

Optimal Legal Standards for Refusals to License IP:

An Welfare Based Analysis

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April 2008

Forthcoming in “Journal of Competition Law and Economics”

Abstract

We adopt a welfare-based, in contrast to a decision-theoretic, approach to the choice of legal standards for refusals to license IPs. We show that if the presumption of legality is not strong, the Commission’s prior in the Microsoft interoperability information case, Decision Theoretic considerations are not helpful for deciding which type of standard is superior. Indeed, a “low false-acquittals” rule, such as the *Microsoft* rule, may well be equally effective to a “low false-convictions” rule, such as the “exceptional circumstances” rule, in reducing the *costs of decision errors* – contrary to what is suggested by Ahlborn, Evans and Padilla (2005). In this sense we agree with the analysis on this issue of Ritter (2005). However, we show that the latter rule may still be *welfare superior* to the former rule due to its welfare improving *deterrence effects*. We also show that, when the presumption of legality is strong, both these rules are likely to be *welfare inferior* to *Per Se Legality* (the standard chosen in *Xerox*), even though the “exceptional circumstances” test may be superior in decision error terms.

JEL Code: K0, K2, K4, L4, L5.

Keywords: refusal to license, compulsory licensing, legal standards, intellectual property and competition policy, exceptional circumstances, Microsoft

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² Thanks are due to the seminar participants at the University College London Law Department for helpful comments. I am particularly grateful to Prof. Korah and Ioannis Lianos for making helpful suggestions on an earlier version of the manuscript. Of course all errors, ambiguities and inaccuracies are entirely my own responsibility.

1. Introduction

Properly understood, Intellectual Property (IP) Law and Competition (or Antitrust) Law are complementary both seeking to promote innovation and enhance consumer welfare³. Yet there is an apparent conflict between the two. The first, by affording inventors protection from imitation, it excludes at least some competition and promotes higher prices while the IP rights last. The second promotes lower prices by prohibiting conduct that limits competition. A long standing objective of Courts, practitioners, academics and enforcement agencies has been to reconcile this apparent conflict.

The importance of IP related issues in competition policy has grown in the last two decades. Commissioner Kovacic in a recent article mentions that “Much of what the FTC does today takes place at the intersection of competition policy and intellectual property”. Though “this is not a recent development in the agency’s experience”, the Commission’s investment and enforcement actions in the past five years in monopolization and attempted monopolization matters in connection with the exploitation of IP rights “constitute ...(its) most ambitious program in roughly thirty years”⁴. A number of very important cases in which the exploitation of IP rights⁵ has come under the scrutiny of the Commission as involving potentially abusive behavior under Article 82, suggest the growing importance of the issue in Europe too⁶. And, as one European legal expert suggested recently, perhaps “in the not too distant future, ‘exceptional circumstances’ in which competition law intervention is justified (in IP licensing cases) will no longer be the empirical exception but the daily bread of competition policy”⁷. Nevertheless, as other commentators have noted, the confusing opinions in many EU and USA antitrust

³ More specifically, their complementary purposes are to balance ex-ante incentives for innovation (IP law) and ex post inefficiencies from the exercise of market power (Competition law). As Gilbert and Shapiro (1996) note while there is no inherent conflict between IP and antitrust laws, with IP law promoting competition in the long-run, “the long run is an elusive concept and in practice great tensions arise”. On the complementary role of IP and Competition Policy see Drexel (2005), who notes the recognition of this role by licensing laws in USA and EU; Korah (2005), p.14; Humpe and Ritter (2005), p.143; Ritter (2005), p.286-7; Lianos (2006); Dolmans et.al (2007), p.110.

⁴ Kovacic (2007), p. 321-325.

⁵ We use the term to include patents, copyrights, trademarks, and data/information subject to protection as trade secrets.

⁶ The cases include *Volvo v. Veng*, *Bronner*, *IMS Health* and *Microsoft*.

⁷ Drexel (2005), p. 16.

cases involving IP, “suggest that the boundaries that define the scope of IP and antitrust law are far from clear”⁸.

The IP laws in EU and USA provide the owners of IP rights with discretion to license these rights or to make or sell products that embody the IP. However, antitrust laws in both territories, though certainly not identical and with different enforcement records, constrain the use of property, including IP, by a firm with market power and may place limitations on the licensing of IP⁹. Exploiting IP rights can raise antitrust concerns in a large number of ways. These include facilitation of product market collusion through horizontal or cross-licensing or through patent pools or patent settlements, exclusive dealing or RPM arrangements through vertical licensing, tying arrangements involving patented products, and refusals to license¹⁰. In this article we will concentrate on the last practice which, in a number of recent landmark cases, has drawn a lot of attention in both sides of the Atlantic.

Competition Law can in principle impose an obligation upon dominant firms *refusing to license an IP right* to make the property available to their competitors. This is equivalent to a requirement for *compulsory licensing*¹¹. The question is: under exactly what circumstances such a requirement should be imposed? More specifically, what is the appropriate *legal standard* for dealing with refusals to license?¹² The need for such a standard is well recognized¹³; and, the Commission’s proposals in its recent Discussion Paper on the reform of article 82 did not meet expectations¹⁴.

⁸ Gilbert and Weinschel (2007), p.2. They note that “the differences between antitrust-centric and patent-centric lawyers, economists and academics are suggestive of a theological conflict”. Korah (2005) notes that EU case law on refusals to license IPs “has been far from consistent” (p.15). For Layne-Farrar (2007) the tension in applying antitrust in IPR issues in recent cases is driven by concern that standards create market power that can be abused. She quotes the EU *Microsoft* case as well as the cases of *Dell, Rambus, Broadcom v. Qualcomm*, and *Nokia v. Qualcomm*.

⁹ The EU Transfer of Technology Guidelines (2004) states that “The fact that IP laws grant exclusive rights of exploitation does not imply that IPRs are immune from competition law intervention” (para. 7 of Commission Notice). This view is shared by the US Intellectual Property Guidelines (1995) (Section 2.1).

¹⁰ See Pate (2003).

¹¹ “Compulsory licensing may embrace the requirement that the owner of software permit access to the underlying code so that others can develop compatible software application programmes”, Gilbert and Shapiro (1996).

¹² As we shall see, EU and USA case law diverge in the answer they provide to this question, particularly after the recent EU decision on *Microsoft*.

¹³ See for example Humpe and Ritter (2005), p. 135; they provide a careful extensive discussion of Refusal to Deal issues including comparison of alternative standards. Also, Lianos (2006).

¹⁴ See Ahlborn et.al. (2006), Section 5.7 and Schweitzer (2007), especially section 2.

The objective of this article is to provide a welfare-based comparison¹⁵ of three legal standards that have been proposed for dealing with refusals to license IPs:

- (a) *Per Se Legality (PSL)*, adopted in US in the *Xerox* case
- (b) The low-false-convictions “exceptional circumstances test” (ECT), adopted in the European cases of *Magill* and *ISM Health*
- (c) The low-false acquittals test adopted by the Commission and CFI in the *Microsoft* case (the MS Test or MST)

We proceed as follows:

- (i) Section 2 provides a brief review of conceptual issues and an outline of the main limitations of the Decision Theoretic Approach to the choice of legal standards.
- (ii) Section 3 examines the main ingredients of the welfare-based approach¹⁶ and establishes some basic results.
- (iii) Section 4 considers optimal standards for refusals to license IPs. First we examine whether refusals to license IP should be considered presumptively legal. Second, we describe in detail two discriminating rules (examples of such rules are what in the literature are referred to as Modified *Per Se* Legality or the Rule of Reason): the “exceptional circumstances” and the *Microsoft* rules and we show that the former is a very low-false-convictions and the latter a low-false-acquittals rule. Third, we undertake a comparison of these rules to each other and to *Per Se* Legality.
- (iv) Section 5 provides brief concluding comments.

