Law Enforcement, Judicial Errors and Private Initiative

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Extended Abstract

In this paper we analyze the optimal design and enforcement of law when the enforcer can make errors, adopting a model of agent’s behaviour that emphasizes the role of private initiative.

Two models of private agent’s behaviour

The traditional model of the Law and Economic literature considers the choice of (illegal) actions that give private benefits and cause social harms. The agent is able to implement any action and decides whether to adopt an illegal practice or not taking into account the expected fines. In this framework, the key point investigated is marginal deterrence, that is the ability of law enforcement to discourage at the margin the most harmful actions (or the most harmful individuals) from committing the crime.

In our model we consider law enforcement in cases where innovation and private initiative play an important role. We distinguish two types of actions: a set of known and lawful actions that the agent can choose, in which the most convenient is $a_0$, and a set of new actions $a \in A$ that the agent learns to implement by investing resources $I$ in research (what we label as "initiative"). Initiative $I$, in turn, increases the probability of learning the new actions. If research is successful, the agent learns how to implement these actions and their private (II) and social (W) effects. While the new actions are always profitable to the agent, they can be (ex-post) welfare enhancing (the good state) or welfare decreasing (the bad state): the bad state occurs with probability $\beta$. The agent therefore has not only to choose an action once the state of nature has realized, as in the traditional model of law enforcement, but he has also to select the research effort $I$ being uncertain on the social consequences of the new actions. While the choice of a specific action $a \in A$ involves the traditional effect of marginal deterrence, the choice of initiative $I$ affects the probability of taking any of the new actions, what we call average deterrence. The enforcement policy works through the enforcement effort $E$, that increases the probability of proving
firms guilty in the bad state, and through the range of fines $f \in [0, F]$ associated to the different actions, what we interpret as norms flexibility.

In Immordino, Pagano and Polo (2006) we have extensively investigated the properties of this model. The main results are: when the ex-ante probability $\beta$ of the bad state is low enough, and the marginal social value of initiative is therefore positive, the optimal policy involves laissez-faire; the norm is instead enforced with positive probability $E$ when the probability of the bad state $\beta$ is larger; initially marginal and average deterrence act in opposite directions while when $\beta$ is large enough, inducing a negative marginal social value of initiative, both marginal and average deterrence call for a higher enforcement effort $E$; finally, when officials are loyal the fines are set using the admitted range (maximum flexibility), while norm’s flexibility is restricted when officials are corrupt. In this paper we apply the model with initiative to the case of judicial errors.

**Judicial errors in the L&E literature**

Errors can be of two types: the enforcer can mistakenly convict an innocent or mistakely acquit a guilty. The first case corresponds to a type I error in statistical inference and it is labelled as a case of over-enforcement or false positive in the L&E jargon, while the second entails a type II error and involves under-enforcement and false negative. The enforcer can commit either type of error over several dimensions of its monitoring, adjudication and investigation activities: it may correctly identify an action but erroneously consider it as unlawful rather than lawful or vice-versa; it may commit an error in identifying the subject of a given error, or the specific action committed, or the consequences of a given action on other parties. All these cases imply different deterrence effects, since the expected fines associated to the actions vary according to the kind of error.

The optimal enforcement of law has been analyzed under several kinds of judicial errors (Shavell (200?), Kaplow and Shavell (1994), (1996), Polinsky and Shavell (1989) among others). These papers adopt the standard model of law enforcement as described above, and analyze the optimal level of accuracy, that is the probability of type I ($\alpha_I$) and type II ($\alpha_{II}$) errors committed. Reducing these probabilities, i.e. improving accuracy, is costly. For instance, if we refer to antitrust cases, we can reduce the probability of type I error by setting more demanding standards of proof in the evaluation of market power. Conversely, we can reduce type II errors by setting stricter standards of proof on efficiency defence arguments. In both cases, more resources are needed to verify the wider set of evidence required. The expected fine when an illegal action is committed is therefore $E(1 - \alpha_{II}) f$, i.e. the fine associated to action $a$ times the probability of being investigated ($E$) and correctly proved guilty ($1 - \alpha_{II}$). Conversely, if the agent takes a legal action it faces an expected fine $E\alpha_{II} f$, given by the probability of investigation times the probability of being mistakenly found guilty times the fine. If $b$ measures the gross increase in utility from committing the crime, the
agent will choose the illegal action if:

\[ b - E(1 - \alpha_{II})f \geq E\alpha_I \]

