

# Optimal Enforcement Structures for Competition Policy<sup>1</sup>

by

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Preliminary Work in Progress – Comments Welcome

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## 1. Introduction

Competition Authorities (CAs) at both national and cross-national (i.e. EU) level have recently adopted significant reforms in enforcement and decision procedures. One such reform, in particular, is that many competition authorities are willing to use economics-based methodologies in the implementation of competition policy drawing on developments in Industrial Organisation theory over the last 30 years. This has led to the adoption of an *effects-based* rather than a *Per Se* approach to deciding cases<sup>5</sup>. It has also resulted in the appointment of eminent academic economists to top positions in some competition authorities.

There have been many other reforms in enforcement and decision structures in competition policy. In Europe, the Commission's Regulation 1/2003 and the 139/2004 Regulation on the Control of Concentrations have been landmark reforms<sup>6</sup> amounting to the most far-reaching restructuring of the EU Competition Policy procedures in more than forty years. Since 2004 the Commission and many national competition authorities

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<sup>5</sup> See for example the recent decision on *Microsoft* (2004) and the US Supreme Court decision in *Leegin vs PSKS*. See also the recent (December 2008) Guidance paper issued by the Commission on implementing Competition Policy in the area abusive practices by dominant firms (art. 82 EC).

<sup>6</sup> For a recent economic analysis of the effectiveness of the 1/2003 reforms see Will *et.al* (2008).

have undertaken a series of further important changes in their decision structure by introducing in the system review panels, the chief economists departments, a hearing officer etc. All these reforms have been the subject of heated debate in recent years<sup>7</sup>.

Now, while in the past economists have focused on analysing the potential anti-competitive outcomes of various business conducts, as they have become more involved in the implementation and enforcement of Competition Policy they have recently turned their attention to considering the optimal design of Competition Authority decision and enforcement practices and of other enforcement procedures (e.g. considering the role of Courts).

In this paper we use the welfare-based framework proposed by Katsoulacos and Ulph (2008a) – hereafter K&U (2008a) - for determining the conditions under which, for *any* type of potentially anti-competitive business practice, an *effects-based* approach is superior to a *Per Se*<sup>8</sup> legal standard. We apply a simplified version of this framework to examine two issues:

- (i) Whether appeal or referral mechanisms are welfare improving
- (ii) Whether internal error-correction mechanisms are welfare improving.

Ahlborn Evans and Padilla (2008) explore the issue of whether enforcement procedures should involve some kind of appeals or referral process. They focus on the impact of such a process on the cost of decision errors and argue that an appeals process will reduce these costs. However their argument is rather informal and also they ignore the impact of an appeals process on deterrence effects – in which case it will be important to recognise the possibility that an appeals process will also involve more delay.

We show that both of these enforcement features will alter the costs of decision errors and the more general welfare implications, such as those produced by deterrence effects, of using any given decision rule (legal standard). More specifically we show the following.

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<sup>7</sup> See for example the collection of articles in “The Reform of EC Competition Law”, edited by I. Kokkoris and I Lianos, Kluwer Publishers, 2008.

<sup>8</sup> A *Per Se* legal standard allows or disallows an entire class of actions without trying to identify more carefully subclasses of actions that might generally be harmful or generally benign. A *discriminating* legal standard or effects-based approach requires the CA to establish explicit criteria for deeming some actions to be harmful and others benign and to then investigate each case to see which of these criteria it meets. An extreme form of the *effects-based* approach is what in US is termed *Rule – of – Reason* under which competition authorities have the discretion to apply economic methodologies on a case-by-case basis.

Appeals procedures:

- (i) Do not affect the decision errors of *Per Se* legal standards, while they
- (ii) Affect the decision errors made by *effects-based procedures* and in particular they:
  - (a) Increase the costs of Type II errors (false acquittals) whilst they
  - (b) Reduce the costs of Type I errors (false convictions)
- (iii) Will affect decision errors in a way that depends crucially on whether the conducts or actions investigated are *presumptively legal* (on average or *prima facie* benign to welfare) or *presumptively illegal* (on average or *prima facie* harmful to welfare). The stronger the presumption of legality the *more* likely that decision errors will be reduced for a presumptively legal practice. The stronger the presumption of illegality the *less* likely that decision errors will be reduced for a presumptively illegal practice. It is more likely that decision errors are reduced for presumptively legal than for presumptively illegal actions.
- (iv) Through their indirect / deterrence effects they will tend to improve welfare for presumptively legal actions and will tend to worsen welfare for presumptively illegal actions.
- (v) Are more likely to improve overall *welfare*<sup>9</sup> when actions are presumptively legal than when they are presumptively illegal. Indeed because of their beneficial deterrence effects they may improve welfare even when they increase decision errors for presumptively legal actions.