We show that if the presumption of legality is not strong, the Commission’s prior in the *Microsoft* interoperability information case, Decision Theoretic considerations are not helpful for deciding which type of discriminating rule is superior. Indeed, a “low false-acquittals” rule, such as the *Microsoft* rule, may well be superior to “low false-convictions” rules, such as the “exceptional circumstances” rule, in reducing the *costs of decision errors* – contrary to what is suggested by Ahlborn, Evans and Padilla (2005). In this sense we agree with the analysis on this issue of Ritter (2005). However, we show

¹⁵ This encompasses a Decision Theoretic comparison. For details of this framework see Katsoulacos and Ulph (2007, 2008). See also Christiansen and Kerber (2006) for a discussion of discriminating legal rules.

¹⁶This is based on Katsoulacos and Ulph (2007, 2008).

that if the latter rule is equally effective to the former rule in costs of decision error terms it will be *welfare superior* due to its welfare improving *deterrence effects*. We also show that both these rules may be *welfare inferior* to *Per Se Legality* (the standard chosen in *Xerox*), even though “exceptional circumstances” may be superior in decision error terms, when the presumption of legality is strong.

2. Optimal legal standards: Decision Theoretic vs. Welfare-Based Comparisons

Choosing appropriate Legal Decision Rules or Legal Standards is extremely important in implementing Competition Law¹⁷. Generally, decision rules differ in a number of dimensions each with significant welfare implications. These are:

- (i) The decision errors generated by the rule
- (ii) The indirect (deterrence) effects of the rule
- (iii) The procedural (or systemic) effects of the rule

(i) Decision errors of legal rules

As noted originally by Ehrlich and Posner (1974), “due to the inherent ambiguity of language and the limitations of human foresight and knowledge” decision errors will occur, that is, legal rules will in practice suffer from problems of “overinclusion” (benign actions are prohibited) and “underinclusion” (harmful actions are permitted)¹⁸.

(ii) Indirect (deterrence) effects of decision rules

While the costs of decision errors are important, the Indirect (or deterrence) Effects caused by alternative legal standards may well be equally or even more important. This has been recognized by, among others, Joskow (2002) who argues that they are more important than the costs of decision-errors as they include the (cost of) the responses and

¹⁷ This is also true in many other contexts (such as those faced by Sectoral Regulators, environmental agencies, tax authorities etc) in which (a) agents are taking actions that are privately beneficial but from a wider social viewpoint may be harmful or beneficial (b) the degree of social harm/benefit varies with the circumstances under which the action is taken (c) the authority *cannot observe the precise circumstances* under which any given action is taken. A *discriminating decision rule* is one that attempts to differentiate between benign and harmful actions depending on the circumstances under which the actions are taken. For details see Katsoulacos and Ulph (2007, 2008).

¹⁸ Page 268. For details on the conceptual issues of legal standards and additional references see Katsoulacos and Ulph (2007) and Christiansen et..al. (2006).

adaptations that target firms as well as other “firms and markets in general make to antitrust rules ... and (the effect of these) on prices, costs and innovation...”¹⁹.

(iii) Procedural (or systemic) effects of decision rules

Finally, in undertaking a comparison of rules it is important to recognize not just decision errors and the indirect/behavioral effects of rules and administrability considerations but also two additional types of Systemic Effect - *delays* in reaching decisions and *imperfect detection* by Competition Authorities (CAs) of the actions taking place.

Limitations of Existing Decision Theoretic Analyses of Legal Standards

In choosing between different legal rules, existing analyses espouse a Decision Theoretic (DT) approach.²⁰ This approach has long recognized that a first important consideration to take into account is the fraction of harmful actions in all possible circumstances, or what can be referred to as the “base-rate probability of anticompetitive harm”²¹. So when benign actions are very rare it may make sense to ban the lot, taking into account the costs of administration and adjudication, i.e. adopt a *Per Se Illegality* rule. When, on the other hand, harmful actions are very rare rules of *Per Se Legality* should be applied²². Further, “Decision theory (also) implies that it is not just the relative frequency of pro- and anti-competitive consequences that matters to the assessment of a *Per Se* rule, but the severity of resulting harm in either case”²³.

Analyses espousing a DT approach have been undertaken in a number of papers following the seminal contribution of judge Easterbrook (1984), putting forward a decision error-cost framework – proposing the idea that legal standards should minimise the sum of the welfare costs caused by decision errors of type I (false positives or false acquittals) and type II (false negatives or false convictions)²⁴. These analyses suffer from a number of limitations. Specifically:

¹⁹ Page 98.

²⁰ See for example Hylton and Salinger (2001), Hylton and Salinger (2004), Ahlborn, et.al (2005) and Salinger (2006).

²¹ Thus, as Whinston (2006) mentions “the justification of the *Per Se* rule is really nothing more than an application of optimal statistical decision making”.

²² See Vickers (2007), ab.cit. p.4, quoting Easterbrook in US Court of Appeals case *Schor vs. Abbott Labs*.

²³ Vickers, ab. cit. p.10.

²⁴ Beckner and Salop (1999), Joskow (2002), Evans and Padilla (2004, 2005), Hylton and Salinger (2001), Ahlborn, Evans and Padilla (2005), Christiansen and Kerber (2006), Salinger (2006).

1. The application of the DT approach to the choice of legal standards has remained largely informal and, further, no effort has been made to relate formally the above decision - theoretic considerations to the underlying quality of economic models in identifying benign and harmful cases. Yet, the latter is of fundamental importance in determining whether a discriminating rule (such as Rule of Reason) will be superior to a *Per Se* rule as well as for the comparison of alternative discriminating rules that could be employed.
2. The DT approach can produce false conclusions because it concentrates on just the subpopulation of cases actually investigated by the Competition Authority (CA) and thus takes into account only the cost of decision errors on these cases and, potentially, administrability considerations. However a full *welfare* comparison of legal rules requires that account is also taken of (i) *indirect (deterrence) effects* of the choice of standard on the behavior of all firms when deciding whether or not to adopt a particular practice; and (ii) *procedural effects* of certain features of the administrative process in particular *delays* in reaching decisions and the *coverage rate* of the actions taking place.

3. Ingredients and Some Results of a Welfare-Based Approach

As noted above a welfare-based approach must account for the cost of decision errors as well as the deterrence and procedural effects of alternative legal rules. In this section we consider each of these in turn.

3.1 Costs of Decision Errors: A Formalization and Extension of the Decision Theoretic Framework

To capture the Decision Theoretic considerations mentioned above, assume that firms belong to just two environments which reflect the exact nature of the firms' characteristics and the characteristics of the markets in which they operate. For (type B) firms from environment B the action, a refusal to license IP, will generate social harm, which we take to be measured by the negative of the present value of the change in consumer surplus, $h_B < 0$ - i.e. will be socially beneficial (or Benign). For (type H) firms from environment H the action will generate social harm of present value $h_H > 0$ - i.e.

will be socially Harmful²⁵. Let the fraction of firms in environment H, or what can be referred to as the “base-rate probability of anticompetitive harm”, be γ , $0 < \gamma < 1$ ²⁶.

Therefore the value of average harm/benefit is $\bar{h} = \gamma h_H + (1 - \gamma)h_B$. Assuming that in deciding whether to allow or disallow an action a CA does so on the basis of its expected social harm - the standard for reaching decisions which is typically employed in Europe and US²⁷ - if a *Per Se* legal standard is used this will be one of *Per Se* Legality if $\bar{h} < 0$, or $\gamma h_H < (1 - \gamma)(-h_B)$, while it will be one of *Per Se* Illegality if $\bar{h} > 0$, or $\gamma h_H > (1 - \gamma)(-h_B)$.

Assuming that we are dealing with a presumptively legal practice²⁸, let us define by s_L the *strength of the presumption of legality* where:

$$\frac{(1 - \gamma)(-h_B)}{\gamma h_H} \equiv s_L > 1 \quad (1)$$

While the value of s_L is very important when comparing alternative legal standards, it is not sufficient in itself. Assume that the CA decides to adopt a ***Discriminating Rule***, that is, a rule that purports to discriminate between harmful and benign actions taking into account the characteristics of the firms undertaking the actions and of the markets in which they operate²⁹. Clearly, a comparison of alternative rules must take into account the quality of the underlying models on which discriminating rules are based, which will determine the relative size of the costs of decision errors.

