Decision Rules and Information Provision: monitoring vs manipulation*

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Abstract

We analyze the contractual design problem of a principal who delegates decision-making and information provision. The principal faces two tasks: he has to decide the level of discretion to be granted to the decision-maker and to establish who is in charge of supplying the information. We show that these two choices are intrinsically related. When the decision-maker is granted high discretion, information provision is optimally delegated to the parties directly affected by the decision. Conversely, when the decision-maker enjoys little discretion, it is more desirable to rely on a third impartial agent. The paper helps rationalize some organizational arrangements that are commonly observed in the context of judicial and antitrust decision-making.

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1 Introduction

A decision process typically involves two stages: information acquisition and decision-making. In the former, information on the basis of which the available alternatives are evaluated is acquired. In the latter, one alternative is selected. Efficiency results from the extent to which the information produced enables to assess the consequences of each alternative and by how the decision taken reflects this information.

In some cases these two stages are not clearly distinct as, for example, when the same agent performs both tasks; in many other cases instead a net separation of investigation and adjudication is observed. The typical example of this is provided by court decisions. Trials generally develop through two distinct phases: the proof-taking, in which the evidence concerning the case under consideration is acquired and disclosed to the judge; and the adjudicative stage, where a verdict is pronounced by the court. A similar approach is prevalent in antitrust proceedings. Following a request of authorization for a merger, information on the welfare consequences of the merger is gathered and presented to the antitrust authority. On the basis of this information, the antitrust authority decides for authorization or prohibition.

The purpose of the paper is to investigate the interaction between the design of decision rules and the delegation of information provision (who should provide the information) when the decision-making process is characterized by separation of investigation and adjudication.

Each of these problems has been extensively studied in isolation. Most of the literature has focused either on the problem of delegating information provision when the decision-maker is a disinterested party (see e.g. Milgrom and Roberts 1986, Shin 1998, Dewatripont and Tirole 1999, Palumbo 2000) or on the issue of ensuring proper decision making when the decision-maker is fully informed about which is the optimal decision but has vested preferences (see e.g. Rogerson 1987, Laffont and Tirole 1990, Armstrong 1994). In the first group of papers the decisional stage is not explicitly modeled; the optimal contract simply consists of delegating full authority to the benevolent decision maker. In the second one, the process by which the information is created is treated as exogenous and the attention is restricted to how contracts should be designed to prevent decision-makers' opportunistic behaviors. Our approach, by looking at the relationship between the adjudicative and investigative stages, represents an attempt to bridge these two strands of literature.

We consider a setting in which a decision-maker - on behalf of a principal - takes a decision relying on the information supplied by other agents. At

the beginning of the game the principal designs a contract that specifies a decision rule and defines the process by which information is provided. We take an incomplete contract approach by positing that comprehensive decision rules are technologically infeasible, either because some information is difficult to describe and foresee ex ante or because it is prohibitively costly to specify the decision to be taken in every conceivable eventuality. To make up for this incompleteness, the principal allocates residual control rights, i.e. the rights to decide in those circumstances that are left out from the initial contract. We consider two alternative allocations. In the first regime, called *Rules*, the principal retain all residual rights, in the second, called *Discretion*, he assigns them to the decision-maker. Delegation is profitable because ex post the decision-maker can better assess which decision is most desirable. The cost of delegation is related to the fact that preferences are non observable and therefore the principal is vulnerable to opportunistic behavior from the decision-maker.

Allocation of information provision is the other contractual dimension. We assume that information collection can be assigned either to the parties directly affected by the decision or to a neutral agent with no direct stake.

We argue that due to contract incompleteness, the allocation of decision rights and the delegation of information acquisition are intrinsically related, that is, the choice of the optimal organizational design at the information acquisition level is determined by how the decision rules are designed. Intuitively, if the principal wants to use the information that becomes available ex post *(Discretion)*, he needs to set appropriate incentives to induce monitoring over the decision-maker, as very inefficient decisions may occur if monitoring does not take place. The way to achieve this is by delegating the information provision to the interested parties. Indeed, while the parties have an inherent incentive to conceal information, they also have diametrically opposed goals which contributes to enhance their role as watchdog. The reason is that concealment by one side always works to the detriment of the other side, therefore each party has an incentive to challenge the opponent's report and uncover possible distortions. In this process a decision-maker who misbehaved may end up being caught. In fact, it is precisely the parties' incentive to manipulate information that enhances control over the decision-maker, via their reciprocal monitoring. Under *Rules*, the role of the parties as watchdogs is limited, for the decision-maker is bound by the compelling evidence that has been gathered. In such circumstances, it becomes desirable to minimize the probability of manipulation of information. This implies that relying on the parties is never optimal and that information gathering is to be delegated to a more impartial agent.