This condition identifies the marginal type

\[ b^* = (1 - \alpha_I - \alpha_{II})Ef \]

such that all the agents with \( b \leq b^* \) do not commit the act while those with a private benefit larger than \( b^* \) choose the illegal action. This threshold is crucial in determining the overall expected welfare, that can be computed using the distribution \( F(b) \) of the different types. Marginal deterrence (Stigler (1975)) corresponds to the marginal impact of the policy parameters \( (E, f, q_I, q_{II}) \) on the marginal type \( b^* \).

In this setting accuracy - the effort devoted to reducing the errors \( \alpha_I \) and \( \alpha_{II} \) - and enforcement - the effort devoted to increasing the probability \( E \) - are strategic substitutes in (marginal) deterrence: the same marginal type \( b^* \) can be implemented with higher enforcement or accuracy effort, i.e. with a higher \( E \) or a lower \( \alpha_I \) and \( \alpha_{II} \). Moreover, accuracy on type I or type II errors work in the same direction regarding marginal deterrence.

The model

When we consider the effects of judicial errors using the model of law enforcement with private initiative developed in Immordino, Pagano and Polo (2006), we find different and new effects. Since the key novelty of our approach is the average deterrence effect, we focus on a simplified version of the model in which there is a single new action \( a \) that can be undertaken if initiative is successful. Hence, marginal deterrence, i.e. the choice among different actions \( a \in A \) is left aside. We concentrate our attention on the effects of the policy on the level of initiative \( I \), i.e. on average deterrence.

If initiative is successful, the agent chooses the new action \( a \), that is always more profitable than the known action \( a_0 \), i.e. \( \Pi \equiv \Pi(a) > \Pi_0 \equiv \Pi(a_0) \). The welfare associated to the new action \( a \) increases in the good state \( g \), i.e. \( W \equiv W_g(a) > W_0 \equiv W(a_0) \) but falls in the bad state \( b \), i.e. \( \bar{W} \equiv W_b(a) < W_0 \), that occurs with probability \( \beta \). The expected profits from initiative \( I \) are therefore:

\[
E\Pi(I) = \Pi_0 + I \left\{ \beta [\Pi - E(1 - \alpha_{II})f] + (1 - \beta) [\Pi - E\alpha_I f] \right\} - c(I) = \Pi_0 + I \left\{ \Pi - \Pi_0 - Ef [\beta(1 - \alpha_{II}) + (1 - \beta)\alpha_I] \right\} - c(I)
\]

where the last term measures the private costs of initiative..

It is immediately evident that the two types of errors work in opposite directions on the expected fines and on the associated expected profits from initiative. Type I errors \( \alpha_I \) (over-enforcement) increase the expected fines and reduce the incentives to exert initiative while type II errors \( \alpha_{II} \) (under-enforcement) increase the incentives to initiative by reducing the expected fines. Enforcement
error $E$, in turn, by increasing the probability of being investigated, reduces the incentives to initiative by increasing the expected fines. This preliminary observation suggests that the relation between enforcement effort and accuracy effort is richer under the model with private initiative and average deterrence than in the traditional model focussed on marginal deterrence.

The optimal policy is chosen to maximize expected social welfare

$$EW = w_0 + \hat{I} \left[ \beta W + (1 - \beta) W - W_0 \right] - c(\hat{I}) - g_E(E) - g_{\alpha_1}(\alpha_I) - g_{\alpha_{II}}(\alpha_{II})$$

where $\hat{I}$ is the optimal level of initiative chosen by the agent and the last three terms correspond to the cost of enforcement and accuracy efforts.

