

Optimal Enforcement and Decision Structures for Competition Policy

by

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1. Introduction

Optimal enforcement and decisional structures in Competition Policy have been the subject of often heated debate in recent years⁴. In Europe, Regulations 1/2003 and 139/2004 were landmark reforms⁵ and since then the Commission has undertaken a series of other changes in its decisional structure by introducing in the system review panels, the chief economist, a hearing officer etc. Further, the Commission and competition authorities more generally, are now willing to adopt a more economics-based approach to the implementation of competition policy drawing on developments in Industrial Organisation theory over the last 30 years. This has led to an increase in the adoption of a *Rule of Reason* rather than a *Per Se* approach to deciding cases⁶.

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⁴ See for example the collection of articles in “The Reform of EC Competition Law”, edited by I. Kokkoris and I Lianos, Kluwer Publishers, 2008.

⁵ For a recent economic analysis of the effectiveness of the reform 1/2003 see Will et.al. (2008).

⁶ See for example recent decision by US Supreme Court in *Leegin vs PSKS* to remand decision on Resale Price Maintenance to be heard under *Rule of Reason* rather than *Per Se*.

Economists, in turn, have directed much of their attention to investigating how Competition Authorities should be formulating decision rules for implementing Competition Policy (see for example Katsoulacos and Ulph, 2008a,b). In all these contributions however, with very few exceptions (such as Ahlborn, Evans and Padilla, 2008), the main question has been to compare *Per Se* with Discriminating-type decision rules (such as RoR) in a context in which the Competition Authority's (CA) decision-making procedure involves a single stage, there are no internal error-correction mechanisms and in which the CA's decisions are final in that there is no possibility for an appeal against these decisions to another (higher) authority by any of the interested parties. Clearly, these assumptions are very unrealistic. Further relaxing these assumptions may have significant implications on at least two important issues:

- (i) Relaxing these assumptions may 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). Thus the question is whether for example a multi-authority world in which the decisions of one authority (the Competition Authority) can be reviewed by additional authorities such as the Courts (i.e. a world with judicial reviews), or a world in which authorities adopt internal error-correction mechanisms or multi-stage decision rules, improves welfare or not.
- (ii) Relaxing these assumptions may affect the welfare comparison between different decision rules. For example, does the introduction of judicial reviews makes discriminating rules more attractive in welfare terms to *Per Se* rules?

In this paper we aim to extend the welfare based analysis of legal standards by Katsoulacos and Ulph (2008a,c) to examine:

- (a) The impact of decision reviews, particularly the impact of judicial reviews but also of internal review panels used as error correction mechanisms, on welfare.
- (b) The impact of multi-stage decision procedures within a competition authority.

2. The Model⁷

There is a population of firms, whose size is normalised to 1, who could potentially take an action⁸. If a firm does take the action there is a possibility that this could become the subject of an investigation by a CA, which could disallow it and could then require the firm to reverse it and/or impose a penalty. Anticipating this firms have to decide whether or not to take the action⁹.

If there were no intervention, the action would confer on the firm taking it a positive private benefit which we take to be the present value of the expected change in profits from the action over its “natural” lifetime¹⁰. Let $b > 0$ denote the benefit accruing to a typical firm. However, the action can also cause wider social harm, which we take to be measured by the negative of the present value of the change in consumer surplus. The extent of the harm caused by any firm will depend on its 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 γ , $0 < \gamma < 1$. We assume that the values of γ, h_H and h_B are common knowledge, as is therefore the value of average harm/benefit

⁷ For full details see Katsoulacos and Ulph (2008a,c).

⁸ An action is defined sufficiently narrowly that it makes sense to think of CAs potentially operating a *Per Se* Rule. Thus we have in mind that an action is a horizontal merger rather than just a merger or an action is “price cutting below (some measure of) cost” not “competitive price cutting”. On the other hand, as we will see (Section 4), a strength of our framework is indeed that the tests we propose direct the analyst in deciding how narrowly the action should be defined.

⁹ Note that this is an *ex-post* investigation process. An alternative decision process involving *ex ante* intervention by the Competition Authority is a *prior clearance* process whereby firms contemplating taking an action (e.g. to merge) have to get prior approval before proceeding. We leave the investigation of this set-up to future work.