Internal error-correction mechanisms such as those introduced by the Commission since 2004:

- (i) Produce exactly the same decision errors as a judicial review system if internal review panels allow the same number of reviews as there are potential judicial reviews (usually two) **and** decisions in the authority are reached unanimously.

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<sup>9</sup> Overall welfare refers to welfare when account is taken of both costs of decision errors and of indirect / deterrence effects.

- (ii) If decisions in the authority are not reached unanimously but rather a majority rule is used the internal review panels will produce more Type I errors and fewer Type II errors relative to unanimity and hence, given (i), relative to an equal number of judicial reviews.
- (iii) Under unanimity, in contrast to judicial reviews, internal reviews unambiguously reduce deterrence effects and thus tend to improve welfare for a presumptively legal practice and tend to worsen welfare for a presumptively illegal practice. However, if decisions in the authority are reached using a majority rule then internal review panels may well increase deterrence effects. This suggests the interesting result that, *ceteris paribus*, *final decisions in the CA with internal review panels should be taken unanimously when the action investigated is presumptively legal and through a majority rule when the action investigated is presumptively illegal.*

## 2. The Model<sup>10</sup>

There is a population of firms, whose size is normalised to 1. Firms could take actions that are privately beneficial but potentially socially harmful. Assuming that some sort of intervention is considered desirable with the objective to disallow harmful actions, this intervention can take two forms. If for a specific action or class of related actions it is possible to assess its *average* social harm then one form of intervention would be to use a blanket rule that disallows this sort of action, whenever such an action is identified, if its average harm is positive. This is an example of a *Per Se* rule<sup>11</sup>. Alternatively, a Competition Authority (CA), which is set up to identify / verify whether an action has taken place, is given the mandate to carry out an *investigation* whenever a specific action is identified in order to determine whether this action is actually socially harmful or not. This would be an example of using a *Discriminating Rule* in order to decide when an action should be disallowed. Anticipating what type of decision rule will be used to

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<sup>10</sup> For full details see Katsoulacos and Ulph (2008a,c).

<sup>11</sup> An action is defined sufficiently narrowly that it makes sense to think of authorities' potentially operating *Per Se* Rules.

handle actions firms have to decide whether or not to take them<sup>12</sup> given also that disallowing an action implies that the firm might be required to reverse it and / or face a penalty.

Let  $b > 0$  denote the present value of the expected change in profits from the action over its “natural” lifetime<sup>13</sup> for a typical firm. The extent to which an action causes social harm, which we take to be measured by the negative of the present value of the change in consumer surplus, will depend on the firm’s environment which encompasses various characteristics of both the firm and of the markets in which it operates. For simplicity we assume that there are just two environments – Harmful and Benign – and that if the action is taken by a firm from the Harmful environment it will generate harm  $h_H > 0$  - while if the action is taken by a firm from the Benign environment it will generate harm  $h_B < 0$  - i.e. will be socially beneficial. Let the fraction of firms in the underlying population of firms who could take the action that come from the Harmful environment be  $\gamma$ ,  $0 < \gamma < 1$ . We assume that the values of  $\gamma, h_H$  and  $h_B$  are common knowledge, as is therefore the value of average harm/benefit  $\bar{h} = \gamma h_H + (1 - \gamma) h_B$ . We will say that the action is *presumptively legal* if  $\bar{h} < 0$  and *presumptively illegal* if  $\bar{h} > 0$ .

While in principle the distribution of private benefits could be different in each of the two environments, here we impose the *symmetry assumption* that the two distributions are identical<sup>14</sup>. So we suppose that the private benefit has a positive continuous probability density  $f(b) > 0$  on  $[0, \infty)$ , with cumulative distribution function  $F(b)$ ,  $0 \leq F(b) \leq 1$ ;  $F'(b) = f(b) > 0$ .

For simplicity we assume that the process of verification is costless. Further while we recognise that, as emphasized in the literature<sup>15</sup> there are costs involved in collecting and analysing the information needed to form the judgments necessary to implement a *Discriminating Rule*, which would not need to be incurred under *Per Se Rules*, and that therefore before deciding to use a *Discriminating Rule* in preference to a *Per Se Rule*, it is

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<sup>12</sup> Note that this is an *ex-post* investigation process. An alternative decision process involving *ex ante* intervention by the authority is a *prior clearance* process whereby firms contemplating taking an action have to get prior approval before proceeding.

<sup>13</sup> This captures the idea that firms operate in a changing environment and that an action taken at a particular time might be modified or even reversed at some later date.

<sup>14</sup> In the absence of compelling evidence to the contrary this assumption may be thought to be quite reasonable.

<sup>15</sup> For example, Christiansen et.al. (2006) p. 223/224, 231

important to ensure that whatever advantages it has in other respects are sufficient to outweigh these additional costs, we take it that this point is well understood and in what follows we will simply ignore these costs.