**Results**

In the paper we prove the following results:

1. The optimal initiative $\hat{I}$ is decreasing in type I errors $\alpha_I$, increasing in type II errors $\alpha_{II}$, decreasing in enforcement effort $E$ and in the fine $f$ and decreasing in the probability of the bad state $\beta$;

2. There exists a threshold level in the probability of the bad state, $\beta_0$ such that the expected marginal social value of initiative,

$$\left[ \beta W + (1 - \beta) W - W_0 \right] - c(\hat{I}(\beta))$$

is positive for $\beta \in [0, \beta_0)$, zero for $\beta = \beta_0$ and negative for $\beta \in (\beta_0, 1]$.

3. If the enforcement effort $E$ is set exogenously at a positive level $E > 0$,

   (a) when the marginal social value of initiative is positive - $\beta \in [0, \beta_0)$ - the optimal level of accuracy is $\alpha_I^* \in (0, 1/2)$ and $\alpha_{II}^* \in 1/2$, i.e. effort is devoted to improve accuracy only on type I errors, i.e. to limit over-enforcement; moreover

   $$\frac{d\alpha_I^*}{d\beta} > 0 \quad \text{and} \quad \frac{d\alpha_I^*}{dW} < 0$$

   that is we seek less type I accuracy ($\alpha_I^*$ is higher) when the bad state $\beta$ is more likely. or when the welfare in the bad state $W$ falls;

   (b) when the marginal social value of initiative is negative - $\beta \in (\beta_0, 1]$ - the optimal level of accuracy is $\alpha_I^* = 1/2$ and $\alpha_{II}^* \in (0, 1/2)$, i.e. effort is devoted to improve accuracy only on type II errors, i.e. to limit under-enforcement; moreover

   $$\frac{d\alpha_{II}^*}{d\beta} < 0 \quad \text{and} \quad \frac{d\alpha_{II}^*}{dW} > 0$$

   that is the level of accuracy on type II errors is improved when the bad state is more likely or the welfare level in the bad state falls down.
(c) when the marginal social value of initiative is zero - \( \beta = \beta_0 \) - the optimal level of accuracy is \( \alpha_I^* = \alpha_{II}^* = 1/2 \), i.e. no effort is devoted to improve accuracy.

4. If the enforcement effort \( E \) is set together with the level of accuracy we obtain:

(a) when the marginal social value of initiative is non negative - \( \beta \in [0, \beta_0] \) - it is optimal not to enforce any prohibition, i.e. \( E^* = 0 \) and \( \alpha_I^* = \alpha_{II}^* = 1/2 \), i.e. laissez-faire.

(b) when the marginal social value of initiative is negative - \( \beta \in (\beta_0, 1] \) - the optimal level of enforcement is positive, i.e. \( E^* > 0 \), accuracy is \( \alpha_I^* = 1/2 \) and \( \alpha_{II}^* \in (0, 1/2) \), i.e. we seek accuracy to avoid type II errors. Moreover,

\[
\frac{dE^*}{dW} < 0 \quad \text{and} \quad \frac{d\alpha_{II}^*}{dW} > 0
\]

that is, when the welfare \( W \) in the bad state falls down, effort increases on both enforcement \( E \) and type II errors accuracy \( \alpha_{II}^* \). Hence, enforcement and accuracy in this case work as strategic complements.

Summing up, when we analyze judicial errors in a context where private initiative matters, we find that accuracy on type I and type II errors play different roles on average deterrence. This is in contrast with the traditional model, where accuracy on either type of error works in the same direction with respect to marginal deterrence. In our setting, the optimal design of the policy involves effort on accuracy only on one type of error, depending on the expectations on the social consequences of initiative. If initiative is ex-ante desirable, we either exert effort to reduce type I errors (over-enforcement), or choose laissez-faire. When, instead, initiative is ex-ante welfare damaging we use together enforcement and accuracy on type II errors (under-deterrence) to improve average deterrence.