¹⁰ 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.

$\bar{h} = \gamma h_H + (1 - \gamma) h_B$. We will say that the action is *presumptively legal* if $\bar{h} < 0$ and *presumptively illegal* if $\bar{h} > 0$.

In principle the distribution of private benefits could be different in each of the two environments. However here we impose the **symmetry assumption** that the two distributions are identical¹¹. So we suppose that the private benefit has a positive continuous probability density $f(b) > 0$ on $[0, \infty)$, with cumulative distribution function $F(b)$, $0 \leq F(b) \leq 1$; $F'(b) = f(b) > 0$.

We assume that a fraction π , $0 < \pi < 1$ of firms who have taken the action come to the attention of the CA, and that these represent a random sub-sample of the population of firms taking the action¹². We refer to π as the *coverage rate*.

We assume that if all actions are allowed – that is the CA uses a *Per Se Legal* decision procedure – then no actions are investigated. Under a *Per Se Illegal* procedure decisions are made solely on the basis of the nature of the action, so once it has been verified that the firm has taken the action, the action will be banned and this will be the end of the investigation process. For simplicity we assume that the process of verification is costless, but recognise that it might still take time, so under a *Per Se Illegal* process firms taking the action will get a fraction ϕ^{PSI} , $0 \leq \phi^{PSI} \leq 1$ of their private benefit before the action is terminated, while society gets the corresponding fraction of the harm/benefit.

If the CA operates a *Discriminating* decision rule then it will try to form a view about the potential pro- or anti-competitive effects of any action it investigates before deciding whether or not to disallow it. That is, it will try to determine from which environment the action has come. The CA does not know this, so it uses whatever information and data it can gather, and applies to this a variety of tests and analytical techniques as a result of which it puts the action in one of just two categories:

¹¹ In the absence of compelling evidence to the contrary this assumption may be thought to be quite reasonable.

¹² There are a number of ways in which this can happen. There could be third-party reports. In this case the assumption that they are a random subset could reflect the fact that third parties are not very skilled at judging social harm but base their decision to report the action on the harm done to their own interests. If the CA selects cases then the assumption that they are a random sub-sample reflects the assumption that their risk-based selection rules are extremely poor. The case where they have good risk-based selection rules is essentially an example of a two-stage rule – for a preliminary analysis of this see below.

- (i) on balance likely to be pro-competitive (potentially benign);
- (ii) on balance likely to be anti-competitive (potentially harmful).

We assume that under a Discriminating Rule it allows all actions in the first category and disallows all actions in the second.

Of course the data, tests and analysis available to the authority will typically be imperfect and lead it to classifying some genuinely harmful actions as pro-competitive and some genuinely benign actions as anti-competitive. So we suppose that there is a probability p_{BB} , $0 < p_{BB} \leq 1$ that if an action is Benign it is identified as being (potentially) benign, and a probability p_{HH} , $0 < p_{HH} \leq 1$ that an action that is truly Harmful is classified as (potentially) harmful. In what follows the quality of the information/analysis available to the CA is characterised by the two parameters (p_{BB}, p_{HH}) . We will sometimes refer to (p_{BB}, p_{HH}) as the CA's model.

If $p_{BB} + p_{HH} = 1$ then the probability of pro/anti-competitive classification is exactly the same whether an action comes from a Harmful or Benign environment and so the CA's information/analysis has no discriminatory power. If $p_{BB} = 1$; $p_{HH} = 1$ 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 $p_{BB} + p_{HH} > 1$, but $p_{BB} < 1$, $p_{HH} < 1$ then firms from the Benign environment are more likely to have their actions classified as pro-competitive than are firms from the Harmful environment, while firms from the Harmful environment are more likely to have their actions classified as anti-competitive than are firms from the Benign environment, so the information/analysis available to the CA has genuine discriminatory power.