As noted by Ehrlich and Posner (1974), different decision rules also “affect the speed, and hence indirectly the costs and benefits, of legal dispute resolution...”<sup>16</sup>. *Discriminating Rules* cause additional delays or have a longer *litigation cycle* than *Per Se* rules since they require both verification plus investigation/analysis. However for the purposes of this article we also abstract for simplicity from these differences<sup>17</sup>. Finally, while in practice only a fraction of firms who have taken the action will come to the attention of the authority (i.e. the *coverage rate* will be less than one), here we will assume that all actions come to the authority’s attention (and they are investigated under *Discriminating Rule* procedures).

If the CA operates a *Discriminating Rule*, the data, tests and analysis available to it will typically be imperfect and lead it to classifying some genuinely harmful actions as benign and some genuinely benign actions as harmful. So let  $p$  be the probability of correctly identifying the environment from which an action comes and suppose that  $p_B, 0 < p_B \leq 1$  is the probability that if an action is Benign it is correctly identified as such, and  $p_H, 0 < p_H \leq 1$  is the probability that an action that is truly Harmful it is identified as such. In what follows the quality of the information/analysis available to the CA is characterised by these two probabilities.

If  $p_B + p_H = 1$  then the probability of identifying an action as harmful is exactly the same whether an action comes from a Harmful or Benign environment and so the authority’s information/analysis has no discriminatory power. If  $p_H = 1, p_B = 1$  then the CA’s information/analysis allows it to perfectly identify the environment from which any firm taking the action comes. In the more general case where  $p_B + p_H > 1$  but  $p_B < 1, p_H < 1$  then firms from the Benign environment are more likely to have their actions identified as benign than are firms from the Harmful environment, while firms from the Harmful environment are more likely to have their actions identified

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<sup>16</sup> Page 265-6.

<sup>17</sup> See K&U (2008) for a full model that allows for differences in delays, specifically assumes zero delays under Per Se Legality, a verification delay under Per Se Illegality and a larger delay under a Discriminating Rule.

as harmful than are firms from the Benign environment, so the information/analysis available to the CA has genuine discriminatory power.

If an action is investigated and disallowed, then the firm may have to pay a fine/penalty and it may have to reverse the action which could cause it to incur significant costs. We will denote these costs by  $f > 0$ .

### *Firms' Decisions – Deterrence Effects*

Assume that firms know:

- the environment  $e = H, B$  from which they come;
- what type of decision rule the CA employs;
- if the authority uses a Discriminating Rule, the quality of the model (the probabilities  $p_H, p_B$ );
- the cost to the firm if its action is disallowed,  $f$ .

Any decision rule/procedure can be characterised by the parameters  $\delta_e, e = H, B$  where  $\delta_e, 0 \leq \delta_e \leq 1, e = B, H$  is the probability that, if investigated, a firm from environment  $e$  will have its action disallowed.

**Definition 1:** A *Per Se Legal* rule is characterised by  $\delta_e = 0, e = H, B$ ; a *Per Se Illegal* rule by  $\delta_e = 1, e = H, B$ ; and any *Discriminating Rule* by  $\delta_H = p_H$  and  $\delta_B = 1 - p_B$ .

Given that the fraction of firms from environment  $e$  who will be deterred under a rule is  $F_e = F(\underline{b}_e)$ , where  $\underline{b}_e$  is defined by  $(1 - \delta_e)b - \delta_e f = 0$ , it is easily established that, in an obvious notation the fraction of firms deterred under any given rule and environment will be<sup>18</sup>:

$$0 = F_B^{PSL} = F_H^{PSL} < F_B^D < F_H^D < F_B^{PSI} = F_H^{PSI} < 1.$$

### *Costs of Decision Errors - Effectively Discriminating Rules*

The Costs of Decision Errors (CDE) are equal to the Costs of Type I Errors (or Costs of False Convictions, CFC) plus the Costs of Type II Errors (or Costs of False

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<sup>18</sup> See for details Katsoulacos and Ulph (2008).

Acquittals, CFA). The CDE under *Per Se* and under a *Discriminating Rule* will be respectively:

$$CDE^{PSL} = \gamma h_H = CFA^{PSL} \quad (1)^{19}$$

$$CDE^{PSI} = (1 - \gamma)(-h_B) = CFC^{PSI} \quad (2)^{20}$$

and

$$CDE^D = \gamma h_H (1 - p_H) + (1 - \gamma)(-h_B)(1 - p_B) = CFA^D + CFC^D \quad (3)$$

Note that the Discriminating Rule will be *effective* i.e. it will reduce CDE relative to *Per Se Legality* iff:

$$q_H \equiv \frac{p_H}{1 - p_B} > \frac{(1 - \gamma)(-h_B)}{\gamma h_H} = s_L > 1$$

where  $s_L \equiv \frac{(1 - \gamma)(-h_B)}{\gamma h_H} > 1$ ,  $s_L$  been what we call the *strength of the presumption of*

*legality* and  $q_H \equiv \frac{p_H}{1 - p_B} > 1$  is a measure of how good is a decision rule's classification

of an action as being harmful - since it measures how often the rule declares an action to be harmful when it is so compared to how often it declares an action to be harmful when it isn't.

