable royalty” patent infringement damages – which is a different task from assessing the royalty base and royalty rate in a negotiated license, which appears to be the subject of the IEEE IPR policy – is that juries are prone to making certain types of cognitive errors, studied by psychologists under the labels “framing” and “anchoring.”¹¹

Mathematically, any given royalty amount can be expressed as the product of a given royalty base and the correspondingly-chosen royalty rate; for example, a 10% royalty on a royalty base of \$1000 yields the same \$100 in total royalties as a 1% royalty on a \$10,000 base or a 0.1% royalty on a \$100,000 royalty base or a 0.01% royalty rate on a \$1 million base. As noted above, the chosen rate should be commensurate with the chosen base. It makes no economic sense to set the one independently of the other. However, juries are sometimes thought to have a “range” of royalty rates that they believe are appropriate, and to be reluctant to award appropriately low royalty rates (e.g., 0.01%) if they start from a large damages base. Starting from a smaller royalty base, such as the “smallest saleable unit,” is sometimes seen as a way of counteracting such a cognitive bias.

¹⁰ The Court estimated three imputed processor sales at \$6.687 billion out of “total system sales” of some \$36 billion.

¹¹ See, e.g., Tversky and Kahneman, “The Framing of Decisions and the Psychology of Choice,” *Science*, New Series, Vol. 211, No. 4481 (Jan. 30, 1981), pp. 453-458, available at <http://www.uta.edu/faculty/richarme/MARK%205342/Articles/Tversky%2081.pdf>, and Tversky and Kahneman, “Judgment under uncertainty: Heuristics and biases,” *Science*, New Series, Vol. 185, No. 4157 (Sep. 27, 1974), pp. 1124-1131, available at <http://www.hss.caltech.edu/~camerer/Ec101/JudgementUncertainty.pdf>.

Though the concepts of “framing” and “anchoring” are well recognized in individual decision-making under uncertainty, the jury deliberation process is a collaborative collective effort, and the empirical basis for the claim of cognitive bias in jury decision-making (far less license negotiations between sophisticated entities¹²) is questionable. I am not aware of any reliable estimates of the magnitude of any such bias. Nor is there any effort to tie the impact of using the “smallest saleable unit” to the magnitude of any such bias. (As noted above, the imputed royalty base in Cornell was only 18.5% of the infringer’s actual sales, implying that one would have to believe that the cognitive bias in setting royalty rates was on the order of fivefold in order to mandate the use of the “smallest saleable unit” in that case as a way of offsetting any cognitive bias.) To my knowledge no court has fully articulated why any such bias cannot be cured by appropriate jury instructions. Nor has the IEEE articulated why such concerns about potential cognitive biases in jury awards should be imported into the IEEE’s IPR policy as a *substantive* rule mandating the use of the “smallest saleable unit,” especially in the context of voluntary license negotiations between sophisticated parties (which, admittedly, take place “in the shadow of the law”) who are unlikely to be affected by any such cognitive biases. One court noted that giving the jury information about the total volume of the infringer’s sales amounted to letting the “cat out of the bag,” arguing that such information “cannot not help but skew the damages horizon for the jury.”¹³ As a pragmatic matter, given cognitive biases such as framing and anchoring, *any* information will tend to “skew” the jury’s analysis in one direction or another. The relevant question is whether juries are more likely to “get it wrong” using a large base than using a small base. Absent evidence that one or the other is the case, it is circular to choose one approach over the other merely because the choice of one or the other will “skew” the analysis relative to choosing the other.

D.V. A “Smallest Saleable Unit” Approach Ignores Values Due To Synergies

It would be one thing if the use of the “smallest saleable unit” fully captured the value that the implementer receives from using the patented technology. But it is a commonplace that the parties to a license negotiation are bargaining over the value to the implementer of being able to use the patented technology. And that value can differ as between the “smallest saleable unit” and other compliant implementation. [Clearly the implementer’s revenues and profits differ as between the products as sold and the “smallest scalable unit.”] Focusing on the “smallest saleable unit” ignores that.