²⁵ In the terminology of Hylton and Salinger (2001), h_H is the “welfare gain from disallowing a type H action” while h_B is the “welfare loss from disallowing a type B action”.

²⁶ We assume that the values of γ , h_B and h_H are common knowledge.

²⁷ This was not so in EU until recently, see for example Korah (2005), p.4. An alternative would be to base decisions on a more comprehensive welfare measure by considering the net harm taking into account the benefit to the firm from pursuing the action – as is happening in some countries such as Canada and Australia.

²⁸ There is a corresponding measure of the strength of the presumption of illegality, see Katsoulacos and Ulph (2007, 2008).

²⁹ Adopting a discriminating rule clearly implies adopting an “effects-based” approach to competition policy. The term “effects-based” is more popular among European economists. “Economics – based” is also often used (see, EAGCP report, 2005). The standard term, popular in the US literature, is “Rule of Reason”, that also has the connotation of case-by-case assessment. Careful commentators even when favoring the use of a more “economics-based approach”, warn that this should not mean unlimited discretionary powers on behalf of the authority: as Vickers (2007a) points out “rules of law should (not) be replaced by discretionary decision making based on whatever is thought to be desirable in economic terms case by case.....not least for reasons of predictability and accountability”. In Katsoulacos & Ulph (2007, 2008), Rule of Reason is one of many potential discriminating rule that the authority can adopt – the one with the highest discriminating quality.

Capturing the quality of the CA's model

Assume that the CA cannot observe the precise circumstances of the action but can use an economic model (out of the many potentially available to it) and available information on the market, the firm, technology, demand etc. to discriminate between benign and harmful actions³⁰. Assume that the criteria and models the authority uses are good enough that with probability p_B , $0 < p_B \leq 1$, actions that are benign, if investigated, are classified as benign and are allowed, and with probability p_H , $0 < p_H \leq 1$, actions that are harmful, if investigated, are classified as harmful and are disallowed. If $p_B + p_H = 1$ then the probability of being convicted/disallowed is exactly the same whichever environment the firm comes from, so the knowledge generated by the model is completely uninformative. However if $p_B + p_H > 1$ then firms from environment B are more likely to be allowed than are firms from environment H, while firms from environment H are more likely to be disallowed than are firms from environment B. So the knowledge generated by the model is more informative. We can refer to (p_B, p_H) as the CA's model.

Figure 1, in which we assume that $p_B + p_H > 1$, can be used to illustrate³¹. Note that to make sure that only *harmful* actions are disallowed the model should be very good in identifying *benign* actions (i.e. have $p_B = 1$); having a very good model in terms of identifying harmful actions ($p_H = 1$) will certainly not guarantee that. Similarly, to make sure that only *benign* actions are allowed, the model should be very good in identifying *harmful* actions (i.e. have $p_H = 1$); having a very good model in terms of identifying benign actions ($p_B = 1$) will certainly not guarantee that. Thus, ***high- p_B rules are “low-false-convictions” rules*** while ***high- p_H rules are “low-false-acquittals” rules***.

³⁰ The discussion in this subsection follows closely Katsoulacos and Ulph (2007).

³¹ This sort of Figure was originally used by my research collaborator David Ulph in his work on issues relating to risk rules for tax avoidance, Ulph (2006).

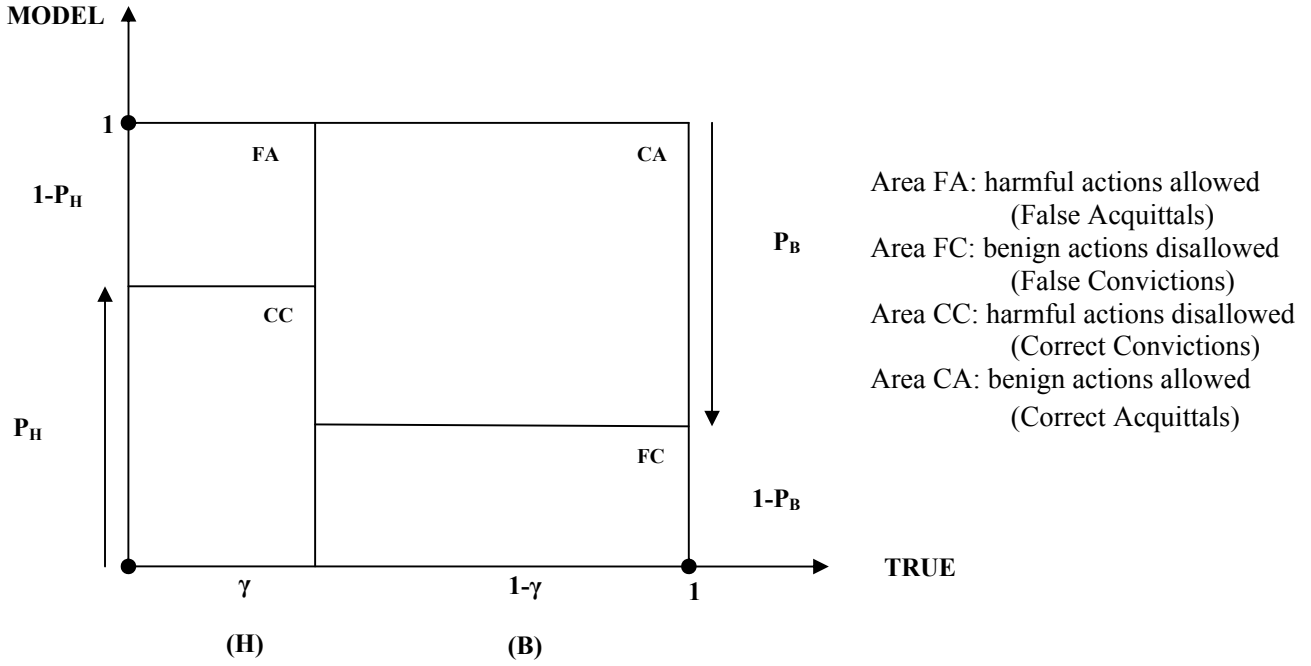


Figure 1

Let us now consider when a discriminating rule will reduce costs of decision errors relative to a *Per Se* rule.

Proposition 1: Decision error comparison of *Per Se* and Discriminating Rules

A necessary and sufficient condition for a Discriminating rule to reduce the cost of decision errors relative to *Per Se* is that the quality of the underlying model and information is high relative to the strength of the presumption of legality. Specifically, the following must be true:

$$q_H \equiv \frac{p_H}{1-p_B} \geq \frac{(1-\gamma)(-h_B)}{\gamma h_H} \equiv s_p > 1 \quad (2)$$

where $q_H \equiv \frac{p_H}{1-p_B}$ is a measure of the quality of the model available to the authority reflecting

as it does the relative propensity to classify as anti-competitive (potentially harmful) actions that are genuinely Harmful and actions that are genuinely Benign.

Proof: See Appendix

We call a Discriminating rule for which condition (2) holds an *effectively discriminating* rule (ED-rule). From (2), we see that the likelihood that a Discriminating rule is effective is larger (a) the larger the base rate probability of anticompetitive harm, γ ; (b) the smaller the welfare loss from false convictions h_B relative to the welfare gain from reducing false acquittals h_H ; (c) the larger the values of p_B and p_H - though, all other things equal, the most effective way to satisfy (4) is to raise p_B , thus reducing false convictions.

