

Modelling Legal Uncertainty

by

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1. Introduction

One of the most important issues when considering what type of enforcement procedure to use in situations in which regulatory intervention in markets is deemed necessary is that of Legal Uncertainty. Certain enforcement or decision procedures are thought of as being, *ceteris paribus*, superior because their cost in terms of the legal uncertainty generated when these procedures are adopted is relatively low. This issue is important for a broad range of regulatory interventions³ which are induced by the following set of circumstances: (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/regulator *cannot observe the precise circumstances* under which any given action is taken.

While the issue of legal uncertainty is widely discussed and considered of fundamental importance among those involved in the design and implementation of public policy and among legal experts and economists, the concept has never up to now been formalised and the “costs of legal uncertainty” has never been analysed using formal microeconomic theory. The present paper attempts to do exactly that.

The context of discussions on legal uncertainty usually involves comparisons of *effects-based* (or what alternatively can be termed discriminating) and *Per Se* decision rules or enforcement procedures⁴. Under *Per Se* procedures firms’ perception as to whether any

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³ These include interventions associated with the application of Competition Policy, Sectoral Regulation, Environmental Policy, Tax Compliance mechanisms etc.

⁴ Under a *Per Se* procedure a RA 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 RA 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.

given conduct is allowed or disallowed is certain⁵. Under effects-based or discriminating procedures this is no longer the case. Below we show that the latter gives rise to Legal Uncertainty in two senses.

- (i) First, even assuming that firms know whether their conduct is harmful or benign and the model/analysis that the Regulatory Authority (RA) will employ to assess their conduct, because of the inherent inability to avoid decision errors firms will no longer be able to say with certainty whether their conduct will be allowed or disallowed. Type I decision errors imply that some benign conduct will be disallowed. Type II decision errors imply that some harmful conduct will be allowed.
- (ii) Second, when RAs adopt extreme forms of effects-based or discriminating procedures associated with the discretionary application of different models on a case-by-case basis (we will use the term *Rule-of-Reason* to describe these cases), then it is likely that firms will not be able to infer exactly how the RA will assess their conduct – firms will then only be able to deduce from the RAs enforcement record the average likelihood of having their actions disallowed.

The importance of legal uncertainty in this second sense becomes apparent once we recognise that regulatory interventions must be judged taking into account not only the performance of alternative procedures in terms of decision errors but also of their (indirect) implications on the wider population of firms who, anticipating what type of procedure will be used to handle their conducts have to decide whether or not to pursue them given also that disallowing a conduct implies that the firm might be required to reverse it and / or face a penalty. These, *deterrence effects* of enforcement procedures have been recognised as equally or even more important than the effects associated with decision errors.

The welfare cost of legal uncertainty that can be produced by an *effects-based* approach in the second sense above, can be measured by the difference in welfare when: a) firms are deterred “correctly”; i.e. through correctly anticipating how the authority will assess their own conduct (as is the case under *Per Se* or under less extreme forms of an *effects-based* procedure), and b) when firms are deterred on the basis of their knowledge about what, on average, the authority has done in the past when investigating similar

⁵ Of course, if the conduct is presumptively (or *prima facie*) illegal, firms face *procedural uncertainty* about whether or not their conduct will be investigated.

practices (because the firms cannot correctly anticipate exactly how their conduct will be assessed by the CA).⁶ We refer to the first case as “marginal” and to the second case as “average” deterrence.⁷

Under average deterrence the fraction of firms deterred will be the same, irrespective of the type of their conduct (harmful or benign). A firm whose conduct is benign will perceive that its conduct will be disallowed with higher probability than with marginal deterrence. A firm whose conduct is harmful will perceive that its conduct will be disallowed with lower probability than with marginal deterrence. As a result, welfare under average deterrence will be lower than welfare under marginal deterrence.