The crucial point is that the direct participation of the parties in the decision process involves a *trade off* between monitoring and manipulation. Under *Discretion*, the principal needs the decision-maker to be monitored ex post. Therefore, he is willing to delegate information provision to the parties (control from below), although this entails a loss related to the manipulation of information. By contrast, under *Rules*, the principal monitors the decision maker ex ante (control from above) and therefore prefers to delegate information provision to a more neutral agent within the organization.

Finally, we compare the two optimal combinations: *Rules* and neutral information collector or *Discretion* and biased information collectors and show that either can be optimal depending on the values of the parameters.

Our approach sheds lights on a number of issues related to institution design and helps rationalize some organizational arrangements that are commonly observed in the context of court and antitrust decision making. The Civil Law and the Common Law systems mainly differ for the degree to which they insist on adherence to predetermined standards, with the Civil Law system being more inclined to standards than the Common Law. Consistent with our results, we observe that where a Civil Law system is adopted, the proof-taking task is assigned to an impartial investigator who is supposed to make the case for both causes. On the contrary, where a Common Law system prevails, evidence is adduced bilaterally (prosecutor and defense attorney) through direct- and cross-examination. The same type of matching is observed in antitrust proceedings in the EU and in the US. The European competition law tends to rely more on predetermined and fixed rules (*per se rules*) whereas in the US, antitrust authorities enjoy much more discretion (*rules of reason*). In line with our analysis, in Europe the investigation is carried out by the Commission itself with very limited intervention of the interested subjects. By contrast, in the US, the parties involved have a great control of the proceeding and the fact-finding.

The remain of the paper is organized as follows. Section 2 describes the model. In particular, Section 2.1 presents the set up, while Section 2.2 discusses the contractual design problem faced by the principal. Section 3 studies the information disclosure and the appeal game. Section 4 shows that relying on an impartial information collector is more desirable when the initial contract imposes restrictions on the decision-maker's authority (*Rules*). Section 5 focuses on the case where the decision-maker is given discretion and shows that relying on the parties enhances control over the decision-maker, although it has a cost in terms of manipulation of information. Section 6 compares the different setting (*Rules* versus *Discretion*) and in Section 7 the insights are used to shed some lights on issues related

to the organization of legal and judicial systems, and antitrust proceedings. Section 8 discusses our main assumptions and concludes.

2 The Model

2.1 The basic setup

Suppose a principal P (Congress, Constitution) delegates to a decision-maker DM (antitrust authority, judge) the task of deciding in a dispute between two parties, a and b (the merging firms and the rivals, prosecutor and defendant). DM can make one of three decisions A, B and 0. Decision $d = A$ and $d = B$ are to be interpreted as favoring respectively party a and b. Depending on the context, $d = 0$ can be interpreted as an intermediate decision or as the decision of maintaining the status quo. The model is perfectly symmetric between the two causes.

The socially optimal decision depends upon the realization of a state of nature $\theta \in \{A, B\}$. More precisely, the optimal decision is $d = A$ when $\theta = A$ and $d = B$ when $\theta = B$. The state of nature is non observable (neither ex ante nor ex post) but it is common knowledge that the probability distribution over its values is characterized by $\Pr(\theta = A) = \Pr(\theta = B) = \frac{1}{2}$.

Information can be gathered so as to obtain signals on the true state of nature. The task to provide information can be assigned either to the parties directly affected by the decision (a and b) or to a third agent with no direct stake. We shall refer to the first institution as *Parties (P)* and to the second as *Neutral Agent (NA)*.

The Principal

The principal's objective is to minimize the expected loss of taking an erroneous decision under some cost constraint. The precise objective function of the principal will be defined as we proceed with the analysis. For the moment it suffices to say that the loss in state $\theta \in \{A, B\}$ when decision $d \in \{A, B, 0\}$ is taken is given by:

$$l_\theta^d = \begin{cases} 0 & \text{if } d = \theta \\ l^0 > 0 & \text{if } d = 0 \\ (1+\delta)l^0 & \text{if } d \neq \theta, 0 \end{cases} \tag{1}$$

We let $\delta > 1$, which implies that ex ante the principal prefers $d = 0$ to a randomly chosen $d = A, B$.