Corollary 1 to Proposition 1:

Note (from (2)) that for all $p_H > 0$ and for all values of $s_L > 0$ there exists a $p_B < 1$ such that the rule can effectively discriminate. However, for some values of $p_B > 0$ and of $s_L > 0$ and sufficiently high, there may be no value of $p_H \leq 1$ for which the rule can effectively discriminate. That is, *when the strength of the presumption of legality is sufficiently high it is only low-false-conviction (high- p_B rules) that will enable the authority to effectively discriminate (i.e. reduce costs of decision errors relative to PSL).*

3.2 Deterrence effects

While under PSL all firms will take the action, the adoption of a discriminating standard will deter a fraction of firms considering refusing to license since under such a standard there will more convictions and fewer acquittals relative to PSL. We assume that the extent to which firms are deterred depends on the perceived risk of been investigated and disallowed, and on the cost to be incurred if this happens. The latter we take to be equal to the foregone profits from been stopped (and required to license), plus the cost that may be incurred from having the action reversed (due to *remedies*, e.g. adjusting communications protocols to allow full interoperability), plus the cost of *antitrust fines*. If the probability of been investigated (the *coverage rate*) under the D-rule is π , $0 < \pi < 1$, and the probability of been convicted (disallowed) depending on the firm's environment is δ_e , $e = H, B$, then the perceived risk of been investigated and disallowed is $\pi \cdot \delta_e$ with $\delta_B = (1 - p_B)$ and $\delta_H = p_H$. Finally, assume that firms' present value of the expected change in profit from taking the action is b and that a fraction φ , $0 \leq \varphi \leq 1$, is what the

firm actually gets if its action is stopped, where φ captures *delays* in reaching decisions (the length of the *litigation cycle*).

Lemma 1: Deterrence effects

Under a discriminating rule a fraction $F(\underline{b}_e^D)$, $e = H, B$, of each firm type will be deterred from taking the action³² where $F(\underline{b}_e^D)$ is increasing in π , the cost of remedies, and the antitrust fines and is decreasing in φ while:

- (i) $F(\underline{b}_B^D)$ is decreasing in p_B
- (ii) $F(\underline{b}_H^D)$ is increasing in p_H

Proof: See the Appendix

3.3 Procedural effects

These are effects related to the administrative process. The *administrative effectiveness* of a rule can be measured by the variable $\rho(1 - \varphi)$, so administration is more effective the greater is the likelihood of investigation (ρ) and the shorter the delay in reaching a decision. Under PSL of course $\rho = \varphi = 0$ while under a discriminating rule these are both positive (with $\rho = \pi$). We assume that the different discriminating rules we will be comparing are on a par in terms of administrative effectiveness. Also we will assume that they have the same implementation cost ($K > 0$) which is avoided under *Per Se* Legality.

3.4 A Full Welfare Comparison

Having discussed all the ingredients for a welfare-based comparison between PSL and a D-rule, this can now be expressed as follows³³:

$$\begin{aligned}
 W^D - W^{PSL} = & [1 - F(\underline{b}_B)] \pi (1 - \varphi) [CDE^{PSL} - CDE^D] \\
 & + F(\underline{b}_B) \bar{h} \\
 & + [F(\underline{b}_H) - F(\underline{b}_B)] \gamma \cdot h_H \cdot [(1 - p_H \cdot \pi (1 - \varphi))] - K(p_B, p_H)
 \end{aligned} \tag{3}$$

where CDE is the cost of decision errors which is defined, for each type of rule, in the Appendix (Proof of Proposition 1), and $K(p_B, p_H)$ is the total economic cost of using the D-rule. By Proposition 1, the first term on the RHS will be positive if the D-rule is

³² Where F is the continuously increasing cumulative distribution function of b .

³³ I have omitted for simplicity the superscript D on the b variable.

effective and thus reduces the cost of *decision errors*. However this is mitigated by two *systemic considerations*: delays and imperfect detection. The second term is negative because the D-Rule introduces an (*absolute*) *deterrent effect* that stops some firms from taking actions which are on balance benign. The third term is positive as $F(\underline{b}_H) - F(\underline{b}_B) > 0$: the D-rule has a *differential deterrence effect*, deterring more harmful than benign actions, which improves welfare. Finally the D-Rule has a higher implementation cost.

Proof: See the Appendix.

Corollary 2: From Proposition 1, the stronger the presumption of legality the less likely that there will be D-rules which can reduce substantially costs of decision errors. Further, the absolute value of \bar{h} will be very high. These, and equation (3), immediately imply that when the presumption of legality is strong the D-rule will be *welfare inferior* to *Per Se* Legality when the coverage rate (π) is low, the litigation cycle (measured by φ) long and the differential deterrence effect is small or zero.

4. Optimal Legal Standards for Refusals to License IPs

In this section we use the analysis and results of Section 3 to compare alternative legal standards for refusals to license IPs.

4.1 Should refusals to license IP be treated as a presumptively legal practice?

A *Per Se* Legality presumption for refusals to license IP requires that for this practice economic analysis and evidence suggest that γ is relatively small and/or that h_B is larger than h_H so that $\gamma h_H < (1 - \gamma)(-h_B)$. Economic analysis, the documented opinions of economic and legal experts and case law in both EU and USA suggest that this is the case. Indeed economic analysis suggests that both these conditions hold for the following fundamental reasons:

- (i) Refusals to license IP actions are only ever likely to be socially harmful if the IP is indispensable in order for other firms to compete. In fact, in most instances,

good substitutes are available for patented products or processes or competitors can reverse engineer or “invent around the patent” with relative ease³⁴.

(ii) Voluntary licensing is a common phenomenon and in the vast majority of cases there will be perfectly innocent reasons for refusing to license an IPR - as where the IP owner simply exercises its right, provided by IP law, to deny access to its IP, in situations in which he has no private incentive to license, though this is in no way related to enhancement of market power³⁵. Also, “these include reasons that are likely to enhance economic efficiency”³⁶, reasons that provide an objective justification for the denial³⁷ and reasons that relate to the desire of the IP owner to promote price discrimination (that could enhance welfare)³⁸.

(iii) The above two considerations suggest that γ is likely to be low for refusals to license IP. Coming to the issue of whether h_B is larger than h_H we note that the welfare loss from convicting a benign action and imposing compulsory licensing (i.e. h_B) reflects the loss from less innovation caused by the reduction in the *ex ante* incentives to invest and innovate. This reduction in *ex ante* incentives to innovate, due to lower expected return from innovating, as innovators are forced to license in situations where it is not privately rational to do so, is compounded by reduced incentives to innovate due to higher returns expected by not innovating³⁹. On the other hand, h_H , the welfare gain from convicting a harmful action, comes from the extra consumers’ surplus when compulsory licensing leads to an expansion of industry output. This short-run static allocative gain is likely to be much smaller than

³⁴ This fact, as Gallini et.al. (1998) notes, underlines the basic principle that competition policy should not presume that IPRs confer market power.

³⁵ There will be a mutually acceptable license iff total industry profits increase with licensing. See Katz et.al. (1985).

³⁶ Gilbert and Shapiro (1996).

³⁷ Such as doubts about the creditworthiness of the potential licensee etc. See Humpe et.al. (2005) p. 161.

³⁸ Gilbert and Shapiro (1996).

³⁹ Gilbert and Shapiro (1996), Katz and Shapiro (1985). See also discussion in Ahlborn et.al. (2006). As the latter note the seemingly opposite results of Tandon (1982), Gilbert and Shapiro (1990) and Denicolo (1996) are due to the assumption made that policy makers can, in the presence of compulsory licensing, prolong the duration of patents. On the other hand, one can construct cases where, under rather special conditions, incentives for complementary innovations increase with compulsory licensing – see for example Leveque (2005).

the dynamic welfare loss from reduced innovation⁴⁰. Thus for a typical refusal to license IP action we expect h_B to be larger than h_H .

Two further remarks are due in relation to this conclusion. First, as shown by Gilbert and Shapiro (1996) even neglecting effects on incentives to innovate, compulsory licensing may well *reduce welfare in the short-run* due to a decrease in efficiency, as the entry of inefficient firms is facilitated⁴¹ - this factor reinforces the conclusion just reached. Second, when the licensee utilizes the license to produce a new product that is not a close substitute to the product of the licensor thus expanding the market and meeting unsatisfied consumer demand, the value of h_H is going to be considerably larger⁴². We need to come back to this point later on⁴³.