To formalize the notion of legal uncertainty and its welfare implications we will use the model developed by Katsoulacos and Ulph (K&U, 2008a, b). They propose a *very general* welfare-based framework for determining the conditions under which, for *any* type of potentially anti-competitive business practice, an *effects-based* approach is superior to *Per Se* procedures. However K&U (2008a, b) do not examine the issue of legal uncertainty.

2. The Model⁸

There is a population of firms, whose size is normalised to 1. Firms’ conducts or actions 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 conduct / 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 conduct, whenever it is identified, if its average harm is positive. This is an example of a *Per Se* rule⁹. Alternatively, an “authority” that is set up to identify / verify whether an action has occurred is given the additional 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

⁶ Vickers (2007) also distinguishes between “discretionary decision making” by a CA “based on whatever is thought to be desirable in economic terms case by case” and the effects-based approach proposed recently in EU. The latter need not necessarily produce legal uncertainty in the second sense above, as when the CA uses clearly specified models and criteria that allow firms to anticipate correctly how their conduct will be assessed—in the sense of correctly anticipating when the conduct will be allowed or disallowed depending on whether it is harmful or benign.

⁷ See Katsoulacos and Ulph (2008a, b); also G. IMMORDINO AND M. POLO, JUDICIAL ERRORS AND INNOVATIVE ACTIVITY, mimeo (2008).

⁸ For full details see Katsoulacos and Ulph (2008a,c).

⁹ Of course, conduct must be defined sufficiently narrowly so as to make sense to think of authorities’ potentially operating *Per Se* Rules.

Discriminating Rule in order to decide when an action should be disallowed. Anticipating what type of decision rule will be used to handle actions firms have to decide whether or not to take them¹⁰ 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” lifetime¹¹ 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 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 $\bar{h} = \gamma h_H + (1 - \gamma) h_B$. 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 identical¹². 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 literature¹³ 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

¹⁰ 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.

¹¹ 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.

¹² In the absence of compelling evidence to the contrary this assumption may be thought to be quite reasonable.

¹³ 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...”¹⁴. *Discriminating Rules* cause additional delays or have a longer *litigation cycle* than *Per Se* rules since they require both verification plus investigation/analysis. However below we also abstract for simplicity from these differences¹⁵. 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 authority 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 authority 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 authority’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 as harmful than are firms from the Benign environment, so the information/analysis available to the authority has genuine discriminatory power.

¹⁴ Page 265-6.

¹⁵ See K&U (2008a, b) 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.

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 $f > 0$.

Costs of Decision Errors and Effectively Discriminating Rules

The Costs of Decision Errors (CDE) from using any given decision rule 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 *Discriminating Rule* will be respectively:

$$CDE^{PSL} = \gamma h_H = CFA^{PSL} \quad (1)^{16}$$

$$CDE^{PSI} = (1 - \gamma)(-h_B) = CFC^{PSI} \quad (2)^{17}$$

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:

$$q_H \equiv \frac{p_H}{1 - p_B} > \frac{(1 - \gamma)(-h_B)}{\gamma h_H} = s_L > 1 \quad (4)$$

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:

$$q_B \equiv \frac{p_B}{1 - p_H} > \frac{\gamma h_H}{(1 - \gamma)(-h_B)} = s_I > 1 \quad (5)$$

¹⁶ 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.

¹⁷ 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.

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 $q_B \equiv \frac{p_B}{1-p_H} > 1$ 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 be benign when it is so compared to how often it declares an action to be benign when it isn't¹⁸.

3. Legal Uncertainty

3.1 Firms' Decisions – Marginal Deterrence Effects

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.

Assume first that firms know:

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

Under these assumptions the parameters $\delta_e, e = H, B$ can be defined for the various decision rules as follows:

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

$$(1 - \delta_e)b - \delta_e f = 0 \quad (6)$$

it is easily established that, in an obvious notation, the fraction of firms deterred under any given rule and environment will be¹⁹:

¹⁸ 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.

¹⁹ See for details Katsoulacos and Ulph (2008a, b).

$$0 = F_B^{PSL} = F_H^{PSL} < F_B^D < F_H^D < F_B^{PSI} = F_H^{PSI} < 1 \quad (7)$$

The fractions of firms deterred as shown in (6) define the *marginal deterrence effects* of each of the various types of decision rule.