The decision maker

We assume that the decision-maker does not respond to monetary incentives and receives a constant wage equal to his reservation wage of zero. There are two types of decision-makers: "congruent" and "incongruent". Congruent decision-makers have no private stakes and therefore always act in the principal's interest; incongruent decision makers receive a private benefit V when $d \neq \{\theta, 0\}$. Incongruence may be due to a different view of social welfare, to corruption or to political or ideological positions. Decision-makers' types and benefits are non observable and non verifiable by third parties. The fraction of incongruent decision-makers is α, where α is common knowledge and strictly lower than 1.[1]

The Parties

Parties' preferred outcomes are independent of the state of the world and common knowledge: party a always prefers decision A to 0 and 0 to B whereas party b always prefers decision B to 0 and 0 to A. For each party $i = a, b$ and each decision $d \in \{A, B, 0\}$ the utilities are private benefits; they are symmetric and given as follows

$$U_i^d = \begin{cases} (1+\lambda)U^0 & \text{if } i = d \\ U^0 > 0 & \text{if } d = 0 \\ 0 & \text{if } i \neq d \end{cases} \qquad (2)$$

with $\lambda > 0$.

The Neutral Agent

To simplify, in most of the paper we shall assume that the neutral agent is not driven by private interests; he does not respond to monetary incentives and receives a constant wage equal to his reservation wage of zero. We shall discuss some consequences of making different assumptions on the agent's preferences in Section 8.

The information

We assume that the environment is sufficiently complex that it would be prohibitively costly for the principal to foresee and/or describe all future information (or combinations of information) and to specify exactly how the decision-maker has to decide for each of them.

Before proceeding with the modellization, it may be useful to illustrate our approach to contract incompleteness by means of a simple example.

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[1]This characterization of the preferences and benefits is only one way to capture the potential conflict of interests between the principal and the decision-maker. This specification is chosen so as to simplify the analysis, and has no impact on its insights.

Suppose that the antitrust authority is called upon to decide on a merger and that the desirability of the merger has to be assessed by extracting information about its welfare effects. The latter are related to factors like the market shares of the two firms before the merger, the degree of concentration of the buyers, the frequency of orders, the existence of potential entrants, and so forth. In some cases, all these factors point towards the same direction and unquestionably tell whether the merger is to be authorized. In other cases, they interact in such a way that it is difficult to predict and describe ex ante: different factors may have different signs, some information may not be available, may be ambiguous or not anticipated. In the former case, it is possible for the legislator to specify ex ante the rule to be followed in the evaluation of the merger. In the latter, providing ex ante guidelines for each possible eventuality may be too costly. Therefore either a simple rule must be defined that covers all these eventualities or the antitrust authority must be given the non trivial role to fill in the gaps.

To capture this idea in a simple way we model information acquisition as the observation of a signal $h \in \{\overline{\theta}, \underline{\theta}\}$, where $\overline{\theta} \in \{\overline{A}, \overline{B}\}$ and $\underline{\theta} \in \{\underline{A}, \underline{B}\}$ represent two different types of information. $\overline{\theta}$ is a contractible piece of information, that is, information (or combinations of information) that is describable ex ante at no cost. Instead, $\underline{\theta}$ is a non contractible piece of information (or combination of information), that is, $\underline{A}$ and $\underline{B}$ are either non anticipated or sufficiently imprecise or ambiguous that it would be too costly to describe them ex ante.[2] We denote by $\frac{1}{2}\mu$ the unconditional probability of observing a contractible signal, i.e. $\frac{1}{2}\mu = \Pr(h = \overline{A}) = \Pr(h = \overline{B})$ and by $\frac{1}{2}(1 - \mu)$ the corresponding probability of observing an uncontractible signal, i.e. $\frac{1}{2}(1 - \mu) = \Pr(h = \underline{A}) = \Pr(h = \underline{B})$.

The probability distribution of the contractible signal is: $\Pr(\theta = A/\ h = \overline{A}) = \Pr(\theta = B/\ h = \overline{B}) = \nu$, where ν is assumed to be common knowledge ex ante; the probability distribution of the non-contractible signal is: $\Pr(\theta = A/\ h = \underline{A}) = \Pr(\theta = B/\ h = \underline{B}) = \rho$. We assume that the decision-maker is able to extract more information out of the non contractible signal than the other players. To formalize this we assume that ρ is only known to the decision-maker ex post; the other players believing that $\Pr(\theta = A/$

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[2] In the merger example described above, $\overline{A}$ can be interpreted as: the market share of the merging firms is above $x\%$, *and* the number of firms in the market is below n, *and* the frequencecy of orders is low, *and* demand is experiencing a negative trend of $y\%$, *and...*. On the contrary, $\underline{A}$ can be interpreted as capturing either the fact that different factors point in different directions (so that the combination of information is characterized by *"and"* and *"but"*) or the fact that some information is missing (so that for some factors there exists neither *"and"* nor *"but"*).

$h = \underline{A}) = \Pr(\theta = B/\ h = \underline{B}) = \rho_P < \rho$. This assumption embodies the idea that the decision-maker is an expert and has higher knowledge of the concerned subject. Throughout we shall assume $\nu = \rho = 1$ and $\rho_P = \frac{1}{2}$. Both assumptions do not have major consequences and simplify the presentation of our results.