Legislation and case law

There is no doubt that IP and antitrust legislation in both US and EU treat refusals to license IP as presumptively legal. As noted by Gilbert et.al. (2007) “US patent law expressly states that ‘no patent holder ... shall be denied relief or deemed guilty of misuse or illegal extension of the patent right by reason of his having ... refused to license or use any rights to the patent’ ... The Supreme Court has held that a patentee is under no general obligation to license its invention”⁴⁴. This can be interpreted as giving “preeminence to the protection of the *ex ante* incentives for innovation over the antitrust

⁴⁰ See Ahlborn et.al. (2006) and (2005) for an extensive discussion. Also, Carlton (2001), Section III. He suggests that “antitrust should be especially wary when its action reduces the return to innovators of IP because we know that there already is too little incentive to create such IP” (p. 674). For arguments that “innovation may actually benefit from (a compulsory licensing) rule” see Ritter (2005).

⁴¹ “This will happen when the licensee has high costs in the absence of the license and also relatively high costs with the license compared to the licensor”, p.6. See Aoki et.al. (2004) and Cugno et.al. (2006) for arguments supporting the prediction of short-run static allocative gains from compulsory licensing, and Ritter (2005), p. 298.

⁴² See Ahlborn et.al. (2005) p. Section V.D.

⁴³ Finally, remember that the importance of the above considerations concerning the effects of Compulsory Licensing (CL) depend on the industry under consideration – on the extent to which, in the industry patent protection is a significant factor to R&D commitments and on the extent to which CL can have a significant effect in increasing effective competition. For brief reviews and references to the varied empirical evidence see Scherer (1995) and Tsilas (2007). Cohen (1999) though critical of the post-1982 US trend “towards strengthening and broadening patent protection”, recognizes the importance of the patent system for innovation in industries such as drugs, medical equipment, biotechnology, software, semiconductors, chemicals and scientific instruments. See also the discussion in Dolmans et.al. (2007), p. 108-11, 113 and 143.

⁴⁴ Gilbert et.al. (2007), p. 20.

goal of *ex post* output expansion ... (and choosing) between a *per se* Legality approach and ‘rebuttable presumption’ or modified *per se* legality approach”⁴⁵.

This is evident in what are probably the two most famous recent US cases involving refusal to license, *Eastman Kodak Co. vs. Image Technical Services Inc.* (1997) and *CSU vs. Xerox* (2000). Both cases involve allegations by a group of independent service organizations (ISOs) that Kodak and Xerox were involved in unlawful monopolization and attempting to monopolize by refusing to license patented parts required for unobstructed access to the service market. In the first case the district court and, after appeal, the Ninth Circuit, found for the ISOs, adopting a rebuttable presumption approach⁴⁶ and finding that the presumption had been rebutted due to the fact that only sixty-five of the thousands of parts at issue were patented, to the fact that Kodak’s IP defense was raised very late in the litigation and could have been viewed as pretextual as opposed to a valid business justification and to concerns that Kodak was using its IP rights as justification for tying practices⁴⁷. In contrast, in the second case, the Federal Circuit found for Xerox, adopting in essence a *Per Se* Legality approach, arguing in what has become a historic decision that “in the absence of any illegal tying, fraud in the patent and trademark office or sham litigation, the patent holder may enclose the statutory right to exclude others from making, using or selling the claimed invention free from liability under the antitrust laws”⁴⁸. Though this decision has been criticized it is worth noting that even FTC Chairman Pitofsky, one of the most prominent critics, has said that he has “no quarrel with the fundamental rule that a patent holder has no obligation to license or sell in the first instance”⁴⁹.

In EU it is mainly competition law that “has been left ... to strike a balance between the prohibitions of Article 82 and the exercise of IPRs at points of conflict”⁵⁰. Nevertheless, until the *Microsoft* case, “Like most US Courts, the European Court of

⁴⁵ Ahlborn et.al. (2005), p. 1149.

⁴⁶ This was also used in the *Data General vs. Grumman Systems Support* case (Ahlborn et.al (2005), p. 1150 and Gilbert et.al. (1996), p. 8).

⁴⁷ Ahlborn et.al. (2005) 1150-1; Gilbert et.al (2007), p. 21. Carlton (2001) provides a powerful critique of this decision.

⁴⁸ This, and the case involving *Kodak*, has been extensively discussed. See Baker (1998), Pitofsky (2000), Ahlborn et.al. (2005), Glenklen (2001, 2003), Pate (2003), Hovenkamp et.al. (2007), Schweitzer (2007), Gilbert et.al. (2007).

⁴⁹ Gleklen (2001), p. 1.

⁵⁰ Anderman (2004), p. 7. See also Korah (2005). For a good review of EU case law see also Dolmans et.al. (2007), p. 114-125.

Justice (ECJ) ... appears to have adopted some kind of ‘rebuttable presumption’ in favor of the legality of refusal to license”⁵¹. In specifying the precondition for a rebuttal, or for finding ‘exceptional circumstances’, the ECJ has, however, taken a novel approach. It does not require a showing of anticompetitive intent, as the *Kodak*-court did. Nor does it require a completely separable actionable abuse, like the *Xerox*-court. The ‘Exceptional circumstances’ as developed by the ECJ rather reflect an ‘essential facilities’ rationale⁵², plus additional requirements to which we will turn below.

4.2 Discriminating Rules for Refusals to License IPs

Below we consider two Discriminating rules: the ECT (Exceptional Circumstances Test) and the MST (Microsoft Test).

The ‘exceptional circumstances’ test

In two cases that have dealt specifically with refusals to license IPRs by a dominant firm, *Magill* (1995) and *IMS Health* (2004), the ECJ established that such conduct could be deemed to be abusive only under ‘exceptional circumstances’. These are:

- (i) The IP requested must be ‘indispensable’ or ‘essential’ to compete;
- (ii) Refusal to provide access to the IP amounts to elimination of competition in a secondary market (so it is necessary that two distinct markets are involved)⁵³;
- (iii) By gaining access to the IP, competitor(s) must be able to offer new products or services not offered by the IP owner and for which there is a clear potential unsatisfied consumer demand;
- (iv) There is no objective justification for the refusal⁵⁴.

Each of these conditions is necessary for establishing abuse (its absence will render the action non-abusive) and, as the Court confirmed in *IMS Health*, it is only when

⁵¹ Modified *Per Se* Legality is the alternative interpretation, by Ahlborn et.al. (2005), of the ECJ standard.

⁵² Schweitzer (2007), p. 11.

⁵³ As Humpe and Ritter (2005) mention this requirement was deprived of any substance in *IMS Health* by accepting that a potential or ‘hypothetical’ market would be sufficient (see also below). Certainly, as Prof. Korah has noted to me, the ECJ has not been consistent between older and more recent decisions on the issue of eliminating competition; see Korah (2006), p.140.

⁵⁴ Temple-Lang (2002), Anderman (2004), Humpe and Ritter (2005), Ahlborn et.al. (2005), Schweitzer (2007), Dolmans et.al. (2007). Most of these also discuss other EU IPR and no-IPR related cases involving refusal to deal – all refer to the most celebrated non-IPR related refusal to deal case, *Bronner*. It should be noted that both *Magill* and *IMS Health* concerned copyrights and not patents – in contrast to the *Microsoft* case. We return to this later on.

all these conditions hold (cumulatively) that the action can be classified as abusive⁵⁵. There has been extensive discussion about the exact interpretation of these conditions, various aspects of which have been heavily criticized⁵⁶. Concerning indispensability, “EU law obliges antitrust authorities to assess the objective impossibility of (competitors) developing... in the case of IPRs ... their own ... IPR which they could use instead of the right which they claim is essential. Usually they can... Even a patent can be ‘invented around’”⁵⁷. Given this, and while the second condition emphasizes that there can be no abuse just because the refusal eliminates a competitor (the requesting party), as Humpe and Ritter (2005) point out “elimination of competition (condition (ii)) and indispensability (condition (i)) constitute one and the same test”, in that the latter also disposes of the former⁵⁸.