Also, the Discriminating Rule will be *effective* i.e. it will reduce CDE relative to *Per Se Illegality* iff:

$$q_B \equiv \frac{p_B}{1 - p_H} > \frac{\gamma h_H}{(1 - \gamma)(-h_B)} = s_I > 1$$

where  $s_I \equiv \frac{\gamma h_H}{(1 - \gamma)(-h_B)} > 1$ ,  $s_I$  been what we call the *strength of presumption of*

*illegality* and  $q_B \equiv \frac{p_B}{1 - p_H} > 1$  is a measure of how good is a decision rule's classification

of an action as being benign - since it measures how often the rule declares an action to

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<sup>19</sup> Clearly under PSL the only costs are Cost of False Acquittals (CFA) – i.e. costs of Type II errors – while costs of Type I errors (Costs of False Convictions (CFC)) are zero.

<sup>20</sup> Clearly under PSI the only costs are Cost of False Convictions (CFC) – i.e. costs of Type I errors – while costs of Type II errors (Costs of False Acquittals (CFA)) are zero.

be benign when it is so compared to how often it declares an action to be benign when it isn't<sup>21</sup>.

### *Welfare comparisons*

Social welfare under any generic rule is:

$$W = \gamma(-h_H)(1 - F_H)(1 - \delta_H) + (1 - \gamma)(-h_B)(1 - F_B)(1 - \delta_B)$$

that is, social welfare is the social gain from benign actions minus the social harm from harmful actions not deterred and not disallowed. In particular, welfare in the first-best is:

$$\hat{W} = (1 - \gamma) \cdot (-h_B) > 0$$

while welfare under *Per Se* rules is:

$$W^{PSL} = (1 - \gamma)(-h_B) + \gamma(-h_H) = -\bar{h} \quad (\bar{h} < 0)$$

and

$$W^{PSI} = 0 \quad (\bar{h} > 0)$$

Thus:

- (i) If the action is *Presumptively Legal* ( $\bar{h} < 0$ ) then:

$$\begin{aligned} W^D - W^{PSL} = & \\ & [\mathcal{H}_H p_H - (1 - \gamma)(-h_B)(1 - p_B)] \cdot (1 - F_B^D) \\ & + F_B^D \bar{h} \\ & + (F_H^D - F_B^D) \cdot \mathcal{H}_H \cdot (1 - p_H) \end{aligned} \quad (18)$$

- (ii) If the action is *Presumptively Illegal* ( $\bar{h} > 0$ ) then:

$$\begin{aligned} W^D - W^{PSI} = & \\ & [(1 - \gamma)(-h_B)p_B - \mathcal{H}_H(1 - p_H)] \cdot (1 - F_B^D) \\ & + (F_H^D - F_B^D) \cdot \mathcal{H}_H \cdot (1 - p_H) \end{aligned}$$

### **3. The impact of judicial reviews**

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<sup>21</sup> Notice that the strength of the presumption of legality/illegality depends on all the factors that have been identified in the existing decision theoretic literature as being relevant to the decision as to whether or not to use *Per Se Rules* – base-line probability of anti-competitive harm, and the magnitudes of the associated harms.

Assume, as described in the previous section, that the CA considers the cases coming before it and decides whether to allow or disallow an action using a particular model characterised by  $p_B + p_H > 1$  but  $p_B < 1, p_H < 1$ . Also assume now that if it decides to allow an action then, as before, this is the end of the matter. However, if it decides to disallow an action the case can be referred to an appeals court which then re-examines the case<sup>22</sup>. We assume that the appeals court re-examines the case using exactly the same evidence and exactly the same criteria as the CA. Also we assume that the decision of the appeal court is final. Thus, essentially the appeal court is offering a second (and final) opinion.

This implies that under a referral process to an appeal court effectively the decision rule becomes  $(\tilde{p}_H, \tilde{p}_B)$  where:  $1 - \tilde{p}_B = (1 - p_B)^2$ ;  $\tilde{p}_H = (p_H)^2$

Let us now consider the implications of this.