Information, both contractible and non contractible is hard and is privately owned by the agent that acquires it. That is, it can be substantiated, if transmitted; however it can be partially concealed. Formally, let $\widehat{h} \in \{\overline{\theta}, \underline{\theta}\}$ denote the report. We assume that if the agent (one of the parties or the neutral agent) observes $h = \overline{\theta}$, he can either tell the truth $\widehat{h} = \overline{\theta}$ or conceal relevant pieces of his information and claim he has observed $\underline{\theta}$ ($\widehat{h} = \underline{\theta}$). However, if he observes $h = \underline{\theta}$ the agent can only report $\widehat{h} = \underline{\theta}$.[3]

Finally, we assume that the amount of information collection is the same under both institutions (*Parties* and *Neutral Agent*). We formalize this by assuming that when the neutral agent is in charge, he observes two simultaneous and independent realizations of h. Instead, when the parties are in charge, they observe one realization each. This simplifying assumption is meant to avoid the bias in the results that could be generated by the parties being better informed than the agent.[4]

2.2 The contractual design problem

The decision rule

If contracts were complete or if the principal could select a decision-maker whose preferences coincide with his own, the delegation problem at the decision stage would be trivial. In the first case, the principal could write a fully contingent rule and ask the decision-maker to implement this rule. In the second, the optimal contract would simply give all authority to the benevolent decision-maker. Things become more complicated when none of these conditions is met and the principal is forced to write an incomplete contract. The contractual design problem faced by the principal can be illustrated as follows. Since $\overline{\theta}$ is contractible and perfectly informative, contingent on this information being reported, the first-best decision can al-

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[3] As pointed out in the previous note, $\underline{\theta}$ is to be thought of as a more incomplete or fuzzy combination of information than $\overline{\theta}$. Therefore, when $\overline{\theta}$ is observed, it is always possible to conceal some information in order to make it appear as if $\underline{\theta}$ were observed. However, since information is not forgeable, the reverse is not possible.

[4] The analysis would be essentially unchanged if we assumed that the information owned by the parties is the same under both regimes, but *when in charge* the neutral agent has access to this information. This is equivalent to say that the parties always learn h (one realization each) and the neutral agent observes their signals if and only if he is charge.

ways be enforced. The optimal contract will thus require the decision-maker to take

$$d = \theta \qquad \text{if} \qquad \widehat{h} = \overline{\theta} \tag{3}$$

Conversely, since $\underline{\theta}$ cannot be made part of an enforceable contract, when $\widehat{h} \neq \overline{\theta}$, the principal must resort to other second-best mechanisms to ensure efficient decision-making.[5] Since payoffs are assumed nonverifiable, such mechanisms are limited to the choice of a control allocation. We assume that the principal has two options. He can either allocate decision rights to himself or to the decision-maker. In the former case, labeled *Rules (R)*, the principal establishes ex ante the decision to be taken whenever $\widehat{h} \neq \overline{\theta}$; in the latter case, labeled *Discretion (D)*, the principal leaves the decision-maker full discretion. It follows from (1) and (3) that, under *Rules*, the optimal contract is

$$\begin{aligned} d &= \theta &\text{if} &\quad \widehat{h} = \overline{\theta} \\ d &= 0 &\text{if} &\quad \widehat{h} \neq \overline{\theta} \end{aligned} \tag{4}$$

Under *Discretion* it is still optimal to require the decision-maker to choose $d = \theta$ if $\widehat{h} = \overline{\theta}$. However, in all remaining situations $(\widehat{h} \neq \overline{\theta})$, the contract only gives him the vague mandate to maximize social welfare.[6] Given our assumptions on the structure of ex post beliefs, it follows that when confronted with a report $\widehat{h} = \underline{\theta}$, a congruent decision-maker always takes $d = \theta$. On the contrary, an incongruent decision-maker chooses $d \neq \{\theta, 0\}$, unless there exists some mechanism that prevents him from abusing his authority.

Allocation of information provision is the other contractual dimension. As mentioned above, we assume that the principal can choose between two institutions: *Parties* and *Neutral Agent.* In the first case, information is provided by the parties directly interested in the decision (a and b); in the second, the same task is assigned to an impartial agent *NA*. As we shall see, the key to this choice is that different structures of information provision give different incentives to disclose information and to monitor the decision-maker.

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[5]With some abuse of notation, we use the expression "if $\widehat{h} = \overline{\theta}$" to mean "if at least one of the reports is $\widehat{h} = \overline{\theta}$". Thus, under *Parties* it suffices that $\widehat{h} = \overline{\theta}$ for either a or b. Similarly, under *Neutral Agent* it suffices that $\widehat{h} = \overline{\theta}$ for at least one realization of h.