Yet, the ‘exceptional circumstances’ standard has also drawn substantial praise from economic and legal experts. As Anderman (2004) mentions the standard as articulated in *Magill* “creates a paradigm that gives considerable recognition to the special qualities of IPRs as regulated by their own legislation and as promoters of innovation ... (Thus) it allows extensive scope for the legitimate exercise of IPRs by their owner, carefully circumscribing the occasions when the owner of IPRs enjoying a real economic monopoly can be charged with abuse by judicial authority... (T)he test ... offers one type of reconciliation between competition law and IPRs based on their mutual interest in innovation by stressing that the ‘exceptional circumstances’ for a compulsory license ... include cases of new products with potential consumer demand but not ‘clones’ or ‘me too’ products”⁵⁹.

According to Ahlborn, Evans and Padilla (2005): “The set of ‘exceptional circumstances’ listed in *Magill* and *IMS Health* limit(s) compulsory licensing to those situations in which the prospective social benefits of licensing are large, while the

⁵⁵ See for example, Drexel (2005), Section II; Ahlborn et.al. (2005), p. 1128; Schweitzer (2007), p. 13.

⁵⁶ All articles in the previous footnote are critical of various aspects especially perhaps condition (iii) – the new product test – though Ahlborn et.al. (2005) are certainly in favor. Also, of the ‘hypothetical market’ concept introduced in *IMS Health* in the leveraging context. Criticism of these aspects of the rule, as reincarnated in the Commission’s DP for Reform of Art.82, is also contained in Ahlborn et.al. (2006) and Schweitzer (2007).

⁵⁷ Temple-Lang (2002). On indispensability see also Dolmans et.al. (2007), p. 127-9.

⁵⁸ On the other hand, as Temple-Lang (2002) correctly indicates, elimination of competition does not necessarily imply indispensability as when competitors are less efficient or are offering less desirable products than the IP owner.

⁵⁹ Anderman (2004), p. 8-13.

negative effects of reducing the incentives to innovate are small. The test ensures that intervention is restricted to cases where the intervention is still likely to increase social welfare⁶⁰.

What is certain is that the ‘exceptional circumstances’ test establishes an “extremely high threshold for unilateral refusals to license to fall under Article 82”⁶¹. Given that the criteria that the test requires to be satisfied for abuse are based on sound economic theory⁶² and truly capture the circumstances under which refusals to license will be socially harmful, the test makes more or less certain that any actions that do not satisfy one or more of these criteria and hence are classified by the test as benign are indeed benign. In other words, the test is characterized by a very high value of p_B , i.e. it is a very “low false-convictions” rule.

The Microsoft test

One aspect of the Commission’s (2004) Decision on *Microsoft*, with which the CFI (2007) Judgment concurred⁶³, found abusive Microsoft’s refusal to share interoperability information (communications protocols) for Windows, protected by IPRs (patents and trade secrets), with its competitors in the work-group server operating systems market. It was argued that the refusal has adverse effects on innovation and ultimately on consumers and compulsory licensing was ordered. To reach these conclusions, the Commission adopted a new Legal Standard, which significantly alters certain aspects of the “exceptional circumstances” standard prevailing in EU until then⁶⁴.

The proposed changes have been commended by some commentators but have also raised substantial opposition. Opponents have argued that the change in the legal standard

⁶⁰ Page 1110.

⁶¹ Schweitzer (2007), p. 14.

⁶² Ahlborn, et.al (2005) built up a strong case for this.

⁶³ European Commission Decision of 24.03.04 and Final Judgment of the CFI (September 2007). Microsoft agreed to comply (October 2007), deciding not to appeal to the ECJ (Managing IP, 2007). For summaries see, for example, Korah (2005), Ahlborn et.al. (2005), Lianos (2006) and Dolmans et.al. (2007), especially p. 121-125. For a critical discussion of the CFI ruling see O’Donohue (2007).

⁶⁴ Note that altering a legal standard could involve one or more of the following: altering or modifying the conditions under which practices are judged as legal/illegal, or whether a condition is treated as necessary or sufficient, or the Standard or Burden of Proof. Also note that in its DP on the reform of article 82 the Commission also adopts an approach for dealing with refusals to license that departs from the ‘exceptional circumstances’ standard and is in tune in most respects with the *Microsoft* standard. See Lianos (2006) and for critical commentaries Ahlborn et.al. (2006) and Schweitzer (2007)

will increase the cost of decision errors as well as legal uncertainty and administrability costs⁶⁵. However others, taking a positive stance, argue that the new test is compatible with recent moves by the EU Commission to adopt a more “economics-based” approach to unilateral exclusionary practices⁶⁶, that it improves the quality of the test and that it provides a new paradigm for dealing with continuing to deal cases involving IP protected products⁶⁷.

According to the *Microsoft* standard, in order for refusals to license IP to be deemed abusive the following conditions must hold: (1) the requested IP is “necessary” for a competitor to “viably stay in the market”; (2) the refusal represents a reduction in “the level of disclosures”; (3) “there is a risk of eliminating competition” in the secondary market; (4) the refusal to supply “has the consequence of stifling innovation in the impacted market”; and (5) the refusal is not objectively justified because “on balance” the possible negative impact of an order to supply in the dominant firm’s incentive to innovate is outweighed by its positive impact on innovation in the whole industry.⁶⁸

Thus, the *Microsoft* standard, in comparison to the ‘exceptional circumstances’ standard:

- (a) Lowers the threshold of the condition relating to “indispensability and consequent elimination of competition” adopting a weaker condition requiring that the requested IP is “necessary” leading to “a *risk* of eliminating competition” in the secondary market.
- (b) Replaces the new product condition of the traditional rule with the weaker condition that refusal may stifle innovation in the impacted market - with the nature of innovation not clarified but certainly not been subject to the requirement that it will be incorporated in clearly identifiable new products or services.

⁶⁵ See Killick (2004), Ahlborn, Evans and Padilla (2005), Geradin (2005) and Byrne (2007). Ahlborn et.al (2006) provide a critique of the Commission DP for reform of art. 82 containing proposals for dealing with refusals to license.

⁶⁶ See on this its 2005 DP on reforming Article 82 and the EAGCP Report (2005).

⁶⁷ See Anderman (2004), Vezzoso (2005), Leveque (2005), Lianos (2006), Dolmans et.al. (2007), especially p. 127-137.

⁶⁸ Ahlborn et.al (2005), p. 1110. This summarizes pages 779-784 of the Commission’s Decision. Here we concentrate mainly on conditions (1) and ((3)-(5). Condition (2) is related more to issues arising from refusals to *continue* to license. These could be important - Anderman (2004) - though there are serious problems with this condition - see Ahlborn et.al (2005), p. 1146; Humpe and Ritter (2005); Ritter (2005). From our point of view it is the other conditions that are more important for a comparison with the ‘exceptional circumstances’ test.

- (c) Alters the traditional objective justifications condition adding a new “*balancing test*” that has the characteristics of a Rule of Reason test in the sense of weighing in each specific case the potential positive and negative effects of compulsory licensing on incentives to innovate in the industry as a whole⁶⁹.

It should be abundantly clear that what the Commission objected to in relation to the ‘exceptional circumstances’ test is treating each of its conditions as necessary - in the sense that the absence of any one of these conditions should render a case non-abusive (benign). Thus it argues that “there is no persuasiveness to an argument that would advocate the existence of an exhaustive checklist of exceptional circumstances and would have the Commission disregard *a limine* other circumstances of exceptional character that may deserve to be taken into account when assessing a refusal to supply”⁷⁰. It thus proposes that instead the right approach is to examine the “entirety of the circumstances” surrounding any specific case and that a refusal may be deemed abusive even though the conditions of the exceptional circumstances standard are not met⁷¹.