#### *a. Effects on Costs of Decision Errors*

First, we concentrate on the Costs of Decision Errors (CDE) and how these are affected. Under our assumptions, with an appeals process the CDE under the various rules will be:

$$CDE_a^{PSL} = \gamma h_H = CFA_a^{PSL} \quad (6)$$

$$CDE_a^{PSI} = (1 - \gamma)(-h_B) = CFC_a^{PSI} \quad (7)$$

and

$$CDE_a^D = \gamma h_H (1 - p_H^2) + (1 - \gamma)(-h_B)(1 - p_B)^2 = CFA_a^D + CFC_a^D \quad (8)$$

Thus, we have:

#### **Lemma 1**

Comparing (3) to (8) we see that an appeals process:

- (i) Increases the costs of Type II errors (false acquittals) whilst it
- (ii) Reduces the costs of Type I errors (false convictions)<sup>23</sup>.

Also, comparing (1)-(3) to (6)-(8) we find:

<sup>22</sup> This is the assumption that is made also by Ahlborn, Evans & Padilla (AEP, 2008),

<sup>23</sup> See also AEP (2008).

### Proposition 1

The appeals process

- (a) does not affect the CDE of *Per Se* rules<sup>24</sup>, while
- (b) it affects the CDE of discriminating rules as follows:

For a presumptively legal practice ( $\bar{h} < 0$ ):

$$CDE_a^D < CDE^D \Leftrightarrow \frac{p_H \cdot (1 - p_H)}{(1 - p_B) \cdot p_B} < \frac{(1 - \gamma) \cdot (-h_B)}{\gamma h_H} = s_L > 1 \quad (9)$$

For a presumptively illegal practice ( $\bar{h} > 0$ ):

$$CDE_a^D < CDE^D \Leftrightarrow \frac{p_B \cdot (1 - p_B)}{(1 - p_H) \cdot p_H} > \frac{\gamma \cdot h_H}{(1 - \gamma) \cdot (-h_B)} = s_I > 1 \quad (10)$$

From (9) and (10) we see that ***in general there is no guarantee that with an appeals process the CDE of discriminating rules will be reduced***<sup>25</sup>. This implies, given also part (a) of the Proposition, that there is in general no guarantee that an appeals process will make Discriminating rules more attractive relative to *Per Se* rules.

Note that we can rewrite the LHS of the inequality in (9) as

$$\frac{p_H(1 - p_H)}{(1 - p_B)p_B} = \frac{q_H}{q_B}$$

Further, we can re-write the RHS of the inequality in (9) as

$$\frac{(1 - \gamma) \cdot (-h_B)}{\gamma h_H} = s_L = \frac{1}{s_I}$$

and note that for a presumptively legal action this is greater than 1 while for presumptively illegal action this is less than 1. So essentially our conditions (9), (10) for the CDE to fall under an appeals process can be expressed as:

$$\frac{q_H}{q_B} < s_L = \frac{1}{s_I} \quad (11)$$

<sup>24</sup> *Per Se* Legality or *Per Se* Illegality.

<sup>25</sup> Contrary to the claim in AEP (2008)

What this says is that for an appeals process to produce lower decision error costs the quality of a decision rule's ability to correctly classify harmful actions must be low relative to the quality of its ability to correctly classify benign actions. This makes sense since an appeals process kicks in because firms appeal against decisions to ban their actions i.e. when they are classified as harmful.

### **Corollary 1**

For presumptively legal practices if the CA's model is better in identifying correctly harmful actions than in identifying correctly benign actions (i.e. if  $p_H > p_B$ ) then an appeals process will reduce the costs of decision errors of a D-rule.

Proof: This is true given that if  $p_H > p_B$  the Left Hand Side of (9) is less than unity.

This suggests that, if  $p_H > p_B$  and the practice is presumptively legal, an appeals process may make a D-rule optimal in decision error terms when a *Per Se Legality* rule would be optimal in its absence.

However note that this condition<sup>26</sup> is neither necessary nor sufficient for the appeals process to reduce the CDE of D-rules: (9) may hold even if the condition does not hold and even if this condition holds the CDE may not be reduced under an appeals process for a presumptively illegal practice – i.e. (10) may not hold even though the LHS of (10) will be greater than unity.

### **Corollary 2**

From (9) and (10) it follows that:

- (a) The stronger the presumption of legality the *more* likely that the appeals process will reduce the CDE of a Discriminating rule for a presumptively legal practice.
- (b) The stronger the presumption of illegality the *less* likely that the appeals process will reduce the CDE of a Discriminating rule for a presumptively illegal practice.
- (c) The appeals process is more likely to reduce the CDE of a Discriminating rule for presumptively legal than for presumptively illegal practices. To see this note that

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<sup>26</sup> AEP (2008) assume that this condition will be true in their discussion of potentially abusive unilateral practices examined in EU under article 82. For the arguments and empirical evidence to which they allude see Section II. of their article.

from Corollary 1, if  $p_H > p_B$ , CDE will be reduced by the appeals process if the practice is presumptively legal but this may not hold if it is presumptively illegal. If on the other hand  $p_H < p_B$  then the LHS of (10) will be less than one (and the LHS of (9) greater than one) so CDE will not be reduced by the appeals process if the practice is presumptively illegal but may be reduced if it is presumptively legal. The intuition for this result is that an appeals process increases false acquittals but reduces false convictions (Lemma 1). For a presumptively legal action false convictions matter more than false acquittals, whereas for a presumptively illegal action false acquittals matter more than false convictions.