As noted in the literature, there is not a single discriminating rule, something that we capture in this framework by thinking of the CA as having a continuum of models available to it. We suppose that at any given time the quality of available data and of Economic/Legal knowledge that can be implemented by way of effective tests is such that there is a maximum quality model: $(\bar{p}_{BB}, \bar{p}_{HH})$ available to the authority where

$(0,0) \ll (\bar{p}_{BB}, \bar{p}_{HH}) \leq (1,1)$; $\bar{p}_{BB} + \bar{p}_{HH} > 1$. We will call this Discriminating Rule that uses this maximum quality model “**Rule of Reason**”¹³.

Now as also emphasized in the literature¹⁴ there are costs involved in collecting and analysing the information needed to form the judgments necessary to implement a *Discriminating Rule*. These costs would not need to be incurred under a *Per Se Rule*. It follows that before deciding to use a *Discriminating Rule* in preference to a *Per Se Rule*, it is important to ensure that whatever advantages it has in other respects are sufficient to outweigh these additional costs. However since this point is well understood and we have nothing new to add, in what follows we will simply ignore these costs.

Further, as noted by Ehrlich and Posner (1974), the choice between decision rules “affects the speed, and hence indirectly the costs and benefits, of legal dispute resolution...”¹⁵. To capture this idea we assume that if the authority disallows the action under a *Discriminating (D-) Rule* procedure then the firm gets only a fraction ϕ^D , $0 < \phi^D \leq 1$ of the private benefit b – and society gets the corresponding fraction of the harm/benefit. Since a Discriminating Rule requires both verification plus analysis while a Per Se Illegal procedure requires only verification, it follows that a Discriminating Rule has a longer *litigation cycle* and so $\phi^D > \phi^{PSI}$.

If an action is investigated and disallowed, then there are two possible consequences for the firm. It may have to pay a fine/penalty $f \geq 0$ and it may have to reverse the action which could cause the firm to incur significant costs which we denote by $c \geq 0$. We assume that $f + c > 0$.

Firms’ Decisions

In deciding whether or not to take an action, firms anticipate the possibility that they might be investigated and that, if investigated, the action may be disallowed,

¹³ We adopt this terminology for simplicity and appreciate that it is not very accurate. Rule of Reason is associated with an approach that proposes the use of what in this paper we term discriminating rules in competition policy exactly as the (European) “economics- or effects-based” approach, but differs from the latter in that it does not recognize that there is a “best” model at any given time for investigating specific actions associated with a specific business practice. Rather, it proposes that a potentially different model is used in each case examined by the authority. We interpret the views expressed by Vickers (2005, 2007a) as ones that favor the European approach to adopting discriminating rules (also for reasons related to Legal Uncertainty).

¹⁴ For example, Christiansen et.al. (2006) p. 223/224, 231

¹⁵ Page 265-6.

possibly after a delay, and, if disallowed they face the sanction $(f + c)$. We assume that firms know:

- the environment $e = H, B$ from which they come¹⁶;
- what type of decision rule the CA employs;
- if the CA uses a Discriminating Rule, the quality of the model (p_{BB}, p_{HH}) ;
- the coverage rate π ;
- the delay factors (ϕ^D, ϕ^{PSI}) ;
- the sanctions (f, c) .

Generically, we can think of any decision rule/procedure being characterised by the four parameters $r = (\rho, \delta_H, \delta_B, \phi)$ where:

- ρ , $0 \leq \rho \leq 1$ is the risk of being investigated;
- δ_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;
- ϕ is the delay in reaching a decision.

Definition 1: A *Per Se Legal* rule is characterised by $r = (0, 0, 0, 0)$; a *Per Se Illegal* rule by $r = (\pi, 1, 1, \phi^{PSI})$; and any *Discriminating Rule* by $r = (\pi, p_{HH}, 1 - p_{BB}, \phi^D)$.

Given that the fraction of firms from environment e who will be deterred under a generic rule is $F_e = F(\underline{b}_e)$, where \underline{b}_e is defined by $[1 - (\rho \cdot \delta_e)]b + (\rho \cdot \delta_e) \cdot [(\phi b) - (f + c)] = 0$, it is easily established that, in an obvious notation¹⁷:

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

Costs of Decision Errors

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 Acquittals, CFA). The CDE under *Per Se* and under a D-rule will be respectively:

$$CDE^{PSL} = \gamma \mathcal{h}_H = CFA^{PSL} \quad (1)^{18}$$

¹⁶ Katsoulacos and Ulph (2007) provide an analysis where this assumption does not hold.