[6]Implicit in this characterization of the optimal contract is the idea that the principal is aware that some information may become available in the future that he was not able to anticipate and describe ex ante.

The focus of the paper will be the interplay between these two contractual dimensions. It is worth mentioning at the outset that we are aware that better contracts than the one considered here may be possible. In this regard, our analysis should not be viewed as aiming at developing a theory of optimal mechanisms but rather at evaluating particular organizational arrangements observed in practice that differ with respect to who collects information and to the degree of freedom granted to the decision-maker. A more in depth discussion of our simplifying assumptions is presented in Section 8.

The appeal

We assume that after a decision is made the parties (a and b) can seek for correction of the proposed decision to the appeal body. The latter has the same ability to infer the optimal decision as the decision-maker and is drawn from the same population. Therefore, it is congruent with probability $1 - \alpha$ and incongruent with the complementary probability. When interrogated, the appeal body can either confirm the decision or reverse it. If the decision is reversed, the decision-maker suffers a reputation loss $R \geq 0$. We assume that this is bounded above by an exogenously given number $\overline{R}$. The appeal has a cost C to the principal.

In practice, appeals serve different purposes: they may be a way to enable discovery of new evidence, they can help correct errors in decision-making or they may act as a monitoring device. To better focus on the goal of the paper, we shall restrict attention to the monitoring role, by ruling out the possibility that at the appeal stage information is discovered that was not found by any of the agents in the previous stage.[7] It does not follow from this, however, that information that was *found and concealed* in the first stage cannot be discovered. In fact, we assume as follows.

Assumption 1 (A1) At a private cost H, each party can search for manipulation of information. If manipulation occurred, it is detected with probability one.

To ease the exposition, we proceed under the assumption that detected manipulation is not punished. Then, in Proposition 3 we show that this is indeed optimal. An immediate consequence of (A1) is stated below.

Result 1 *In the optimal contract the right to appeal is restricted to those situations where the appealing party can provide verifiable evidence that an inefficient decision was made in the first stage.*

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[7]Our assumption that $\rho = 1$ automatically rules out the possibility that the appeal works as a device to correct decision-maker's errors.

That is, the optimal contract will have the feature that party a, say, is allowed to appeal when $d \neq A$ only if she can show $h = \overline{A}$, and therefore force the appeal body to take $d = A$.

Note that contract enforceability implies that deviations from (3) will never occur.[8] Thus, under *Rules*, Result 1 is trivial. Since, the appeal body is bound by the initial contract to choose $d = 0$ whenever $\widehat{h} = \underline{\theta}$, an appeal can never be optimal unless the appealing party has evidence that some information was concealed by the other party. Under *Discretion*, the argument is similar although a bit more subtle. When no restrictions are imposed to the right of the parties to appeal, the decision process is equivalent to a standard two-period game. Since past behavior does not affect payoffs in period 2, the outcome of this game is the static outcome of the one-period game and appeal only add an extra cost C.

To summarize, the timing of the game is as follows. At stage 0 (contractual stage, ex ante) the principal designs the contract. A contract delegates decision-making and allocates information provision to either the neutral agent or the parties. At stage 1 (pre-decision stage, ex post) information is gathered and disclosed to the decision-maker. At stage 2 (decision stage, ex post) the decision-maker takes a decision contingent on the information received and the selected decision rule. Learning the decision, the parties decide whether or not to incur H (stage 3, appeal stage). If none of the parties incurs H or if no evidence of manipulation is found, the initial decision is implemented. If one of the parties finds verifiable evidence that the other party manipulated her information, she will appeal and ask for correction. In this case, the optimal decision will be implemented.

3   Information disclosure and appeal

In this section we investigate the behavior of the parties (a and b) and neutral agent (NA) at the disclosure stage. Given our specification of the preferences, the neutral agent has no incentive to misreport the information and therefore he always reports truthfully. The biased parties instead have an inherent incentive to disclose only evidence that is favorable to their cause. More formally, from (2) and (4) it follows that the optimal strategy for party a is to report $\widehat{h} = \underline{B}$ when $h = \overline{B}$ and $\widehat{h} = \overline{A}$ when $h = \overline{A}$. Similarly, the optimal strategy for party b is to report $\widehat{h} = \underline{A}$ when $h = \overline{A}$

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[8]The same kind of argument implies that under *Rules* the decision-maker always chooses $d = 0$ when $\widehat{h} = \underline{\theta}$.

and $\widehat{h} = \overline{B}$ when $h = \overline{B}$. Table 1 summarizes the parties' behavior for the case in which $\theta = A$.