### ***b. Full Welfare Comparison***

An appeals process will not only affect decision errors. It will also influence administrative procedure factors and the deterrence effects of legal standards. In this section we turn to a consideration of these too.

First we need to consider how appeals affect the length of time in reaching a decision. Assume that under an appeal procedure the total length of time is  $\phi_a$ ,  $\phi < \phi_a \leq 1$ , where  $\phi = 0$  (by assumption here) is the length of time if there is no appeal. Next, assume that the cost to a firm from having its action disallowed might depend to some extent on the length of time for which the practice was in operation. So we suppose that the total costs a firm faces if its action is disallowed after a time  $\phi$  is  $\phi c + f$  where  $f$  is now the fixed (time-independent) cost / penalty that the firm faces and  $c$  is the component of the penalty that depends on the length of time the action is in place<sup>27</sup>.

If there is no appeal process then, as noted in the previous section, the expected profits of a firm if it takes the action will be:  $(1 - \delta)b - \delta f$ .

So a firm will take the action iff:

$$b > \underline{b}^0 = \frac{\delta f}{1 - \delta}.$$

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<sup>27</sup> For example in the *Microsoft* (2007) case, the company had to pay a certain amount per day for its alleged refusal to license practice during the period of the appeals process.

Of course the value of  $\delta$  depends on the type of the firm and since  $\delta_H = p_H > \delta_B = (1 - p_B)$ ,  $\underline{b}^0$  will be greater for firms whose action is harmful than for firms whose action is benign – more firms from the harmful environment will be deterred.

With an appeal process the firm is involved in a two stage decision: in stage 1 it has to decide whether or not to take the action; in stage 2 – if the CA has decided to disallow the action, it has to decide whether or not to appeal. If it decides to appeal then there is a cost  $m > 0$  to mounting an appeal. Consider each stage in turn.

### Stage 2

If the firm having taken an action which was disallowed by the CA does not appeal then its net income will be  $-f$ . If the firm appeals then it will incur cost  $m$  and with probability  $\delta$  its action will be disallowed by the court generating net income  $\phi_a b - (\phi_a c + f)$ . On the other hand with probability  $(1 - \delta)$  the action will be allowed by the appeal court generating income  $b$ . Thus, the firm will appeal iff:

$$\delta[\phi_a b - (\phi_a c + f)] + (1 - \delta)b - m \geq -f$$

That is, iff:

$$b \geq \underline{b}_a = \text{MAX} \left[ \frac{m - f + \delta(\phi_a c + f)}{\delta\phi_a + (1 - \delta)}, 0 \right]$$

Notice that the first term in square brackets is negative (and so all firms will definitely appeal) if (a) there are no costs of appealing -  $m = 0$ ; and (b) the expected penalty from appealing is no greater than from not appealing. Put differently, the factors that would cause the firm to consider not appealing are: (a) the costs of mounting an appeal – i.e.  $m > 0$ . (b) the fact that, because the action persists longer, the expected fine is greater than not appealing.

Note that since  $\delta_H = p_H > \delta_B = (1 - p_B)$  the value of  $\underline{b}_a$  will be greater for firms whose action is harmful than for firms whose action is benign – so:

### Lemma 2

Less firms from the harmful environment will be appealing having taken an action that was disallowed<sup>28</sup>.

We can now turn to Stage 1 and consider the decision to take an action. In the discussion below we abstract from differential deterrence effects.

### *Stage 1*

There are two cases to consider:

CASE 1:  $\underline{b}_a > \underline{b}^0$ .

Here firms with  $b \leq \underline{b}_a$  will not appeal and will have expected profits from taking the action that are exactly the same as if there were no appeal process. So their decision to take the action is exactly the same as if there were no appeal process. Firms with  $b > \underline{b}_a$  will definitely appeal and so make greater profits from taking the action than if no appeal were possible. But they were already making positive net profits from taking the action so, once again, the fact that an appeal is possible will not change their decision as to whether or not to take the action. So *in this case the deterrence effects are exactly the same as in the case where no appeal is possible.*

Now for those firms with  $\underline{b}^0 \leq b \leq \underline{b}_a$  i.e. those who do not appeal, the decision cost errors will be exactly the same as if there were no appeal. However for those with  $b > \underline{b}_a$  who do appeal the decision to disallow will be made with probability  $\delta^2$  and so will produce different decision cost errors. As we saw above these could be higher or lower than if there were no appeal.