¹⁷ See Katsoulacos and Ulph (2008).

$$CDE^{PSI} = (1 - \gamma)(-h_B) = CFC^{PSI} \quad (2)^{19}$$

and

$$CDE^D = \gamma h_H (1 - p_{HH}) + (1 - \gamma)(-h_B)(1 - p_{BB}) = CFA^D + CFC^D \quad (3)$$

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

$$q_H \equiv \frac{p_{HH}}{1 - p_{BB}} > \frac{(1 - \gamma) \cdot (-h_B)}{\gamma h_H} = s_L > 1 \quad (4)$$

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

and $q_H = \frac{p_{HH}}{1 - p_{BB}} > 1$ 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 D-rule will be *effective* i.e. it will reduce CDE relative to *Per Se Illegality* iff:

$$q_B \equiv \frac{p_{BB}}{1 - p_{HH}} > \frac{\gamma \cdot h_H}{(1 - \gamma) \cdot (-h_B)} = s_I > 1 \quad (5)$$

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

illegality and $q_B = \frac{p_{BB}}{1 - p_{HH}} > 1$ 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 be benign when it is so compared to how often it declares an action to be benign when it isn't²⁰.

¹⁸ 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.

¹⁹ 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.

²⁰ 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.

3. The impact of judicial reviews

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_{BB}, p_{HH}) ; $p_{BB} + p_{HH} > 1$. 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 case²¹. 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 $(\tilde{p}_{BB}, \tilde{p}_{HH})$ where:

$$1 - \tilde{p}_{BB} = (1 - p_{BB})^2; \quad \tilde{p}_{HH} = (p_{HH})^2.$$

We will 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

$$CDE_a^D = \gamma h_H (1 - p_{HH}^2) + (1 - \gamma)(-h_B)(1 - p_{BB})^2 = CFA_a^D + CFC_a^D \quad (8)$$

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

²¹ This is the assumption that is made also by Ahlborn, Evans & Padilla (AEP, 2008),

(ii) Reduces the costs of Type I errors (false convictions)²².

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

Proposition 1

The appeals process

- (a) does not affect the CDE of *Per Se* rules²³, while
- (b) it affects the CDE of discriminating rules as follows:

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

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

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

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

From (9) and (10) we see that there is in general no guarantee that with an appeals process the CDE of discriminating rules will be reduced²⁴. This implies, given also part (a) of the Proposition, that there is in general no guarantee that an appeals process will make D-rules more attractive relative to *Per Se* rules.

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

$$\frac{p_{HH} \cdot (1 - p_{HH})}{(1 - p_{BB}) \cdot p_{BB}} = \frac{q_H}{q_B}$$

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 >1 while for presumptively illegal action this is < 1 . So essentially our conditions (9), (10) can be expressed as:

²² See also AEP (2008).

²³ *Per Se* Legality or *Per Se* Illegality.

²⁴ Contrary to the claim in AEP (2008)

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

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 $p_{HH} > p_{BB}$) then an appeals process will reduce the costs of decision errors of a D-rule.

Proof: This is true given that if $p_{HH} > p_{BB}$ the Left Hand Side of (9) is less than unity.

This suggests that, if $p_{HH} > p_{BB}$ 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 condition²⁵ 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 D-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 D-rule for a presumptively illegal practice.

²⁵ 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.

(c) The appeals process is more likely to reduce the CDE of a D-rule for presumptively legal than for presumptively illegal practices. To see this note that from Corollary 1, if $p_{HH} > p_{BB}$, 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 $p_{HH} < p_{BB}$ 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 ϕ_a , $\phi < \phi_a \leq 1$, where ϕ 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 ϕ is $\phi f + c$ where c is now the cost of reversing the action plus any fixed penalty that the firm has to pay and f is the component of the penalty that depends on the length of time the action is in place²⁶.