Interpreted in terms of the analysis of the previous two sections we can say that the Commission believes that by adopting the traditional test it runs a serious danger of falsely acquitting too many socially harmful cases. When one or more of the conditions of the traditional standard do not hold, the Commission is arguing, a refusal to license IP may still be harmful, and an innovation-incentives effects test is best in order to identify these other cases: the traditional standard is too high on “false acquittals” according to the Commission or the area FA in Figure 1 is too large. Having a new standard that admits the possibility that there are harmful cases under a wider set of circumstances will lower false acquittals and thus raise welfare⁷².

⁶⁹ All changes have been criticized; Killick (2004), Ahlborn et.al (2005), Geradin (2005), Byrne (2007). For a more positive interpretation see Dolmans et.al. (2007), p. 127-37. For a criticism of the traditional test’s new product condition see Leveque (2005). It is important to note that here we are describing the fundamental attributes of the new standard proposed by the Commission – we are NOT arguing that in the specific *Microsoft* case the traditional conditions were not met - a different issue. As Leveque (2005) and Dolmans et.al. (2007) note, for the Commission (and, actually, the CFI), in the *Microsoft* case, the traditional ‘exceptional circumstances’ conditions were also met and this is true with respect to “indispensability and elimination of competition” **and** with respect to the “new product” test.

⁷⁰ Page 555 of Decision. The Commission regards the conditions of the ‘exceptional circumstances’ test when cumulatively present as sufficient.

⁷¹ Page 558 of Decision.

⁷² This approach is repeated in the DP for reform of article 82 in which the Commission “fundamentally reconceptualizes the approach towards refusals to license A strong presumption against a duty to license is turned into a significantly laxer test of abuse...”, Schweitzer (2007), p. 21.

The point is that, if the conditions in the ‘exceptional circumstances’ standard are indeed based on sound economics, then while by lowering thresholds one may reduce false acquittals one will also increase false convictions. Now we have shown in the previous section (Corollary to Proposition 1) that adopting a “low false acquittals” rule for a practice for which there is a very strong presumption of legality is the wrong strategy: only by adopting a “low false convictions” rule (such as the ‘exceptional circumstances’ one) we can hope to achieve better results than a PSL standard. However, the crucial question is: does the Commission believe that we should treat refusals to license IP as strongly presumptively legal?

The line of thinking at the heart of the Commission’s arguments in *Microsoft*, suggesting that harmful refusals to license IP may not be so rare and that potential disincentive effects on IP owners may, in not a negligible fraction of circumstances, be outweighed by positive (short-run and long-run) compulsory licensing effects⁷³, suggests that the Commission believes that while refusals to license IP are on average likely to be benign the presumption for this should not be thought of as very strong: s_L may be larger than unity but not significantly so. In support of this, the Commission argues that even if ***interoperability information*** “may be considered a trade secret it may not be appropriate to apply to such refusals to supply ...the same high standards for intervention” as in other cases⁷⁴. Indeed, some authors have stressed the differences between patents and other forms of IPRs and argued that legal standards should be designed to take these differences into account⁷⁵.

There is actually another very strong indication that the Commission’s prior is one of no strong presumption of legality. This comes from its treatment of its “balancing test” essentially as an efficiency defense that falls squarely on the shoulders of the defendant who also has to prove, if its IP is “necessary” and there is a “risk” of eliminating competition, that compulsory licensing will not reduce innovation incentives *in the industry as a whole*. But then, this *allocation of the Burden of Proof* in showing long-run harm to consumers is strongly reminiscent of article 81 or more generally cases in which

⁷³ For arguments supporting this view see Ritter (2005).

⁷⁴ DP on the reform of article 82, para. 242. Also Dolmans et.al. (2007), p. 136.

⁷⁵ See for example Ahlborn et.al. (2006), section 5.7.

the practice is *presumed illegal*. The Rule of Reason type of approach, that the use of the “balancing test” implies, itself suggests that the Commission rejects the view that there is a strong presumption of legality.

What the above discussion has established is that:

- (i) The ECT is a very high- p_B or very low-false-convictions rule
- (ii) The MST is a high- p_H or a low-false acquittals rule
- (iii) The Commission’s prior, at least for interoperability information cases, is one of no strong presumption of legality.

4.3 Comparison of Alternative Rules

We can now establish the following results:

4.3.1 Strong Presumption of Legality

1. ***If the presumption of legality is strong then of the two discriminating rules proposed for refusals to license IPs, it is only the ECT that is likely to be superior to Per Se Legality in reducing costs of decision errors.***

This follows from the fact that the ECT is a very high- p_B or very low-false-convictions rule and Corollary 1 of Proposition 1.

2. ***However, if the presumption of legality is strong even the ECT may well be welfare inferior to PSL for refusals to license IPs.***

This is because, as we have seen in the previous section (Corollary 2), the advantage in reducing CDEs will then be small and may well not compensate for the negative absolute deterrence effect, given the large value of \bar{h} . Note that this result is most likely when the differential deterrence effect is small or zero. This will be true when firms do not know whether their action is welfare harmful or benign as it may be reasonable to assume for refusals to license. In this case, deterrence rates are independent of the firms’ environment⁷⁶ so the differential deterrence effect is zero. Also, the ECT is disadvantaged

⁷⁶ See Katsoulacos & Ulph (2007) for an analysis based on this assumption. The assumption implies that firms perceive a common probability of been convicted if investigated equal to $\lambda = (1 - \gamma)(1 - p_B) + \gamma p_H$ i.e to the frequency with which actions are disallowed. The assumption that firms do not know whether their action is socially benign or

by a small coverage rate (π), decision delays and a higher implementation cost. This result can be used to provide a rationale for the much criticized *Xerox* case.

4.3.2 Weak Presumption of Legality

If the presumption of legality is not strong, as the Commission believes to be the case at least for interoperability information, then the following will hold:

3. ***With a weak presumption of legality, it is likely that there will be D-rules that will be welfare superior to PSL, as they reduce substantially decision error costs, i.e. rules with q_H substantially larger than s_L .*** Table 1 provides an example. In Table 1 we calculate s_L values under the assumption that $0.1 \leq \gamma \leq 0.5$ and $1.8 \geq (-h_B / h_H) \geq 1.1$, so we assume that the presumption of legality is not very strong. Also, we show combinations of p_H and p_B such that the quality of the D-rule (q_H) is equal to the strength of the presumption of legality, s_L . Specifically, p_B^* is the p_B value that equates s_L to q_H when $p_H = 0.5$ while p_B^{**} is the p_B value that equates s_L to q_H when $p_H = 0.9$. Increasing the value of p_H or p_B above the values shown will make $q_H > s_L$ and thus the D-rule superior to PSL on costs of decision error terms. One can easily confirm that when for example $s_L = 1.7$ the high- p_B D-rule ($p_B = 0.9$ and $p_H = 0.75$) will produce a value of q_H close to 4.5 times the value of s_L . We expect that D-rules that are so much better in reducing costs of decision errors relative to PSL will also be welfare superior to PSL⁷⁷.
4. ***If the presumption of legality is not strong Decision Theoretic considerations are not helpful for deciding which type of discriminating rule is superior: different types of effectively discriminating rule could reduce substantially the costs of decision errors relative to PSL.*** Table 1 can be used to compare “low

harmful is a reasonable one for many unilateral practices, such as refusal to license IP, the implications of which, for welfare, depend on a complex weighing of anticompetitive and precompetitive effects.

⁷⁷ In the example, substituting in the expressions for CDE in the Appendix, CDE^{PSL} will be 2.4 times CDE^{ED} while $\bar{h} = (-0.7CDE^{PSL})$.

false-acquittals” (high- p_H) rules to “low false-convictions” (high- p_B) rules. We can see that there are “low false-acquittals” rules, such as the MST, that may well be superior to “low false-convictions” rules, such as the ECT, in reducing the costs of decision errors – contrary to what is suggested by Ahlborn, Evans and Padilla (2005). In this sense we agree with the analysis on this issue of Ritter (2005)⁷⁸. For example, the high- p_B D-rule ($p_B = 0.81$ and $p_H = 0.5$) has the same discriminating quality ($q_H = 2.6$) as the high- p_H D-rule ($p_B = 0.65$ and $p_H = 0.9$). Thus, if the presumption of legality is weak, it is incorrect to criticize the Commission’s adoption of a new (low-false-acquittals) legal standard in *Microsoft* on decision theoretic grounds.