So in this case welfare could be higher or lower with an appeal than without depending on how decision cost errors go.

CASE 2:  $\underline{b}_a < \underline{b}^0$

Here everyone with  $b \geq \underline{b}_a$  will appeal if they take the action. Those with  $b < \underline{b}^0$  were making negative net profits from taking the action without an appeal, but since they appeal their profits will be higher from taking the action. Hence there exists a

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<sup>28</sup> This follows from expression for  $\underline{b}^0$  which is increasing in  $\delta$ .

$\underline{b}^1, \underline{b}_a \leq \underline{b}^1 < \underline{b}^0$  such that every firm with  $b \geq \underline{b}^1$  will both take the action and will appeal.

So now, with the possibility of appeal available, fewer firms are deterred from taking the action. Thus in this case there is a favourable, welfare enhancing, deterrence effect if the practice is presumptively legal – since then too many firms are deterred – and a negative, welfare reducing, deterrence effect if the practice is presumptively illegal – since then too few firms are deterred. Further, as we saw above, decision cost errors could be higher or lower than if there is no appeal. Thus, for a presumptively legal practice, if decision errors are lower under an appeals process then this is an overall welfare improvement; if they are higher then one has to trade-off higher decision error costs against lower mis-deterrence costs. For a presumptively illegal practice, if decision errors are higher under an appeals process then this is an overall welfare deterioration; if they are lower then one has to trade-off lower decision error costs against higher mis-deterrence costs.

So we have shown:

### **Proposition 2**

The appeals process will either not affect or it will reduce the deterrence effect of a Discriminating rule. Thus, through its influence on deterrence, the appeals process will tend to improve welfare for a presumptively legal practice and it will tend to worsen welfare for a presumptively illegal practice.

Putting Proposition 1 (and its Corollaries) and Proposition 2 together we obtain:

### **Corollary 3**

The appeals process is more likely to improve *welfare* under a Discriminating rule when the practice is presumptively legal than when the practice is presumptively illegal. Indeed the appeals process may improve welfare even if it reduces the CDE for a presumptively legal practice (this follows immediately from Corollary 2c and Proposition 2).

### **Corollary 4**

The appeals process will not influence or will reduce welfare under a *Per Se Illegality* standard. This is true given that, from Proposition 1, the appeals process does

not affect CDE under a Per Se Illegality standard and that, from Proposition 2, it has a zero or a negative deterrence effect.

Overall our analysis shows that the impact of the appeals process on welfare depends crucially on the *type of action* (presumptively legal or illegal) considered and the *type of legal standard* employed by the Competition Authority.

#### 4. The Impact of Internal Error Correction Mechanisms

As noted in the Introduction, since 2004 the European Commission (and other Authorities) have established alternative internal error correction mechanisms to that of the appeals process, such as the system of internal peer review panels, in order to reinforce internal scrutiny<sup>29</sup>. AEP (2008) mention that the comparison of the judicial review with the use of internal peer review panels depends “on the level of consensus that is required” when the latter is used. Does a final decision require unanimity in the internal decisions of all review panels? Or is there a majority rule used (if the number of panels is more than two)?

There are, of course, some other important differences with a judicial review. Thus, in contrast to the judicial review under which a firm has to decide, if its action is disallowed, whether or not to appeal and then has to face certain additional costs if it does appeal, with internal review panels the case is reviewed automatically and the firm has to bear no additional costs – though in both cases there is further delay in reaching a final decision.

Assume that the internal review panels only examine cases disallowed by the CA’s case team<sup>30</sup>. Also assume that for the final decision unanimity is required. If there are  $N \geq 2$  review panels then effectively the decision rule becomes  $(\tilde{p}_H, \tilde{p}_B)$  where:

$$1 - \tilde{p}_B = (1 - p_B)^N; \tilde{p}_H = (p_H)^N$$

In the context of the EU Commission  $N = 3$ , the two peer review panels been the so-called devil’s advocate panel and the Chief Competition Economist team.

Therefore the CDE when  $N$  internal review panels are used will be:

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<sup>29</sup> For a brief discussion see AEP (2008), p. 28.