Information		Reports	
a	b	a	b
$\overline{A}$	$\overline{A}$	$\overline{A}$	$\underline{A}$
$\underline{A}$	$\overline{A}$	$\underline{A}$	$\underline{A}$
$\overline{A}$	$\underline{A}$	$\overline{A}$	$\underline{A}$
$\underline{A}$	$\underline{A}$	$\underline{A}$	$\underline{A}$

Table 1

Under our assumption that detected manipulation is not punished these strategies are (weakly) dominant. Hence, they are optimal independent of the strategies played at later stages of the game. Given Result 1, the differences in the behavior of the parties and of the neutral agent have important consequences on the effectiveness of the appeal as a monitoring device, as summarized below.

Result 2 *Delegating information provision to the parties is a necessary condition for an appeal to be triggered.*

When information is truthfully reported, it is never possible for the parties to find the necessary evidence to trigger an appeal. This does not hold when the parties are directly involved in the decision process and therefore manipulation occurs. Anticipating that concealment from one side is always damaging to the other side, a party facing an unfavorable decision has incentive to check the opponent and discover distortions in her report. Thus, detecting manipulation provides the parties with the means to appeal and ask for correction of the proposed decision.

4   Rules

In this section we investigate the desirability to delegate information provision to the parties or to a more impartial agent when the initial contract allocates decision rights to the principal *(Rules)*. The next proposition demonstrates that under *Rules* it is always optimal to rely on the neutral agent.

Proposition 1 *Under Rules delegating information acquisition to the neutral agent is always preferred.*

The intuition behind this result lies in the fact that under *Rules* the principal protects himself against the risk of opportunistic behavior from the decision-maker by restricting his scope of authority (control from above). Insofar as the decision-maker's hands are tied, the outcome of the decision making process is only determined by the behavior of those who provide the information. Thus, relying on the impartial agent is always more desirable than relying on the biased parties.

To see this more formally, first suppose that the supply of information is assigned to NA. Under proposition 2 the expected welfare loss under *Rules-Neutral Agent* (RNA) is:

$$L^{RNA} = (1 - \mu)^2 l^0 \tag{5}$$

where $(1-\mu)^2$ is the probability that $h = \underline{\theta}$ for both realizations of the signal. As already pointed out, under *Rules*, the decision-maker never deviates from (4), because he is aware that any deviation would be immediately corrected. Therefore, the loss is zero when $h = \overline{\theta}$ for at least one realization and l^0 otherwise.

Now suppose that the parties collect the information. An inefficient decision ($d = 0$) is taken whenever both parties report $\widehat{h} = \underline{A}$ or $\widehat{h} = \underline{B}$. As shown in Table 1, this occurs with probability $1 - \mu$, therefore the expected welfare loss under *Rules-Parties* (RP) if there is no appeal is $(1 - \mu)l^0$. Clearly this is larger than L^{RNA}. Notice that allowing for the appeal would not affect our result. The best the appeal can do is to permit the party to discover the manipulation of their opponent, which can lead to the optimal decision being taken when manipulation has occurred. Hence, at most, we obtain $(1 - \mu)^2 l^0 - X$, where $X > 0$ is the expected cost of appeal.[9] This yields

$$L^{RP} = \min\{(1 - \mu)^2 l^0 - X, \ (1 - \mu)l^0\} \tag{6}$$

and again $L^{RP} > L^{RNA}$.

5 Discretion

We now look for the optimal structure of information provision when the initial contract grants the decision-maker full discretion. Obviously, when

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[9]Notice that to have an appeal under *Rules* two conditions are to be met : the social cost of the appeal must be sufficiently small that it is in the principal's interest to let the parties appeal $C < l^0$; the parties' stake has to be sufficiently high that they wish to appeal $H < U^0$.

the decision-maker is congruent, discretion is optimal. However, when interests are in conflict the possibility arises that the decision-maker uses his authority to act in a way that contrasts with the principal's goals. In particular, when confronted with a report $\widehat{h} = \underline{\theta}$, an incongruent decision-maker would always choose $d \neq \{\theta, 0\}$, unless there exists the possibility to detect such behavior and to inflict him a high enough penalty.

More precisely, suppose that the information is provided by *NA*. With probability $(1 - \mu)^2$ information collection leads to $h = \widehat{h} = \underline{\theta}$ for both realizations of the signal and the decision-maker can exercise his discretional power. Moreover, parties never incur H, for they correctly anticipate that they will not be able to find hard evidence of wrongdoing. Therefore, the expected welfare loss under *Discretion-Neutral Agent* is:

$$L^{DNA} = (1 - \mu)^2 \alpha (1 + \delta) l^0 \tag{7}$$

Let us now suppose that information provision is delegated to the parties and analyze their incentives to incur H in order to seek evidence of manipulation from the other side. Since the model is perfectly symmetric we can focus on one party only, say a.