If there is no appeal process and ρ , $0 < \rho < 1$ is the probability of a firm being investigated and δ , $0 < \delta < 1$ is the probability of having its action disallowed, then as

²⁶ 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.

noted in the previous section, if there is no appeal the expected profits of a firm if it takes the action will be:

$$(1 - \rho\delta)b + (\rho\delta)[\phi b - (\phi f + c)]$$

and so a firm will take the action iff:

$$b \geq \underline{b}^0 = \frac{(\rho\delta)(\phi f + c)}{1 - (\rho\delta)(1 - \phi)} > 0$$

Of course the value of δ depends on the type of the firm and since $\delta_H = p_{HH} > \delta_B = (1 - p_{BB})$, \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 $[\phi b - (\phi f + c)]$. If the firm appeals then it will incur cost m and with probability δ its action will be disallowed by the court generating net income $\phi_a b - (\phi_a f + c)$. 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:

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

That is, iff:

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

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 – i.e. if $\delta\phi_a \leq \phi$ because then appealing means that there is a probability of not having to incur the cost of undoing

the action and this is always worth doing. 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 – i.e. $\delta\phi_a > \phi$.

Note that since $\delta_H = p_{HH} > \delta_B = (1 - p_{BB})$ 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 disallowed²⁷.

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 δ^2 and so

²⁷ This follows from expression for \underline{b}^0 which is increasing in δ .

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 $\underline{b}^1, \underline{b}_a \leq \underline{b}^1 < \underline{b}^0$ 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. For a presumptively legal practice, if they are lower 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 they are higher 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 D-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 D-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 scrutiny²⁸. As noted by AEP (2008) 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 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

²⁸ For a brief discussion see AEP (2008), p. 28.

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 team²⁹. Also assume that for the final decision unanimity is required. If there are $N \geq 2$ review panels then effectively the decision rule becomes $(\tilde{p}_{BB}, \tilde{p}_{HH})$ where:

$$1 - \tilde{p}_{BB} = (1 - p_{BB})^N; \tilde{p}_{HH} = (p_{HH})^N$$

In the EU Commission context $N = 3$, 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:

$$CDE_r^D = \gamma h_H (1 - p_{HH}^N) + (1 - \gamma)(-h_B)(1 - p_{BB})^N = CFA_r^D + CFC_r^D$$

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 (p_{BB}, p_{HH}) ; $p_{BB} + p_{HH} > 1$. 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 $(\tilde{p}_{BB}, \tilde{p}_{HH})$ where:

$$1 - \tilde{p}_{BB} = (1 - p_{BB})^3 + 3(1 - p_{BB})^2 p_{BB}; \tilde{p}_{HH} = (p_{HH})^3 + 3p_{HH}^2(1 - p_{HH})$$

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.

²⁹ As in AEP (2008), see p. 29.

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 is³⁰:

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

where $\phi_r, \phi < \phi_r \leq \phi_a \leq 1$ is the delay in reaching 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 to worsen welfare if it 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:

$$\tilde{p}_{HH} = (p_{HH})^3 + 3p_{HH}^2(1-p_{HH}) > p_{HH}$$

and this will hold if p_{HH} is $0.5 < p_{HH} < 1$. 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 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.

³⁰ 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.

- (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. Optimal Decisional Structures of Competition Authorities: Multi-stage vs. Single-stage rules

a. Introduction

We turn now to the issue of the optimal decisional structure within a Competition Authority. Specifically, in contrast to the type of procedures we have considered in the previous section in which authorities are assumed to use single-stage decision rules, a alternative decisional procedure often proposed is a multi-stage or, at its simplest, *two-tier* one³¹. To define the latter let us assume that the CA can in principle use two discriminating rules:

- Rule 1 is based on considering a small number of criteria;
- Rule 2 uses the same criteria as Rule 1 and adds some more.

Also assume that Rule 2 is better than Rule 1 in that, if operated in isolation:

$$P_{BB}^2 > P_{BB}^1; \quad P_{HH}^2 > P_{HH}^1$$

³¹ An alternative terminology sometimes used, instead of multi-stage rules, is “structured rule of reason”, though this is strictly speaking associated with our Variant 1 below (see, for example, AEP, p.15-17).

Instead of using (the better one of these two rules, i.e) Rule 2, an alternative is to use a two-tier rule defined by the procedure of using Rule 1 as a screen and then, conditional on the signal produced, either deciding (to allow or disallow) or else going on and applying other criteria (of Rule 2). There are two variants of this multi-stage or screening rule:

V1 : Use model 1; if test suggests B (that action is Benign) then allow, but if test suggests H (that action is Harmful) then run Rule 2;

V2 : Use model 1; if test suggests H then disallow, but if test suggests B then run Rule 2.

