

STANDARD SETTING AND INTELLECTUAL PROPERTY: AN OUTLINE OF THE ISSUES

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Consider the following hypothetical:

- There are a number of technologies each of which is the intellectual property of its sponsor and all of which are equally capable of performing the same function.
- None of the sponsors produces the product in which the technologies are used, i.e., they are suppliers of technology to the producers of that product.
- The investments in R&D to develop the various technologies are sunk.
- *De facto* standardization is impossible, perhaps because a multiplicity of competing technologies would cause such confusion among consumers that they would be unwilling to risk being “stranded” with the “wrong” technology and no single producer of the final product, or small group of producers, can start a standards “bandwagon” on its own.
- This is the “last round” of standards competitions involving these technologies, i.e., there is no possibility of future “refinements”.
- The technologies, although equally capable, have different “manufacturing costs,” i.e., ignoring licensing fee, the cost of producing the final product depends on which technology is employed, and these costs are the same for all producers.
- There is an industry standards body whose members are the firms that produce the final product but not the sponsors of the technologies.

Question 1: Should the standards body choose a standard?

Question 2: Which technology should the standards body choose?

Question 3: What rights should the standards body obtain from the winning sponsor?

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Question 4: What should be the license fee?

The answer to Question 1 is “yes,” because I have assumed that otherwise the market for the final product would never develop.²

The answer to Question 2 is “the technology with the lowest manufacturing costs.”

The answer to Question 3 is “the right to use the winning technology for the term of its intellectual property protection at a license fee that is determined at the time the technology is chosen.”³

The answer to Question 4 is “some amount between zero and the difference in manufacturing costs when using the lowest and second lowest cost technologies.” Thus, for example, if the per unit manufacturing cost using the lowest cost technology is \$9 and the per unit manufacturing cost using the second lowest cost technology is \$10, the license fee cannot exceed \$1 per unit.⁴

What I have described here is the outcome of an *auction* held by the producers of the final product in which they award a monopoly to the sponsor of the lowest cost technology but in which they exploit the *ex ante* competition among sponsors to limit the magnitude of the license fee.⁵

² Nonetheless, even in this case, some organizations may be reluctant to choose a standard either out of fear of incurring antitrust liability or because of the high costs of avoiding that liability. For an example, see the discussion of the reluctance of the National Association of Broadcasters to adopt an AM stereo standard in S.M. Besen and L.L. Johnson, *Compatibility Standards, Competition, and Innovation in the Broadcasting Industry*, The Rand Corporation, R-3453-NSF, November 1986.

³ An alternative might be to allow for the possibility of reconsidering a standard if acceptable license terms cannot be negotiated. For a case in which a standards body succeeded in obtaining lower license fees by threatening to remove technologies from a standard see T. Lefton, “IBM, Unisys Reduce Fees For Modem Compression,” *Electronic News*, January 1, 1990, p. 1.

⁴ This assumes both that which technology is chosen affects *variable* manufacturing costs and that the license fee is quoted on a *per-unit* basis. Note that I am also implicitly assuming all users pay the same license fee. Although fixed rather than per-unit license fees may be more efficient, because they do not affect producers' marginal costs, they may be difficult to set if there is substantial uncertainty about future sales and because the appropriate fixed fee may be different for different producers.

⁵ Of course, the use of an auction, whether formal or not, to obtain a lower license fee may itself be controversial since it raises questions about whether the standards body is being used by the producers of the final product to exercise monopsony power. However, the assumption that the market cannot develop unless a standard is chosen by the standards body would seem to largely ameliorate that concern. Note, too, that the license fee that a winning sponsor will demand may be constrained by its desire to develop a reputation for reasonableness, in order to increase the likelihood that its technology will be chosen in future standards competitions, as well as by the presence of competing technologies.

Some additional questions and some possible answers:

- What if there are differences in the technical capabilities of the various technologies? The auction should take into account the quality-adjusted differences in manufacturing costs.⁶
- What if some sponsors are members of the standards body? Those members that are final producers but not sponsors must be concerned that the standard that is chosen, and the license fee that is set, will reflect not only their interests, as in the initial hypothetical, but the interests of the sponsor members. There may also be a concern that some sponsors will be able to use their influence to disadvantage other sponsors, i.e., that the “best” technology – which depends on both technical capabilities and manufacturing costs -- will not be chosen as the standard.⁷
- What if the sponsors are among the producers of the final product? The auction should take into account any competitive advantage the winning sponsor obtains. That is, a sponsor should be willing to accept lower license fees if winning the standards competition gives it a manufacturing cost advantage over its rivals.
- What if R&D costs are not sunk? The auction should take into account the effect of the license fee on the incentives of sponsors to invest in R&D, perhaps by accepting a higher license fee than could be obtained in an auction. [An alternative is for R&D to be supported directly, perhaps though an industry consortium.]
- What if *de facto* standardization is possible? The auction should take into account the effect of the license fee on the incentives of the sponsors to participate in the voluntary standards process instead of competing to become the industry standard “in the market.” That is, if the license fee is set too low in the auction, some or all of the sponsors may elect to compete to become the *de facto* standard rather than participating in the auction being run by the standards

⁶ Note that this means that the standard that is chosen need not be the one that is technologically “best” and, in any event, the license fee that the technologically “best” alternative can command may be constrained by the presence of inferior technological alternatives.

⁷ Among the possible reasons for a divergence between the interests of sponsors and final producers are: (a) differences between sponsors and producers about which standard to adopt; (b) a desire for standardization by producers and for a continuing standards competition by sponsors; and/or (c) a desire by sponsors for *incompatibility*, in order to reduce the extent of price competition among them. For a discussion of these differences see S.M. Besen, “The European Telecommunications Standards Institute: A Preliminary Analysis,” *Telecommunications Policy*, December 1990. For a more general discussion of the incentives of sponsors to agree on standards see S.M. Besen and J. Farrell, “Choosing How to Compete: Strategy and Tactics in Standardization,” *Journal of Economic Perspectives*, 1994.

body. [Note, that competition to become the *de facto* standard may result in lower license fees to producers whose participation is critical to winning the standards competition.⁸]

- What if this is not “the last round”? The standards body should take into account any incumbency advantage that the winning sponsor in this round might have in later rounds. Doing so could involve some combination of: (a) negotiating a lower license fee; (b) obtaining a commitment to joint development of future technologies; and/or (c) obtaining a commitment for development of future technologies by a neutral third party. If the winning sponsor is also a producer of the final product, the standards body might also obtain a commitment by the winner to provide timely information about future technological developments to rival producers.

⁸ In the case of the video encryption standard discussed in Besen and Johnson, *op. cit.*, it is generally believed that Home Box Office, whose adoption decision was thought to be critical to the success of the standard, obtained a lower license fee than did other cable program services.