Notice that under *Discretion* the possibility that the parties check each other has important consequences on the behavior of an incongruent decision-maker. This is because he now faces the possibility of being caught and suffer a loss R, if $\widehat{h} = \underline{\theta}$ and he chooses $d \neq \theta, 0$. [10] Thus, the (incongruent) decision-maker will play a simultaneous game with the parties where the strategies are: "acting opportunistically" ($d \neq \theta, 0$) "making the efficient decision" ($d = \theta$), for the decision-maker and "searching" (incur H) and "not searching " (not incur H) for the parties.[11] Let y denote the probability that party a searches for party b's manipulation; x denote the probability that an incongruent decision-maker takes his preferred decision ($d \neq \theta, 0$). The equilibrium probabilities x^*, y^* are computed as follows.

As shown in the Appendix, the expected benefit for party a when searching for manipulation, is

$$\frac{\mu \alpha x}{\mu \alpha x + \frac{1}{2}(1 - \mu)}(1 + \lambda)U^0 - H \tag{8}$$

while the expected benefit when not searching is equal to zero. Similarly, for the decision-maker, acting opportunistically yields an expected pay-off

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[10]Given $R \geq 0$ a congruent decision-maker always prefers $d = \theta$.

[11]Notice that it is never optimal for the parties to incur H before learning the decison. Therefore, depending on the decision, the decision-maker plays against one party or the other.

of

$$-y\mu R + y(1 - \mu)V + (1 - y)V \qquad (9)$$

while taking the efficient decision gives him a pay-off of zero. First, suppose that $x = 1$. From (8) the cost H is too large to induce party a to search if

$$H > H_0 \equiv \frac{\mu\alpha}{\mu\alpha + \frac{1}{2}(1 - \mu)}(1 + \lambda)U^0 \qquad (10)$$

When equation (10) holds, the appeal is never triggered (since $y^* = 0$) and therefore the incongruent decision-maker always takes his preferred decision $(x^* = 1)$. When equation (10) does not hold, the incongruent decision-maker trades-off the benefits from acting opportunistically (V) with the cost of being caught and punished (R). Thus, from equations (9) and (8) the equilibrium probabilities of the mixed strategy equilibrium are given by

$$y^* = \frac{V}{\mu(V + R)} \qquad (11)$$

for party a and by

$$x^* = \frac{\frac{1}{2}(1 - \mu)H}{\mu\alpha[(1 + \lambda)U^0 - H]} \qquad (12)$$

for DM . We assume $R > \frac{1 - \mu}{\mu}V$ to ensure that $y^* > 0$.

Equations (11) and (12) provide the interesting insight that delegating information provision to the parties may enhance monitoring over the decision-maker (control from below). Since they have conflicting goals, the parties have incentive to discover possible manipulations in their respective reports. This gives them the means to exercise control over the decision-maker, when the initial contract grants him discretional power. This result is summarized in the next proposition.

Proposition 2 *Under Discretion, delegation of information provision to the parties enhances monitoring over the decision-maker.*

Our analysis predicts that delegation of information provision to the parties is valuable, but also costly. The principal suffers a loss due to the manipulation of information if he wants the parties to act as a monitoring device. Either of these two effects may dominate, so we now proceed to compare these costs and benefits and provide conditions under which it is desirable to rely on the parties to provide information under *Discretion*. To this purpose we introduce the assumption that $C < \alpha(1 + \delta)l^0$ which

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ensures that the appeal is socially desirable when the decision-maker has high discretional power and therefore the principal is exposed to the risk of suffering large losses. The expected welfare loss under *Discretion-Parties* is given by

$$L^{DP} = (1-\mu)^2 \alpha x^*(1+\delta)l^0 + \mu(1-\mu)[\alpha x^*(1-y^*)(1+\delta)l^0 + \alpha x^* y^* C] \quad (13)$$

The first term of the right-hand side of (13) is welfare loss when $h = (\underline{\theta}, \underline{\theta})$ and therefore appeal never occurs. The second term is welfare loss when $\widehat{h} = (\underline{\theta}, \underline{\theta})$ but one of the two parties concealed information and therefore appeal occurs with probability y^*.[12]

Substituting for (11) and (12) from (13) and comparing with (7) yields:

Proposition 3 *Under Discretion, introducing penalties for detected manipulation is never desirable and delegating information acquisition to the parties is optimal if $H < H_1 \equiv \frac{\mu\alpha}{\frac{1}{2}+\mu\alpha}(1+\lambda)U^0$, where $H_1 < H_0$.*

Proposition 3 contains a crucial idea of our analysis, namely that manipulation and monitoring are the two sides of the same coin. Manipulation gives the parties incentive to exert reciprocal monitoring, which is the channel through which they keep the decision-maker on his toes. Clearly, all other things being equal, the smaller H the higher the monitoring exercised by the parties. Thus, for small enough H the costs of parties' manipulation of information are more than off-set by the benefits of control and relying on the parties is optimal. Clearly, in a complete contract set up there would be better ways of controlling the decision-maker than relying on the biased parties to provide information, but exploiting the conflict of interests between the parties is an easy way to guarantee some monitoring.