Welfare comparisons under marginal deterrence

Social welfare under any generic rule is:

$$W = (1 - \gamma)(-h_B)(1 - F_B)(1 - \delta_B) + \gamma(-h_H)(1 - F_H)(1 - \delta_H) \quad (8)$$

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:

$$\hat{W} = (1 - \gamma)(-h_B) > 0 \quad (9)$$

while welfare under *Per Se* rules is:

$$W^{PSL} = (1 - \gamma)(-h_B) + \gamma(-h_H) = -\bar{h} \quad (\bar{h} < 0) \quad (10)$$

and

$$W^{PSI} = 0 \quad (\bar{h} > 0) \quad (11)$$

Thus:

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

$$\begin{aligned} W^D - W^{PSL} = & \\ & [\mathcal{H}_H p_H - (1 - \gamma)(-h_B)(1 - p_B)].(1 - F_B^D) \\ & + F_B^D \bar{h} \\ & + (F_H^D - F_B^D).\mathcal{H}_H.(1 - p_H) \end{aligned} \quad (12)$$

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

$$\begin{aligned} W^D - W^{PSI} = & \\ & [(1 - \gamma)(-h_B)p_B - \mathcal{H}_H(1 - p_H)].(1 - F_B^D) \\ & + (F_H^D - F_B^D).\mathcal{H}_H.(1 - p_H) \end{aligned} \quad (13)$$

Therefore we have the following for the case in which Discriminating rules generate marginal deterrence:

Proposition 1

(i) Even though Discriminating rules introduce Legal Uncertainty (LU) *in the sense of firms been unable to predict with certainty whether their actions will be allowed or disallowed*, nevertheless *effectively* Discriminating rules may well be welfare

improving relative to *Per Se*, so there is no great virtue in reducing legal uncertainty in this sense: been certainly wrong (in a number of cases) may be welfare inferior to been uncertainly right.

- (ii) Effectively Discriminating rules always welfare dominate *Per Se* rules for presumptively illegal practices²⁰.

Proof: See Appendix.

A useful benchmark for measuring the cost of LU of this type is welfare under a Perfect Discriminating (PD) rule, i.e one for which $p_B = p_H = 1$. Thus the Cost of Legal Uncertainty under marginal deterrence (call it *CLU1*) can be thought of as the reduction in welfare from adopting a Discriminating rule relative to a Perfect Discriminating rule:

$$CLU1 = W^{PD} - W^D \quad (14)$$

where under a Perfect Discriminating rule:

$$p_B = p_H = 1, F_B^D = 0, F_H^D = 1$$

and, for a presumptively legal practice:

$$W^{PD} - W^{PerSe} = \gamma h_H > 0$$

3.2 Average Deterrence

In the analysis above we assumed that firms know their type and the Discriminating rules used by the authority so they are able to correctly anticipate exactly how the authority will assess their conduct. Assume now that the RA adopts forms of *effects-based* or discriminating procedures associated with the discretionary application of different models on a case-by-case basis. We use the term *Rule-of-Reason* to describe these procedures. It is then likely that firms will not be able to infer exactly how the RA will assess their conduct – firms will only be able to deduce from the RAs enforcement record the average likelihood of having their actions disallowed. It will be on the basis of this average likelihood that their action will be disallowed that firms will have to decide whether or not to undertake the action. The deterrence that is thus generated, under *Rule of Reason* procedures, we will term *average deterrence*²¹.

²⁰ This need not however hold in a more general model – see K&U (2008a, b).

²¹ See also K&U (2008a, b) and Immordino & Polo (2008).