Consider, for example, a patent on cellular communication technology. Suppose that technology can be used in two different products: a basic cellphone that does not contain a digital camera, and a camera phone that does. The camera feature is technologically unrelated to the patented cellular technology. It might be argued that the “smallest saleable unit” is the basic cellphone without the camera technology.

But the value to consumers of the camera phone, and thus the value to them of the cellular capability, is enhanced by the ability to share pictures taken with the camera in the phone over the cellular network with others. And *vice versa*, the value of the camera capability is enhanced by the ability to send photos via the cellular network.. That is, there is a *value synergy* between the camera feature and the cellular capability. Focusing only on the “smallest saleable unit” ignores this source of synergistic value. If, as the IEEE now proposes, a “reasonable royalty” should be based on the “smallest saleable unit” – *i.e.*, the

¹² The IEEE’s proposals are apparently intended to apply to license negotiations, not just to jury damages awards.

¹³ *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F. 3d 1292 (Fed. Cir. 20110), at 1320.

basic phone – even if the implementer actually sells (and may even predominantly sell) the camera phone containing both features, that denies the patent holder any share of that synergistic value, which can be considerable. In my view, that is not “reasonable” in the sense of “commercially reasonable,” and fails to “adequately compensate” the patent holder for that aspect of the infringement.

To be sure, the synergistic value is not caused *solely* by the patented cellular technology. But it is likewise not caused solely by the camera functionality. The cause of the synergistic value is the presence of *both* features. The IEEE has given no explanation for why the patent holder should not receive a negotiated “fair share” of that synergistic value, or why it believes that the implementer (and/or the consumer) should obtain all of it, as the proposal to use the “smallest saleable unit” implies.

D.VI. “Smallest Saleable Unit” and Manipulability

Another concern is that the prices and features of the “smallest saleable unit” may be manipulable by the implementer in ways that the actual selling price of the products sold are (in practice) not. For actual sales, prices are set by arms’-length transactions in the market. Holding product features constant (which is generally not the case with respect to the “smallest saleable unit”), the seller prefers a high price, while the buyer prefers a low one. The seller’s actual pricing reflects a trade-off between price, volume and features. Thus the patent holder will choose that mix of products, product features, and prices that it believes is optimal given demand and its cost structure.

If royalties are calculated on the basis of the “smallest saleable unit,” as the IEEE now proposes, the implementer has an economic incentive to try to manipulate the selling price of the “smallest saleable unit” downward so as to reduce the royalties due, especially if such units only account for a relatively small fraction of the implementer’s actual sales. Even holding product characteristics constant, firms that sell a variety of products with a variety of features have the ability to allocate their overhead costs across products so as to artificially depress the price of “bare bones” products and load the overhead onto other more-feature-laden products. Similarly, under such a royalty system the implementer has an economic incentive to manipulate the mix of product features that it offers, introducing a “bare bones” product incorporating the patented feature but few other features and selling it for a low price so as to reduce its royalty obligations, especially if it knows that the majority of its actual sales will be of more complex products with additional features selling for higher prices. (Detroit used to be accused of keeping the MSRP of its cars artificially low by stripping out features consumers actually wanted and were willing to pay a premium for, setting a low list price for a “bare bones” car, but then making such cars in very limited quantities or only in unpopular colors.) The incentives to do so would be exacerbated if the royalties they had to pay to patent holders were to be calculated on the basis of the “smallest saleable unit.”

D.VII. “Smallest Saleable Unit” and the “Value Chain”

In the cellular communications field, as in many other industries, there is a “value chain” consisting of a number of distinct but interrelated levels/markets, with the output of one level in the “value chain” being used as an input into the next level. For example, cellular chipsets are made by chipset manufacturers and sold to cellular handset manufacturers, who incorporate the chipsets into cellular handsets. The handsets are sold either to consumers (indirectly, through retailers) or to cellular service providers, and are used by cellular service providers together with other equipment (cellular base stations, switching equipment, land

lines) to provide cellular service. Firms at different levels of the value chain each receive value from being able to use patented technology. The values are different at different levels in the value chain. The total benefit is the sum of the benefits at different levels in the value chain.

