

# Agenda

Advancing economics in business

## Untangling FRAND: what price intellectual property?

The inaugural meeting of the Oxera Economics Council was held on January 15th 2008. The topic for discussion was the concept of FRAND (fair, reasonable and non-discriminatory), which is often used by standards-setting organisations and in the licensing of intellectual property rights. What insight can economics provide into this tricky legal and commercial problem?

Commercial pricing decisions reflect a plethora of factors: costs incurred in both product development and production; the position of competitors; the negotiating strength of customers; the value of the product to customers in downstream markets; and so on. Yet the challenge of understanding the motivations behind, and implications of, pricing decisions has not prevented competition authorities from seeking to intervene over pricing in a small number of cases, if only because they receive complaints from customers or competitors. The European Commission's Qualcomm case provides an example (see p. 2).

Such actions are controversial, in large part due to the lack of simple rules to assess pricing. The aim of this article is to explore the concept and implications of the principle of FRAND—fair, reasonable and non-discriminatory—pricing. (In the USA, RAND is the relevant concept as the fairness element is absent.) Commitments to price on FRAND terms can be seen in standards-setting arenas and in abuse of dominance cases. This raises a number of complicated legal and policy questions, the answers to which require input from economics and financial analysis.

### Oxera Economics Council inaugural meeting, January 2008

Oxera consultants were joined by fellow Council members Professor Mathias Dewatripont (Chairman), European Center for Advanced Research in Economics and Statistics (ECARES) at the Université Libre de Bruxelles, Walter Beckert (University of London), Estelle Cantillon (ECARES), Bruno Jullien (Toulouse School of Economics), Patrick Legros (ECARES), Massimo Motta (European University Institute, Florence), and Eric van Damme (Tilburg University).

Damien Neven, Chief Competition Economist at the European Commission, participated as a special guest

at this first meeting and was keynote speaker at the reception which followed.<sup>1</sup>

### Mathias Dewatripont said of the Council:

Through its debate and by bringing together academics from across Europe, the Council seeks to stretch the boundaries of existing economic thinking, particularly in the context of public policy in competition and regulation, giving economists the opportunity to create practical analytical insight and tools for policymakers and practitioners.

### Questions discussed at the inaugural meeting

- What do economic principles tell us about FRAND? What economic theories and techniques can be used to identify prices above FRAND?
- What policy objectives is FRAND trying to achieve?
- Is FRAND relevant for competition law investigations under Article 82 (abuse of dominance), or only for 'ex ante' pricing commitments—for example, in the context of standards setting?
- Does FRAND provide a sufficiently clear measure to effectively prevent unfair pricing while maintaining incentives to innovate?

Note: <sup>1</sup> Damien Neven's speech can be found on the European Commission's website at: <http://ec.europa.eu/dgs/competition/economist/oxera.pdf>.

**Qualcomm**

Proceedings against Qualcomm were opened by the European Commission under Article 82.<sup>1</sup> The alleged infringement concerns the terms under which Qualcomm licenses its patents essential to the WCDMA standard, which forms part of the 3G standard for European mobile phone technology (also referred to as UMTS). This followed complaints lodged with the Commission by Ericsson, Nokia, Texas Instruments, Broadcom, NEC and Panasonic, all mobile phone and/or chipsets manufacturers. The complaints alleged that Qualcomm's licensing terms and conditions are not FRAND and may therefore breach EC competition rules.

The investigation will focus on whether Qualcomm is dominant and whether the licensing terms and royalties it

Note: <sup>1</sup> European Commission (2007), 'Antitrust: Commission Initiates Formal Proceedings Against Qualcomm', MEMO/07/389, October 1st.

imposes are, as alleged by the complainants, not FRAND. In a context of standardisation, a finding of exploitative practices by Qualcomm in the WCDMA licensing market contrary to Article 82 may depend on whether the licensing terms imposed by Qualcomm are in breach of its FRAND commitment.

The complaints are based on an understanding that the economic principle underlying FRAND commitments is that essential patent holders should not be able to exploit the extra power they have gained as a result of having technology based on their patent incorporated in the standard.