So under variant V1 of the multi-stage rule effectively the decision rule becomes $(\tilde{p}_{BB}, \tilde{p}_{HH})$ where:

$$\tilde{p}_{BB} = p_{BB}^1 + (1 - p_{BB}^1) \cdot p_{BB|H}^2 > p_{BB}^1$$

$p_{BB|H}^2$ being the probability that a benign action will come up with a B signal at the end of the full model 2 test given that it showed H on completion of the initial set of criteria (of model 1). If the case was passed to a different part of the CA which conducted their own investigation – and so possibly coming to a different decision on the evidence from the first set of criteria then $p_{BB|H}^2 = p_{BB}^2$. This implies:

$$\tilde{p}_{BB} = p_{BB}^2 + p_{BB}^1 \cdot (1 - p_{BB}^2) > p_{BB}^2$$

Also:

$$\tilde{p}_{HH} = p_{HH}^1 \cdot p_{HH|H}^2 < p_{HH}^1$$

where $p_{HH|H}^2$ is the probability that a harmful action will come up with a H signal at the end of the full model 2 test given that it showed H on completion of the initial set of criteria. Once again if the case was passed to a different part of the CA which conducted their own investigation – and so possibly coming to a different decision on the evidence from the first set of criteria then $p_{HH|H}^2 = p_{HH}^2$. This implies:

$$\tilde{p}_{HH} = p_{HH}^1 \cdot p_{HH}^2 < p_{HH}^1$$

Thus we have:

Lemma 3

With variant V1 of the multi-stage rule, the probability of correctly identifying benign actions increases (so Type I errors – false convictions - decrease) while the probability of correctly identifying harmful actions decreases (so Type II errors – false acquittals - increase).

By analogy, under variant V2 of the multi-stage rule effectively the decision rule becomes $(\tilde{p}_{BB}, \tilde{p}_{HH})$ where:

$$\tilde{p}_{BB} = p_{BB}^1 \cdot p_{BB/B}^2 = p_{BB}^1 \cdot p_{BB}^2 < p_{BB}^1, p_{BB}^2$$

$$\tilde{p}_{HH} = p_{HH}^1 + (1 - p_{HH}^1) \cdot p_{HH/B}^2 > p_{HH}^1$$

or

$$\tilde{p}_{HH} = p_{HH}^2 + (1 - p_{HH}^2) \cdot p_{HH}^1 > p_{HH}^2$$

Thus we have:

Lemma 4

With variant V2 of the multi-stage rule, the probability of correctly identifying benign actions decreases, so Type I errors increase, while the probability of correctly identifying harmful actions increases, so Type II errors decrease.

The last two Lemmas immediately lead to:

Proposition 4

The optimal type of screening rule in terms of decision errors depends on the type of errors that the CA is minimizing: in order to minimize Type I errors a CA should use variant V1 of the screening rule. In order to minimize Type II errors a CA should use variant V2 of the screening rule.

b. Comparison of the CDEs of two-tier and single stage rules

The CDE of the screening (two-tier) rule s, s = V1, V2 are:

$$CDE^s = \gamma h_H (1 - \tilde{p}_{HH}^s) + (1 - \gamma)(-h_B)(1 - \tilde{p}_{BB}^s) = CFA^s + CFC^s$$

Under variant V1 of the screening rule:

$$\tilde{p}_{BB}^{V1} = p_{BB}^2 + p_{BB}^1 \cdot (1 - p_{BB}^2)$$

$$\tilde{p}_{HH}^{V1} = p_{HH}^1 \cdot p_{HH}^2$$

While under variant V2:

$$\tilde{p}_{BB}^{V2} = p_{BB}^1 \cdot p_{BB}^2$$

$$\tilde{p}_{HH}^{V2} = p_{HH}^2 + p_{HH}^1 (1 - p_{HH}^2)$$

Thus comparing the CDE of variant V1 with the CDE of Rule 2 we get that:

$$CDE^{V1} < CDE^{D2} \Leftrightarrow \frac{p_{HH}^2 \cdot (1 - p_{HH}^1)}{(1 - p_{BB}^2) \cdot p_{BB}^1} < \frac{(1 - \gamma) \cdot (-h_B)}{\gamma h_H} = s_L > 1$$