5. Table 1⁷⁹

$(-h_B/h_H)$	γ	s_L	q_H	$P_B^* = 1 - (P_H/s_L)$	P_H	$P_B^{**} = 1 - (P_H/s_L)$	P_H
1.1	0.5	1.1	1.1	0.545	0.5	0.182	0.9
1.1	0.4	1.7	1.7	0.697	0.5	0.455	0.9
1.1	0.3	2.6	2.6	0.805	0.5	0.649	0.9
1.1	0.2	4.4	4.4	0.886	0.5	0.795	0.9
1.1	0.1	9.9	9.9	0.949	0.5	0.909	0.9
1.4	0.5	1.4	1.4	0.643	0.5	0.357	0.9
1.4	0.4	2.1	2.1	0.762	0.5	0.571	0.9
1.4	0.3	3.3	3.3	0.847	0.5	0.724	0.9
1.4	0.2	5.6	5.6	0.911	0.5	0.839	0.9
1.4	0.1	12.6	12.6	0.960	0.5	0.929	0.9
1.8	0.5	1.8	1.8	0.722	0.5	0.500	0.9
1.8	0.4	2.7	2.7	0.815	0.5	0.667	0.9
1.8	0.3	4.2	4.2	0.881	0.5	0.786	0.9
1.8	0.2	7.2	7.2	0.931	0.5	0.875	0.9
1.8	0.1	16.2	16.2	0.969	0.5	0.944	0.9

5. If the ECT and the MST are equally effective in reducing costs of decision errors then superior deterrence effects suggest that the ECT is welfare superior to the MST.

⁷⁸ He notes that “Those who argue that false convictions are more damaging to the economy than false acquittals have so far failed to produce evidence supporting their position” (p. 298).

⁷⁹ P_B^* is the p_B value that equates s_L to q_H when $p_H = 0.5$ while P_B^{**} is the p_B value that equates s_L to q_H when $p_H = 0.9$.

To see this consider equation (3) and assume that ECT and MST are equally effective in costs of decision errors (CDE) terms. While a high- p_H rule increases $F(\underline{b}_H)$ (from Lemma 1) and thus tends to increase the positive differential deterrence effect that favors such a rule relative to PSL, this is mitigated by the effect of a higher p_H on the administrative cost $\pi \cdot (1-\varphi)$: overall a higher p_H may actually *reduce* welfare under the D-rule, when we abstract from its impact on the CDEs. On the other hand, a high- p_B rule reduces $F(\underline{b}_B)$ (from Lemma 1) and thus unequivocally increases the positive differential deterrence effect but *also* reduces the negative absolute deterrence effect *and* increases $1 - F(\underline{b}_B)$, i.e. the population of firms not deterred on which the advantage of lower costs of decision errors applies.

5 Concluding Remarks

In this paper we have applied the welfare based framework for the optimal choice of legal standards of Katsoulacos and Ulph (2007, 2008) to explore the issue of legal standards for refusals to license IP. This is an area in which, as a number of eminent commentators have noted, case law “has been far from consistent”. One of the reasons for this may well be that, while economic theory suggests that refusals to license IPs are on average benign, this presumption is not unequivocally accepted as being always very strong.

Our conclusions differ significantly from some of the conclusions reached in the existing (decision-theoretic) literature. In particular our analysis suggests that *Per Se Legality* may be the *welfare optimal* rule for some types of refusals to license IP for which the presumption of legality is quite strong, even if it is inferior to the ECT on cost of decision errors grounds. This result can be used to provide a rationale for the much criticized *Xerox* case. If the presumption of legality is weak, the Commission’s prior for interoperability information in *Microsoft*, a discriminating rule should be adopted and the ‘exceptional circumstances’ rule is likely to be the welfare optimal rule, though *not* because it is superior in costs of decision errors terms relative to the test adopted by the Commission in *Microsoft*, but because it generates optimal deterrence effects relative to the latter.

Appendix

Proof of Proposition 1: A necessary and sufficient condition for discriminating rules to reduce the cost of decision errors relative to Per Se Legality

First, notice that under PSL the CA is correctly allowing all the benign actions but wrongly allowing all harmful actions. Therefore, the error-costs involved are as follows:

- the Rate of False Convictions is $RFC^{PSL} = 0$;
- the Rate of False Acquittals is $RFA^{PSL} = \gamma$;
- the Cost of False Convictions is $CFC^{PSL} = RFC^{PSL}(-h_B) = 0$;
- the Cost of False Acquittals is $CFA^{PSL} = RFA^{PSL} \cdot h_H = \gamma h_H$

and so the overall Cost of Decision Errors (CDE) is:

$$CDE^{PSL} = CFC^{PSL} + CFA^{PSL} = \gamma h_H \quad (A1)$$

Suppose instead that the CA operates a discriminating rule (D - Rule). Under this rule the CA will be wrongly disallowing some cases from environment B and wrongly allowing some cases from environment H. Thus, its costs of decision errors are:

- the Rate of False Convictions is $RFC^D = (1 - \gamma)(1 - p_B)$;
- the Rate of False Acquittals is $RFA^D = \gamma(1 - p_H)$;
- the Cost of False Convictions is $CFC^D = RFC^D(-h_B) = (1 - \gamma)(1 - p_B)(-h_B)$;
- the Cost of False Acquittals is $CFA^D = RFA^D h_H = \gamma(1 - p_H)h_H$;

and consequently the overall Cost of Decision Errors is:

$$CDE^D = CFC^D + CFA^D = (1 - \gamma)(1 - p_B)(-h_B) + \gamma(1 - p_H)h_H \quad (A2)$$

Note that the D-rule increases false convictions and reduces false acquittals relative to PSL. To compare the two rules, from (A1) and (A2) it follows that:

$$CDE^D \leq CDE^{PSL} \Leftrightarrow (1 - \gamma)(1 - p_B)(-h_B) \leq \gamma \cdot p_H \cdot h_H \Leftrightarrow \frac{p_H}{1 - p_B} \geq \frac{(1 - \gamma)(-h_B)}{\gamma h_H} \quad (A3)$$

which is condition (2) of the text.

Proof of Lemma 1: Deterrence Effects

Under our assumptions, the firm's net expected benefit from taking the action under a discriminating rule will be $(1 - \pi\delta_e)b + \pi\delta_e[\phi b - (C + f)]$, where $C \geq 0$ is the cost that may be incurred from having the action reversed (due to *remedies*) and *antitrust fines* are equal to $f \geq 0$.⁸⁰ A firm will therefore only take the action if:

$$b > \underline{b}_e^D = \frac{p\delta_e(C + f)}{1 - p\delta_e(1 - \phi)}$$

$e = H, B$, with $\delta_B = (1 - p_B)$ and $\delta_H = p_H$.

Proof of Equation (3): Welfare difference between PSL and Discriminating rules

Social welfare under any generic rule, neglecting the implementation cost K is:

$$W = \gamma \cdot (-h_H) \cdot (1 - F_H) \cdot [1 - \rho \cdot \delta_H \cdot (1 - \phi)] + (1 - \gamma) \cdot (-h_B) \cdot (1 - F_B) \cdot [1 - \rho \cdot \delta_B \cdot (1 - \phi)] \quad (A4)$$

where ρ is the risk of been investigated and is equal to zero under PSL and equal to π under a Discriminating rule. That is, social welfare is the social gain from benign actions minus the social harm from harmful actions not deterred and not detected and disallowed. Clearly, given that the value of F is zero under PSL, the value of social welfare is then $-\bar{h} = -[\gamma h_H + (1 - \gamma)h_B]$. Substituting the relevant variables for the D-rule into (A4) and subtracting gives equation (3) of the text. For a more detailed discussion see Katsoulacos and Ulph (2007, 2008).

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⁸⁰ Assume that all costs, such as litigation costs are zero for simplicity.

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