As noted by Professor Mathias Dewatripont, Chairman of the Oxera Economics Council, the topic is 'both broad and challenging and therefore in line with the Council's aims to consider what insight economic theory can add to this question.'<sup>1</sup>

**Where could FRAND be relevant?**

To give a flavour of the situations in which issues of FRAND pricing arise, many, if not most, emerge in the context of intellectual property (IP), and in particular in the context of standards-setting organisations (SSOs), such as the European Telecommunications Standards Institute (ETSI). Inclusion of IP in any of ETSI's standards requires the IP holder to agree to license that IP on FRAND terms to any licensor.

While SSOs may require FRAND licensing terms, little interpretation of the concept is provided. As a result, the question of whether a pricing proposal is compliant with a FRAND commitment can form a central element of legal disputes, culminating in private litigation between IP licensors and potential licensees, or indeed challenges to competition authorities.

Issues relating to FRAND are relevant for competition authorities, both in terms of ex post assessments of abuse of dominance to ascertain whether a particular pricing level is in excess of FRAND (see the Qualcomm case), and for ex ante remedies, such as those of merger investigations. Under Article 82, the relevant issues relate to exploitative pricing practices (the FR in FRAND), and sometimes also to concerns about exclusion of competitors (the ND in FRAND).

It is fair to say that the legal and economic thinking in this arena is currently at an early stage, both in developing conceptual tools that could be used, and in applying those tools in practice.

**What is fair and reasonable?**

The significance of FRAND grows as the interests of those owning the technology in the standard have diverged. Those wishing to produce standard-compliant products are obliged to obtain licences for all the IP covered by a standard if there is a non-negative risk that the patents would be enforced. This could provide each owner of essential patents with significant market power.<sup>2</sup> However, assessing the selling power of each seller of essential IP in a standard without reference to the demand-side characteristics of the buyers would result in an incomplete analysis. This can have analytical implications if potential licensees seek to challenge the licensors over whether IP holders are seeking terms that exceed FRAND.

SSOs have generally been reluctant to give guidance on the interpretation of FRAND, and it has therefore largely been left to the patent holders to interpret it however they see fit. The result has been a large number of agreements (usually highly confidential), apparently on a FRAND basis, as well as many high-profile litigations and antitrust complaints.

The nature of IP rights means that static cost rules do not provide useful guidance for setting price ceilings. In particular, the typically low marginal cost of distributing IP indicates that setting price equal to marginal cost would not generate incentives for innovation and the requisite investment in R&D. It is therefore necessary to look for alternatives.

Drawing from the relevant literature, two main alternatives for interpreting FRAND in the context of SSOs can be identified.<sup>3</sup>

**Option 1** The Swanson–Baumol approach—the price that the IP holder would be able and willing to

charge *prior* to the acceptance of the IP into the standard represents a fair price, as it reflects the value of the IP independently of the value of the standard.<sup>4</sup>

**Option 2** The Shapley value approach—a fair and reasonable price awards each IP holder the *value* representing its contribution in a cooperative game situation.<sup>5</sup>

These two approaches were the focus of discussion at the Oxera Economics Council.

## IP pricing on an ex ante basis: the Swanson–Baumol approach

The approach envisaged by Swanson and Baumol (option 1) can be summarised as follows. To alleviate concerns over the exertion of ex post market power held by an IP holder having been accepted into a standard, this solution would involve prospective licensees negotiating licence terms prior to their acceptance into the standard, and hence at a point in time when there is still active competition between technologies.