Some have suggested that the “smallest saleable unit” practicing the cellular standard is the chipset, on the grounds that the chipset contains “the guts” of the cellular functionality (ignoring the fact that a standalone chipset, or even a standalone handset not part of a cellular system, cannot be used to make phone calls). The IEEE’s focus on “components” may add fuel to this suggestion, which ignores the fact that handset manufacturers buy chipsets and incorporate the chipsets into handsets. [When focusing on the “smallest saleable unit,” one question becomes: “saleable” by whom? A chipset is saleable by a chipset manufacturer to a handset manufacturer, but handset manufacturers do not sell chipsets, but instead sell handsets incorporating chipsets, and calculating royalties as if they did sell chipsets distorts economic reality.]

Chipset prices and profit margins are low, much lower than the prices/profits on handsets or the provision of cellular services. The suggestion that a “reasonable royalty” should be measured at the chipset (“component”) level ignores the fact that both handset manufacturers and cellular service providers are also using the patented technology to sell products/services, and that the value that they receive from using the patented technology is unlikely to be reflected in actual chipset prices/profit margins. [It would be one thing if one were to show that chipset manufacturers were able to set the prices of chipsets so as to extract *all* of the value that those “downstream” from them in the “value chain” received from using the patented technology, but that is unlikely given competition at the chipset level, and the IEEE’s analysis does not support such an empirical claim.] Simply put, there is no reason to believe that a royalty assessed at the chipset (“component”) level, especially one assessed with reference to chipset prices and chipset profits, adequately captures the value to those at *other* levels in the value chain – such as handset manufacturers and cellular service providers – of using patented cellular technology. Such royalties are not likely to be “adequate to compensate” for infringement at the handset or cellular service level.

Given the “patent exhaustion” doctrine – a legal proposition that provides, to simplify somewhat, that, once a patent holder has licensed an entity at one level in the value chain, it cannot obtain further royalties from those “downstream” from its licensees in the value chain that buy and use licensed components – saying that a “reasonable royalty” should be assessed at the chipset (component) level implies that the compensation that the patent holder receives is likely to (significantly) underestimate the total value at all stages in the value chain from using the patented technology. [In the absence of the patent exhaustion doctrine, a patent holder could in theory collect royalties at multiple levels in the value chain, reflecting the value associated with using its patented technology at different levels.]

Put another way, from an economic perspective, the “value” to a firm from using patented technology is measured by the incremental profits that it can earn using the technology relative to the profits that it can earn using the next-best non-infringing alternative, and there is no reason why reasonable royalties should be capped by the profit margins earned on (or even the prices of) cellular chipsets, given that there is “value” of being able to use the patented technology at multiple levels along the “value chain,” not just at the chipset (“component”) level.

As Chief Judge Davis said in *Commonwealth Scientific & Industrial Research Organization v. Cisco Systems*, a case involving WiLan (802.11) cellular technology: “the benefit of the patent lies in the

[technological] idea, not in the small amount of silicon that happens to be where that idea is physically implemented. Basing a royalty solely on chip price is like valuing a copyrighted book based only on the costs of the binding, paper and ink needed to actually produce the physical product. While such a calculation captures the cost of the physical product, it provides no indication of its actual value.”¹⁴ Similarly, because chipset prices and profits are driven by competition and costs at the chipset level, there is no reason to believe that royalties based on chipset prices and/or profits will be “adequate to compensate” the patent holder for use of its technology at the handset or cellular service level, especially if chipset manufacturers have not built adequate royalties into the prices they charge for chipsets (as would be the case, for example, if there were widespread infringement).

The fact that a patent holder that has made a RAND commitment has committed to making an “unlimited” number of licenses available does not, in my view, require the patent holder to license at the chipset (or “component”) level,¹⁵ and I do not understand the IEEE to be suggesting otherwise. A patent holder can comply with that obligation by making an “unlimited” number of licenses available at the handset level, or at the cellular service provider level. It is common industry practice and thus “reasonable” in the sense of “commercially reasonable” for a patent holder to limit its licensing to firms at a single level in the “value chain.” Cents-per-unit royalties would avoid the pragmatic difficulties associated with licensing at different levels in the “value chain,” but I have never seen any credible suggestion that RAND licensing must be on a cents-per-unit basis, and percentage-based royalties are common in many industries.