With variant V2:

$$CDE^{V2} < CDE^{D2} \Leftrightarrow \frac{p_{BB}^2 \cdot (1 - p_{BB}^1)}{(1 - p_{HH}^2) \cdot p_{HH}^1} < \frac{\gamma h_H}{(1 - \gamma) \cdot (-h_B)} = s_I > 1$$

These lead to:

Proposition 5

- (i) For as long as Rule 1 has some discriminatory power ($p_{HH}^1 + p_{BB}^1 > 1$), a sufficient condition for the screening rule to reduce CDE is that Rule 2 is ineffectively discriminating. From the last two conditions, this implies that screening rule V1 could well be superior to a *Per Se Legality* rule and screening rule V2 could well be superior to a *Per Se Illegality* rule in decision error terms even though Rule 2 is not.
- (ii) If Rule 2 can effectively discriminate it will only be optimal in decision error terms to use a screening rule if Rule 1 is of high discriminating quality i.e it is not sufficient that for Rule 1, $p_{HH}^1 + p_{BB}^1 > 1$.

c. Effects on Deterrence

Let us consider first the length of time to run the two-tier rule. If a different part of the authority runs the cases from scratch then the total length of time to run the two-tier rule of variant V1 would be either time it takes to conduct the first test if signal is B or time it takes to run the first test **plus** time it takes to run the second test if signal is H. If the authority just continues to second part of test having run the first test then the total

length of time to run the two-tier rule would be either time it takes to conduct first test if signal is B **or** time it takes to run second test if signal is H.

By analogy if a different part of the authority runs cases from scratch the total length of time to run the two-tier rule of variant V2 would be either time it takes to conduct first test if signal is H or time it takes to run first test **plus** time it takes to run second test if signal is B. If the authority just continues to second part of test having run the first test then the total length of time to run the two-tier rule would be either time it takes to conduct first test if signal is H **or** time it takes to run second test if signal is B.

In short, if $\tilde{\phi}$ is the total length of time it takes to run the two-tier rule then:

$$\phi^1, \phi^2 \leq \tilde{\phi} \leq \phi^1 + \phi^2$$

where ϕ^1, ϕ^2 indicate, respectively, the length of time it takes to run Rule 1 and Rule 2.

Effect of two-tier rule on \underline{b}

As seen above, with variant V1 of the screening rule the probability of been disallowed is reduced and this together with the fact that the screening rule could delay further decisions reduces \underline{b} . Thus, with variant V1 there is a smaller deterrence effect which tends to improve welfare for a presumptively legal practice and tends to worsen welfare for a presumptively illegal practice.

With variant V2 of the screening rule the probability of been disallowed is increased and this tends to increase \underline{b} , though the fact that the screening rule could delay further decisions reduces \underline{b} . If there is no substantial additional delay (as when ...) then variant V2 will generate a larger deterrence effect which tends to improve welfare for a presumptively illegal practice and tends to worsen welfare for a presumptively legal practice.

In summary, we have:

Proposition 6

The alternative variants of screening rules will affect deterrence effects relative to a single-stage D-rule as follows: variant V1 will unequivocally reduce deterrence and thus will tend to improve welfare for a presumptively legal practice and it will tend to worsen welfare for a presumptively illegal practice; variant V2 will increase deterrence if

the delaying effect of the screening rule is not too large and thus will tend to improve welfare for a presumptively illegal practice and it will tend to worsen welfare for a presumptively legal practice.

Corollary 5 (of Propositions 4 and 6)

When the presumption of legality is strong a variant V1 of the screening rule maximises the likelihood that welfare is improved relative to *Per Se Legality*. To see this note that if the presumption of legality is strong only very low Type I error D-rules will be effective. From Propositions 4 and 6, the CA by using a variant V1 screening rule it minimizes Type I errors **and** the (negative) deterrence effect of the D-rule.

6. Conclusions

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