Licence terms set at that point would remove the ability of the IP holder to change its pricing in response to changes in the value of the standard over time since, ex post, the price is limited to that revealed prior to the inclusion of the technology into the standard. This is broadly the model that two SSOs, the Institute of Electrical and Electronics Engineers and the VITA Standards Organization, are currently exploring, whereby IP holders reveal in their applications to the SSO the maximum royalty rate that would apply for the lifetime of the standard were they to be accepted.<sup>6</sup>

This approach is intended to mitigate, if not eliminate, the risk of hold-up of purchasers. Hold-up involves inducing purchasers to adopt a particular technology before subsequently seeking royalty rates that exploit the relationship-specific investments made by the purchaser.<sup>7</sup> An example of this type of behaviour has arisen in the computer chip sector in relation to Rambus Inc., a computer technology developer, which was found by the US Federal Trade Commission (FTC) to have breached Section 2 of the Sherman Act.<sup>8</sup> In June 2002, the FTC charged Rambus with violating federal antitrust laws by engaging in behaviour to deceive the Joint Electron Device Engineering Council, and thereby causing, or threatening to cause, substantial harm to competition and consumers. In a parallel case, the European Commission issued a Statement of Objections against Rambus in 2007.<sup>9</sup>

Risks of hold-up aside, life-cycle pricing of innovative products is relatively common, and can provide

justification for periods of very low pricing, followed by periods where the benefits are reaped, particularly in network sectors. This raises the concern that, if a method for determining FRAND limits the extent to which IP holders can incorporate the future success of products based on a standard to which their technology contributes, just rewards for the innovation may not be forthcoming.<sup>10</sup>

## The Shapley value approach

The second main alternative for assessing whether pricing is FRAND is termed the Shapley value approach. The logic underlying this approach is somewhat less intuitive than the Swanson–Baumol approach. It has been described as follows.

Suppose that there are  $n$  patent-owners, one for each patent involved ... Suppose the patent-owners arrive at the SSO in random order each with her patent in her pocket, with all possible arrival sequences equally likely. Now suppose that in each sequence, each patent-owner receives the amount by which her patent increases the value of the best standard that can be built from the patents that are already at the SSO when she arrives ... The Shapley value gives the average of such contributions over all possible arrival sequences—each patent thus receives the average (over arrival sequences) of its marginal contribution.<sup>11</sup>

This model can generate some unexpected outcomes. Consider a standard with two complementary technologies, which for the sake of exposition can be described as the technology to enable a vehicle to turn left and that to enable it to turn right. While for most users these will be of equal value, the payouts may not be the same under the Shapley value approach.

If, for example, just one operator develops the technology to turn left, while two work out how to turn right, the payoffs would be two-thirds to the former, with one-sixth to each of the developers of the technology to turn right. Note that in this analysis, both innovators of turning right receive a payoff, even though only one of them can ultimately be included in the standard, and that the payoffs are driven by the number of alternatives for each element of the technology, rather than the innate value that a particular technology brings to the standard.

## Relative merits of these approaches

The Swanson–Baumol approach can be characterised as an efficiency-based approach. This is because it is also auction-based, so the resulting licensing rates should reflect the value that each patent brings to the standard over and above the value that the next-best solution could provide. In contrast, the Shapley value

approach is a normative approach that can arguably be used more to judge outcomes than to provide practitioners with a toolkit for understanding how operators may change their behaviour.

Despite their fundamentally different approaches, there are similarities in outcomes under both options. For example, an IP holder that faces no competition from alternative technologies vying to be included in the standard will be expected to earn greater returns than an IP holder for a technology for which there is competition.

In practice, this could lead to the paradoxical outcome of a monopoly provider of a peripheral technology earning greater returns than a provider of a more fundamental element of the standard, for which alternatives exist. However, as noted in the Oxera Economics Council's discussion, economically, this outcome would be the least distortive, and should not in itself raise concerns.

For both approaches, there are significant operational challenges. For the Swanson–Baumol approach to be effective, the auction design would need to overcome the fact that value from a standard is created by aggregating different technologies together to form a single standard. In essence, the sum is greater than the parts. Each patent holder would therefore need to assess not only its position relative to competing patent holders, but also the value of the technological input it is providing relative to the cumulative value of the technology. In this context, it was noted in the Council's discussions that the application of Article 81 to SSOs and to patent pools actually may have the effect of preventing any discussion or agreement over cumulative royalty rates among patent holders.