D.VIII. “Smallest Saleable Unit” and Existing Licenses

Another problem with appealing to the “smallest saleable unit” is that royalties in real-world licenses, which are the best information about prices actually agreed to for the use of the same or “comparable” technology, are overwhelmingly based, not on the “smallest saleable unit,” but on the products actually sold by the licensee. Above and beyond the concerns expressed above about the IEEE’s rejection of the use of license terms entered into in light of an “explicit or implied” threat of injunctive relief, the current proposed emphasis on the “smallest saleable unit” risks ignoring clearly relevant information.

D.IX. “Smallest Saleable Patent Practicing Unit” Issues

The IEEE’s reference to the “smallest saleable Compliant Implementation that *practices* that [patent] claim” raises other issues. Patent claims can be written in many ways. Determining whether a particular product does or does not “practice” a given claim is often a disputed issue, turning as it does, not merely on the language of the patent claim and on how that language is construed, but also on the characteristics of the product. It is not uncommon for patent claims to be written at the device level or even at the system level (e.g., a cellular communications system that has certain features) so that the “smallest saleable Compliant Implementation that practices the claim” may require the use of multiple components (e.g., at least a system with multiple cellular handsets and a group of base stations). In such a situation, the chipsets may not themselves infringe the claim, but their suppliers may be found liable for inducement

¹⁴ Commonwealth Scientific & Industrial Research Organization v. Cisco Systems, No. 6-11-cv-00343, 2014 WL 3805817, at 11 (E.D. Tex, July 23, 2014).

¹⁵ Though it clearly can *choose* to do so.

to infringe and/or contributory infringement if their products are used as intended in an infringing fashion. Whether such components would qualify as a “smallest saleable Compliant Implementation that practices the claim” is unclear.

Put another way, the fact that different “Compliant Implementations” (e.g., chipsets, handsets, cellular service) all comply with the *standard* does not resolve the question of whether they all “practice the claim” of the patent. The latter raises issues of claim scope and claim construction that can be complex and are often contentious. The fact that the patent holder may have contended that its patent is “essential” in order to practice the standard does not resolve this issue. It does not appear to me that the IEEE has thought carefully about what “practices the claim” means in the law, nor why what is a “reasonable royalty” for the use of an invention should depend on issues such as whether the product “practices” the particular limitations of the patent claim, given that patent claims for “the same” invention can be written in a variety of different ways.

D.X. Discussing Licensing Terms

Back in 2007, the IEEE sought and received a “Business Review Letter” from the Antitrust Division of the U.S. Department of Justice¹⁶ in connection with its then-current proposed IPR policy, which proposed that the IEEE be allowed to ask (but not require) patent holders making FRAND commitments to disclose their “not to exceed” licensing terms. At the time, the IEEE policy did not allow IEEE members to discuss proposed license terms at IEEE meetings.

The current suggestion the IEEE “shall provide procedures stating when and the extent to which patent licensing terms may be discussed” is contrary to the situation contemplated in the Business Review Letter that the IEEE got in 2007 when it submitted the earlier proposed policy, which provided that “IEEE working group members will be allowed to discuss within certain limits the relative costs and benefits of alternative technologies within technical standard-setting meetings,” but the 2007 BRL also explicitly provided that “working group members will not discuss specific licensing terms at standards-development meetings.” The IEEE’s current proposal would change that to allow such discussions once (unspecified) “procedures” have been adopted. The obvious concern is that other SSO members are the most likely licensees, and allowing prospective licensees to collectively discuss proposed licensing terms runs the risk of buyer-side oligopsonistic coordination and price-fixing for the use of patented technology. The concern would be exacerbated if the SSO were to explicitly condition incorporation of some technology into a proposed standard on the patent holder’s agreement to reduce the royalty rates it would otherwise charge.