To distinguish this case from the case of marginal deterrence examined above let us now indicate the probability with which firms will anticipate that their action will be disallowed under marginal deterrence when a Discriminating rule is adopted as $\delta_B^{D,m} = 1 - p_B$ if their conduct is benign and as $\delta_H^{D,m} = p_H$ if their conduct is harmful (where superscript “m” stands for marginal deterrence). In this case the fraction of firms deterred is $F_e^{D,m} = F(\underline{b}_e^{D,m})$ where $e = B, H$, with the values of F under various procedures been given by (7) and with $\underline{b}_e^{D,m}$ been given by equation (6) in the previous section.

Now, on average, the authority adopting a *Rule of Reason* type of **D**iscriminating procedure will disallow with probability

$$\delta^{D,a} = (1 - \gamma)(1 - p_B) + \gamma p_H \quad (15)$$

so in the case of *Rule of Reason* generating average deterrence, $\delta^{D,a}$ will be the probability that firms conceive that their action will be disallowed. In this case the fraction of firms deterred will be $F^{D,a} = F(\underline{b}^{D,a})$ where $\underline{b}^{D,a}$ is given by (6) in the previous section when δ_e is substituted by $\delta^{D,a}$.

Note that since

$$\delta_B^{D,m} < \delta^{D,a} < \delta_H^{D,m} \quad (16)$$

for as long as $p_B + p_H > 1$,

it follows that

$$F_B^{D,m} < F^{D,a} < F_H^{D,m} \quad (17)$$

Consider a presumptively legal action.

The difference between welfare under a discriminating rule producing average deterrence and welfare under PSL is given by:

$$W^{D,a} - W^{PSL} = [\mathcal{H}_H p_H - (1 - \gamma)(1 - p_B)(-h_B)](1 - F^a) + F^a \bar{h} \quad (18)$$

The difference between welfare under a discriminating rule producing marginal deterrence and welfare under PSL is given by:

$$\begin{aligned}
W^{D,m} - W^{PSL} = & \\
& [\mathcal{H}_H p_H - (1-\gamma)(-h_B)(1-p_B)].(1 - F_B^{D,m}). \\
& + F_B^{D,m} \bar{h} \\
& + (F_H^{D,m} - F_B^{D,m}).\mathcal{H}_H.(1-p_H)
\end{aligned} \tag{19}$$

The Cost of Legal Uncertainty due to average deterrence (call it CLU2) for presumptively legal practices ($\bar{h} < 0$) can be expressed as:

$$\begin{aligned}
CLU2 = W^{D,m} - W^{D,a} = & [\mathcal{H}_H p_H - (1-\gamma)(-h_B)(1-p_B)].(F^a - F_B^{D,m}) \\
& - (F^a - F_B^{D,m})\bar{h} \\
& + (F_H^{D,m} - F_B^{D,m}).\mathcal{H}_H.(1-p_H) > 0
\end{aligned} \tag{20}$$

So $CLU2 > 0$ and we have:

Proposition 2

A *Rule of Reason* procedure, generating average deterrence, will be welfare superior to *Per Se* when welfare under the Discriminating rule adopted exceeds welfare under *Per Se* by at least CLU2. This suggests that Legal Uncertainty is certainly not enough for choosing *Per Se*. This follows from the fact that

$$W^{D,a} > W^{PerSe} \quad \text{if} \quad W^{D,m} - CLU2 > W^{PerSe} \quad \text{or} \quad W^{D,m} > W^{PerSe} + CLU2$$

Note that CLU2 will be higher:

- (a) the greater the difference between the fraction of firms deterred under average deterrence and the fraction of benign firms that would be deterred under marginal deterrence;
- (b) the greater is on average the gain in welfare from the action;
- (c) the greater the differential deterrence effect – the difference between the fraction of harmful firms and the fraction of benign firms that would be deterred under marginal deterrence (because with average deterrence you deter less harmful actions than you should have done);
- (d) the more accurate the authority's model in identifying benign and harmful conduct i.e. the more effective is the Discriminating rule – this is an interesting result: the intuition is that the greater the effectiveness of the Discriminating rule the greater the loss from the adverse deterrence effect due to legal uncertainty on *prima facie* benign actions that would be investigated.

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