For the Shapley value approach, in the context of an ex post intervention, one particular challenge would be to try to recreate the market conditions that existed at the point of the creation of the standard, in order to identify and assess the implications of alternative solutions available at that time.

## Concluding remarks

FRAND is a concept that has been rather loosely applied in the past, with little precision offered by those imposing

the restrictions. This may have been a good practical solution for various SSOs to get standards approved, but it has now also led to numerous disputes, some resorting to litigation, and some ending up being considered by the competition authorities. Adequately responding to allegations that pricing may not be compliant with FRAND obligations, and if it is not, that there may be abuse of a dominant position, will generate challenges for the authorities that are perhaps significantly greater than 'bricks and mortar' cases of excessive pricing.

This article has introduced two of the economic approaches to assessing FRAND, highlighting that there are no simple solutions to the question of how FRAND should be interpreted. In addition to the complexity of the specific methodologies, there are a number of broader policy issues that are relevant, and which were raised during the discussions of the Oxera Economics Council (see box below).

### Further conclusions reached by the Oxera Economics Council

- **Just because an issue is complex does not mean that the competition authorities should not seek to address it (this was echoed by the official representatives present).**
- **There is not likely to be a unique solution; as with excessive pricing issues more generally, a pragmatic approach that applies the alternative techniques available, and finds conformity among the conclusions, will be more robust than reliance on any single approach.**
- **Whatever approach or approaches are adopted, the authorities need to be clear what the costs of non-enforcement are in order to determine the appropriate enforcement route.**
- **While the application of competition law in the context of IP and standards should avoid overriding the protections granted by IP law, for this to remain a valid approach, it is vital not only that the patent authorities make high-quality decisions when awarding IP, but also that SSOs could or should be more critical before accepting IP as essential to their standards.**

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- <sup>1</sup> See also Dewatripont, M. and Legros, P. (2007), "'Essential' Patents, FRAND Royalties and Technological Standards', December.
- <sup>2</sup> This discussion abstracts from the debate as to whether there is competition between standards, as has recently been observed between Sony's Blu-Ray and Toshiba's HD DVD technology.
- <sup>3</sup> A liberal interpretation of FRAND would be that the unfettered market price is fair and reasonable: any price that the market can bear should be considered fair, as no individual purchaser would be prepared to pay more than it valued the IP in question.
- <sup>4</sup> Swanson, D. and Baumol, W. (2005), 'Selection of Compatibility Standards and Control of Market Power Related to Intellectual Property', *Antitrust Law Journal*, 73:1.
- <sup>5</sup> This option is described as 'The Shapley solution' in Layne-Farrar, A., Padilla, A.J. and Schmalensee, R. (2007), 'Pricing Patents for Licensing in Standard Setting Organizations: Making Sense of FRAND Commitments', CEMFI Working Paper No. 0702, January. The underlying thinking derives from Shapley, L.S. (1953), 'A Value for N-Person Games', in H.W. Kuhn and A.W. Tucker (eds), *Contributions to the Theory of Games II*, Princeton: Princeton University Press.
- <sup>6</sup> Treacy, P. and Kostenko, M. (2007), 'Safer Standard Setting', *Competition Law Insight*, July, pp. 10–11.
- <sup>7</sup> Farrell, J., Hayes, J., Shapiro, C. and Sullivan, T. (2007), 'Standard Setting, Patents, and Hold-up', draft, Haas School of Business, University of California, Berkeley, December 1st.
- <sup>8</sup> Federal Trade Commission (2006), 'In the Matter of Rambus Incorporated', Docket No. 9302, August.
- <sup>9</sup> European Commission (2007), 'Antitrust: Commission Confirms Sending a Statement of Objections to Rambus', press release, MEMO/07/330, August 23rd.
- <sup>10</sup> Determining IP revenues on the basis of a share of downstream revenues earned by licensees can mitigate this risk to some extent.
- <sup>11</sup> Layne-Farrar, A., Padilla, A.J. and Schmalensee, R. (2007), op. cit., p. 24.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email [d\\_holt@oxera.com](mailto:d_holt@oxera.com)

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