D.XI. Reciprocity

The suggestion that “Reciprocity” be limited to the other party’s “essential” patent claims for the same standard ignores the fact that it is a “reasonable” business practice to seek a broad cross-license allowing both “design freedom” and “freedom to operate,” and those goals may require licenses to (1) non-essential patents and (2) patents that are essential for other standards. The obvious antitrust concern is with “tying” standards-essential patents (“SEPs”) for one standard to non-SEPs and/or to SEPs for a

¹⁶ The 2007 BRL is available at <http://www.justice.gov/atr/public/busreview/222978.pdf>.

different standard. The IEEE apparently has no problem with “tying” SEPs for one standard to cross-licenses for SEPs for the same standard. Its stated rationale¹⁷ for rejecting the possibility that a patent holder might legitimately want to condition and out-license for its SEPs on the availability of an in-license for the other party’s non-IEEE-standards-related patents makes no economic sense as an *affirmative* justification for the proposed change.

D.XII. Patent-Claim-By-Patent- Claim Licensing

The draft revised IEEE IPR policy is silent on the issue of whether patent holders can elect only to license on a portfolio basis, or whether they have an obligation to make licenses available on a patent-by-patent or patent-claim-by-patent claim basis. [The policy specifies that parties can choose to license on a portfolio basis if they mutually *agree* to do so, but that does not resolve the question. The issue is whether a patent holder has an obligation to make licenses available on a patent-by-patent or patent-claim-by-patent-claim basis if the implementer insists it wishes such a license, and if the patent holder desires a portfolio cross-license.]

In response to a proposed comment on the draft IPR policy revisions from Daniel Hermele of Qualcomm, the IEEE PatCon responded that “the comment, however, is based on the *mistaken premise* that a patent holder can satisfy its obligations by offering only a complete portfolio license *rather than* offering *licenses for individual Essential Patent Claims*.”¹⁸

The assertion that it is a “mistaken premise” that “a patent holder can satisfy its obligations [under its LOAs] by offering only a complete portfolio license rather than offering licenses for individual Essential Patent Claims” implies that the PatCom believes that, under the IEEE patent policy (whether as it currently is or as amended), patent holders that have made RAND commitments have an obligation to make licenses available “for individual Essential Patent Claims” if the prospective licensee desires such a license.¹⁹ The IEEE response amounts to the claim that the licensee’s desire for a patent-claim-by-patent-claim license should “trump” the patent holder’s desire for a portfolio license.

This would seem to be both a substantial change from the existing IPR policy and a substantial change from licensing practice in many high-technology industries, where portfolio licensing is the norm²⁰ and patent-claim-by-patent-claim licensing is the extremely rare exception. Because portfolio licensing is the overwhelming norm, it would appear to be “reasonable” in the sense of “commercially reasonable.” It

¹⁷ “Regulators and various commenters have suggested that some limitations on reciprocity are appropriate. The draft policy is consistent with those suggestions.”

¹⁸ http://grouper.ieee.org/groups/pp-dialog/drafts_comments/PatCom_sort_by_comment_ID_0301214.pdf at p. 11 (emphasis added).

¹⁹ In response to the Hermele comment, the PatCom noted that, under the policy, the parties could *agree* to any mutually –acceptable license, including in particular a portfolio-based license. That is clearly true, but that does not resolve the question of whether the patent holder has an *obligation* to make patent-claim-by-patent-claim licenses available if that is what the licensee wants, as the PatCom response implies.

²⁰ See Grindley and Teece, *supra* note 2.

also makes sense from a transaction cost basis, as negotiating patent-claim-by-patent-claim licenses would involve significantly higher transaction costs than negotiating portfolio licenses.²¹

Moreover, the administrative difficulties associated with implementing and administering such patent-claim-by-patent-claim licenses in practice would be formidable. Would the patent holder have to show that particular licensee products satisfy the limitations of a given licensed patent claim in order to be able to collect royalties under such a license? What where the parties dispute patent claim construction, or dispute validity or infringement? [This is one reason why licenses typically call for the licensee to pay royalties based on its sales of “Licensed Products,” a defined term, and why the licensee’s contractual obligations to pay royalties are typically not reduced if certain patent claims are found invalid and/or not infringed. A patent claim-by-patent-claim license would presumably change that.] Given that one common purpose of patent licenses is to achieve “patent peace” and avoid disputes as to whether particular products are or are not licensed under particular patent claims, requiring such a showing would be a major step backward and would be a recipe for contractual disputes over whether or not royalties were owed.