<sup>30</sup> As in AEP (2008), see p. 29.

$$CDE_r^D = \gamma h_H (1 - p_H^N) + (1 - \gamma)(-h_B)(1 - p_B)^N = CFA_r^D + CFC_r^D$$

Clearly if  $N=2$  the CDE are exactly the same as with a single judicial review while if  $N > 2$  there will be an increase in Type II errors or false acquittals and a decrease in Type I errors or false convictions relative to a single judicial review. So when  $N > 2$  it is not possible in general to say whether the CDE will increase or decrease relative to a single judicial review: as when comparing a judicial review process to its absence, the outcome will depend on whether the practice is presumptively legal or illegal, on the strength of this presumption and the relative values of  $(\tilde{p}_H, \tilde{p}_B)$ ;  $p_H + p_B > 1$ . If the judicial process allows for two reviews, as is the case in EU with the CFI and the ECJ then the CDE with the Commission's two internal review panels will be exactly the same as the CDE in the absence of internal panels but with the possibility of two judicial reviews.

If internal decisions are reached by a majority rule and, for example,  $N = 3$ , then the decision rule becomes  $(\tilde{p}_H, \tilde{p}_B)$  where:

$$1 - \tilde{p}_B = (1 - p_B)^3 + 3(1 - p_B)^2 p_B ; \tilde{p}_H = (p_H)^3 + 3p_H^2(1 - p_H)$$

Substituting into the expression for the CDE it is easily seen that with a majority rule there is a decrease in Type II (false acquittals) errors and an increase in Type I (false convictions) errors relative to unanimity.

Coming to deterrence, under internal review panels all cases disallowed are reviewed. Thus with  $N$  panels and assuming unanimity the critical value of  $b$  above which firms decide to take an action is<sup>31</sup>:

$$\underline{b}_r = \frac{\delta^N f}{1 - (\delta^N)(1 - \phi_r)}$$

where  $\phi_r, \phi < \phi_r \leq \phi_a \leq 1$  is the delay in reaching a final decision after all internal reviews. The lower probability of having the action disallowed plus the increase in delay reduce  $\underline{b}$  and thus there is an unambiguous reduction in deterrence relative to having no decision reviews. This tends to improve welfare if the practice is presumptively legal and

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<sup>31</sup> We abstract from differential deterrence effects on firms of different types. Also we assume that, in contrast to an appeals process, here the cost to the firm of been disallowed is not affected by the delay in reaching decisions.

to worsen welfare if it is presumptively illegal. However, this may not be true if final decisions are taken using a majority rule. For example with  $N = 3$  then the probability of a harmful action been disallowed will be greater if the CA uses the review panels than if such panels do not exist iff:

$$\tilde{p}_H = (p_H)^3 + 3p_H^2(1 - p_H) > p_H$$

and this will hold if  $p_H$  is  $0.5 < p_H < 1$ . In this case there may be an *increase in deterrence* (if internal panels do not delay a lot the decision process of the authority) and this improves welfare if the practice is presumptively illegal and worsens welfare if it is presumptively legal.

Thus our analysis in this section has established:

**Proposition 3**

- (i) Internal review panels that allow the same number of reviews as there are potential judicial reviews (usually two), will produce exactly the same CDE as the judicial review system if decisions in the authority are reached unanimously. Again it is not possible to say whether the CDE will be reduced or increased relative to a system with no reviews. If the number of internal reviews is greater than that of potential judicial reviews there will be an increase in Type II errors or false acquittals and a decrease in Type I errors or false convictions relative to the judicial review process.
- (ii) If decisions in the CA are not reached unanimously but rather a majority rule is used the internal review panels will produce more Type I errors and fewer Type II errors relative to unanimity and hence, given (i), relative to an equal number of judicial reviews.
- (iii) Under unanimity, internal review panels, in contrast to judicial reviews, unambiguously reduce deterrence effects and thus tend to improve welfare for a presumptively legal practice and tend to worsen welfare for a presumptively illegal practice. However, if decisions in the authority are reached using a majority rule then internal review panels may well increase deterrence effects. This suggests the interesting result that, *ceteris paribus, final decisions in the CA with internal review panels should be taken unanimously when the*

*practice is presumptively legal and through a majority rule when the practice is presumptively illegal.*

## 5. Conclusions

A somewhat loose but still quite accurate interpretation of what the results outlined in the last two subsections imply is the following:

- “Heavier” procedures (judicial appeals, internal reviews, chief economists, unanimity rules) are more likely to be used with benefit for *prima facie* good than for *prima facie* bad conduct.
- When the presumption of illegality is very strong (cartels would be a good example), so *Per Se Illegality* seems the right legal standard to use, one should not rely on “heavy” procedures. However, when behavior is presumptively illegal but the presumption is not very strong (RPM may be such an example, for which many would like to adopt an *effects-based procedure*) adopting an intermediate degree of “heaviness” would seem to be most appropriate (e.g. internal reviews and unanimity may not be called for but one should allow for judicial reviews).

Intuitively: if the conduct is *prima facie* good, let's put as many obstacles as possible in the way of the authority; if it is *prima facie* bad, the conclusion is the reverse.

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