Response to proposed changes as part of assimilation of TTBER.

First, many thanks for the extensive feedback to those who participated in the consultation in the new document.

General comment: Overall, I agree with the approach and find it compatible with my views. At a few points, I was unsure whether the document had phrased some of my points correctly. I do not always express myself clearly, so this is not surprising. To be sure, though: while I added considerable discussion around the point, my bottom line in my original comments was that I support the approach to grantbacks and termination clauses taken in this proposal: I find the 2014 revised version of the EU TTBER an improvement on the 2004 version, so I would fully support what I understand to be the approach you take.

Response to your Query in the Proposal: You also ask for a reaction to your proposed move to technology counts (only) as part of evaluating technology markets, whilst relying on market shares for product markets with no change from current practice.

I addressed this somewhat in my first set of comments and have not changed my view: I believe that there is information contained in both technology market shares and in technology market counts. In that sense, both are useful, and I support using both.

On the side of supporting technology counts, a technology does not "disappear" if it is not used. It remains as available as it ever was as long as the knowledge is available (in the form of a patent document or otherwise), and so its potential as the basis for a competitive constraint does not disappear simply due to lack of use. This is quite different from a product market where, if no other products are available, the market functions without much competitive constraint. In this sense, market shares are relevant to product markets in a way that they are not to technology markets.

Technology counts are not trivial to undertake, but they are also not impossible for those who know the field well. Protected technologies are explained in some depth in patent registers and trade-secret based technologies may not be public knowledge but may be known to those within the field using reverse engineering, conference discussions combined with general technical knowledge, or other methods. Documenting trade secrets for the purposes of a formal undertaking is, of course, a problem for technology markets but this problem may not get any better (or worse) by using market shares instead of counts.

On the side arguing for market shares to be used alongside the counts, while there are not economies of scale in technologies, meaning that market shares are not as clearly justified as in product markets, there is important information that such market shares convey. This information is relevant to both static and dynamic market operation.

Start with static market functioning. Consider, for example, a technology that is patented but is not used by anyone, whereas two other patented technologies are being used at good scale in the market. This share information reveals that one technology has not proven attractive to those who are producing for the market. We do not know exactly why: it might be that it requires a large switchover cost in production facilities, results in no savings in production cost, lacks good understanding so that trained personnel are not handy, or otherwise is not as desirable to implement as the other two technologies. Regardless, the third technology, while constituting potential competition, is likely of "lower effective quality" than the existing technologies. This relaxes the competitive constraint that it could exercise on the technology market.

In a dynamic sense, this scenario also suggests that two of the technologies will benefit from learning by doing that can feed back on further improvements in the application of the used technologies, can provide an income stream to the innovators to spur them to generate further improvements in a "sequential innovation" sense, and can develop the basis for network effects that could further aid in developing and disseminating the technology. We know from the business literature on innovation[1] that

[1] This has been developed largely based on work by Eric Von Hippel, summarised and critiqued more recently in a discussion by Paul Trott, P. Van Der Duin, D. Hartmann, "Users as Innovators? Exploring the Limitations of User-Driven Innovation", Prometheus, 2013. This literature takes a more restrictive view of users than is taken

user-innovator interaction is an important source of continuing improvements, so only the two used technologies will benefit from this. As such, the unused technology will likely not have much staying power as it will likely become obsolete due to lack of investment or learning. As such, it is neither the basis for actual competition nor does it likely constitute potential competition. Indeed, a patent on an unused technology can simply be allowed to lapse unless it is providing some other (for example, defensive) benefit. Indeed, a patent used for purely defensive purposes would not necessarily be a desirable feature for the problem we are considering.

While this would not be a concern if most patents were used at some point, as an empirical issue, most patents are not. Many are held for strategic purposes or are taken out for completely different reasons than the profits they would generate in standard use. The bulk of patents do not receive forward citations from follow-on research, as we would expect if the technology had been developed and improved. The problem of unused or poorly used technologies and how to interpret these observations is, then, an empirically important issue. To borrow from the terminology used in some of the decisions in the pharmaceutical sector, the argument in this note is that when using technology counts, one must consider whether a technology is a "real and concrete" alternative today and whether it will remain a real and concrete alternative in future. If a technology is used very little or not at all, it may not be such a real and concrete alternative in either period.

Unrestricted technology counts may not, then, not tell the full story, although they are an important start. I would continue to advocate technology counts as a good indicator of potential competition but would advocate restricting this to only real and concrete alternative technologies. I should say that this restriction could be implemented by combining counts with technology market share data. The argument is that market shares are a good (and relatively ready-to-hand) indicator of both actual competition among technologies and the "persistence" of this competition based on likely "live" technologies in the market in the future. Supporting information for the dynamic issues can of course be based on industry information on innovation rates, obsolescence, licensing practices, and other specific information about how innovation behaves for the relevant industry. This can give a fuller picture of the evolution of the technology and product markets over time.

Market shares are not the only indicator, of course. Still, due to past practice at least innovators are used to calculating them, so some learning exists on good ways to support innovators who must do this.

The Servier case[2] is an interesting reference for technology counts that could help with thinking on this issue. Here, the European Commission used technology counts for another purpose: in that case alternative technologies were claimed to have been acquired to reduce rivalry. Indeed, several of the technologies were terminated upon purchase. During the various (apparently ongoing) appeals following the original case, which found in support of the claims, the criterion of "real and concrete" alternatives has been raised. This criterion was developed in other pharma decisions involving somewhat different issues, firms, and products[3], but seems relevant more generally to technology count issues.

In terms of where these issues should be addressed, I should think that guidance would need to be issued along with the formal criterion (counts, market shares, or both) regardless, but particularly if "real and concrete" is used alongside the basic criterion.

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here, as we could think that any market activity could generate the "eyeballs" on the technology necessary to generate both the information and stimulus for further development of the technology.

[2] European Commission reference: Case AT39612 Perindopril (Servier), 2014.

[3] CAT case C-307/18 discusses this criterion.