D.XIII. Procedural Concerns

I am aware that some have objected to the process by which the proposed revisions were developed, arguing that the development process was done by a selected group (the Ad Hoc Committee of PatCon) that was not fully representative of the IEEE membership as a whole (and, in particular, that the interests of patent holders were underrepresented), that certain firms that wanted to participate in the Ad Hoc Committee’s deliberations were not allowed to do so, and that attempts to comment on and change the proposals were largely rejected. I have previously written about the quasi-political nature of standards setting, noting that the interests of patent holders and implementers are not fully aligned, and noting that the standards-setting process must strike a balance between the interests of various stakeholders or face the risk that those who are disgruntled by the process may elect not to participate.²² I am not in a position to opine on the procedural process by which the proposals were made from a factual perspective, though I have reviewed the proposed comments on the proposed revisions and the responses given by the Ad Hoc committee,²³ and many of the responses seem to simply assume (without proof or argument) that there is a “problem” that needs to be “fixed.” But one has to be concerned that a biased consideration process may have skewed the proposals in ways that are not consistent with the interests of society as a whole, especially given the voluntary nature of the standards-setting process. In particular, it does not appear to me that the proposals, and the way they were arrived at, comport with the consensus-based nature of the standards-setting process more generally, and the overall process may have lacked certain aspects of fundamental fairness. Given that, in most SSOs, implementers typically outnumber patent-holding innovators whose technologies are incorporated into standards, it may not be surprising that the Ad Hoc Committee apparently favored the interests of implementers over the interests of patent holders. But such

²¹ In response to the Hermele comment, the PatCom noted that, under the policy, the parties could *agree* to any mutually –acceptable license, including in particular a portfolio-based license. That is clearly true, but that does not resolve the question of whether the patent holder has an *obligation* to make patent-claim-by-patent-claim licenses available if that is what the licensee wants, as the PatCom response implies.

²² “Standards Setting and Antitrust” (with Edward F. Sherry), *Minnesota Law Review* 87:6 (June 2003), 1913–1994.

²³ http://grouper.ieee.org/groups/pp-dialog/drafts_comments/PatCom_sort_by_comment_ID_0301214.pdf.

a policy is short-sighted from a societal perspective, when considering the need for technological innovation to drive progress and the development of new standards. Certainly, the fact that a number of major technology innovators (Qualcomm, Nokia, Ericsson, Blackberry) have objected to the proposed revisions indicates that there is cause for concern.

E. Overall Conclusion

From an economic perspective, the proposed changes to the IEEE IPR policy have a number of disquieting characteristics. They amount to a substantial substantive change in what is meant by FRAND, in ways that favor implementers at the expense of patent holders. The proposal that “reasonable rates” should “exclude” any value associated with incorporating the patented technology into the standard is the most objectionable aspect of the proposed changes, implying as it does that patent holders should not share in the gains from standardization (other than via the volume effect). The emphasis on the “smallest saleable unit” – especially at the “component” level – is also seriously problematic, as it ignores both “value synergies” between the patented feature and other unpatented features and the value at other levels in the value chain. The proposal that firms that have made FRAND commitments should not seek nor enforce injunctive relief amounts to stripping away a useful technique for encouraging recalcitrant implementers from taking broad licenses and achieving “patent peace,” “design freedom” and “freedom to operate,” and significantly restricts the rights that patent holders would otherwise have to *seek* (not necessarily *receive*) injunctive relief, in particular by denying access to certain expedited proceedings (such as an ITC Section 337 exclusion order). The proposal that patent holders that have made FRAND commitments have an obligation to make licenses available on a patent-claim-by-patent-claim basis would wreak havoc with existing licensing practices in many high-technology industries, would increase transaction costs, and would reduce economic efficiency. In my opinion, the proposed changes would adversely affect the innovation ecosystem, to the detriment of patent holders in the short run and of implementers, consumers and society in the longer run. Finally, concerns about an apparent lack of accepted input from firms that one would have thought would or should have been key participants in the process of developing the proposals raise troubling issues.