6 Rules versus Discretion

6.1 Theoretical predictions

We now compare the optimal combinations of decision rules and structures of information acquisition and show that either can be optimal depending on the values of the parameters. To focus on the most interesting case, we introduce the following assumption.

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[12]Note that L^{DP} is lower than C, where C would be the loss if the principal did not delegate the appeal decision to the parties but specified ex ante that appeal occurs with probability 1.

Assumption 3 (A3) $\alpha > \frac{1}{1+\delta}$

Assumption *(A3)* implies that $L^{RNA} < L^{DNA}$. That is, when information provision is assigned to the neutral agent and therefore there is no monitoring, imposing restrictions on the scope of authority conferred to the decision-maker *(Rules)* is more desirable than leaving him discretion *(Discretion)*. Under assumption *(A3)*, the relevant contrast is the one between RNA and DP. The results are summarized in the following proposition.

Proposition 4 *DP dominates RNA when parties' stake $((1 + \lambda)U^0)$ is high enough, the search costs (H) are low enough and the degree of contract incompleteness is low $(1 - \mu \to 1)$.*
RNA dominates DP when the loss of control (δ) is very large.

Proof. Notice that $L^{DP} < L^{RNA}$ if $H < H_2 \equiv \frac{2\mu}{(1+\delta)+2\mu}(1 + \lambda)U^0$, with $H_2 < H_1$. ∎

According to the above proposition, the beneficial role played by the parties' monitoring activity can correct for both their manipulations of information and for the decision maker abuse of discretion, so as to make discretion optimal.

7   Applications

Comparative legal and judicial systems

Legal systems contain the body of rules that allocates authority within the judiciary and defines the degree of discretion granted to the judges as well as the procedures they are to follow. The two most widely adopted legal systems are those of Civil Law and Common Law. The former is typically observed in European continental countries, whereas the latter is more widespread in the Anglo-Saxon world. Underlying the Civil Law system is the great importance given to the "certainty of decision-making", which is guaranteed by a systematic organization of the law into a code whose provisions the courts should administer without power of amendment. The code is viewed as to supply a solution for any legal problem that may arise; official discretion is seen as negative and harmful. In contrast, in the Common Law system taking the decision most appropriate to the specific circumstances of each case is considered the most important task.

Judicial systems on the other hand, regulate the process of acquisition and disclosure of evidence at trial. The two most widely adopted procedures are the adversarial and the inquisitorial types. In the latter, the trial

is conceived as an official inquest conducted by a single investigator who is supposed to be impartial and to look for evidence both against and in favor of the accused. Instead, in the adversarial procedure the proceeding is dominated by the two parties - prosecutor and defense attorney- and evidence is adduced bilaterally through direct- and cross-examination. It is of interest that the same combination of legal and judicial system is observed in nearly all the countries. In particular, Civil Law systems are generally associated with inquisitorial procedures whereas Common Law systems are often combined with adversarial procedures. The paper provides a theoretical justification for this stylized fact.

Antitrust proceedings

The insights generated by our analysis appear to be relevant also in the context of antitrust regulation. The problem of designing efficient proceedings for the enforcement of antitrust policies has been central among politicians and economists in recent years. At the core of the debate lies the inherent tension between flexibility and certainty in competition law. Certainty is necessary to maintain some degree of predictability of outcomes and help the firms to anticipate that a particular conduct or agreement does or does not violate antitrust laws. Flexibility is important to reflect changes in economic thinking and in market conditions, two aspects that are particularly relevant for competition laws where the legal analysis is combined with an economic-based approach. In antitrust laws, the only way to ensure certainty is to have *per se rules.* A *per se rule* requires that a particular practice or agreements always be treated in the same way, regardless of who engaged in the conduct and regardless of the effects of the conduct. Flexibility on the other hand can be achieved adopting *rules of reason.* The classical definition of the *rule of reason* was given by the Supreme Court in 1919:

> The court must ordinarily consider the facts peculiar to the business to which the restraint is applied, its condition before and after the restraint was imposed, the nature of the restraint and its effects, actual and probable. The history of the restraint, the evil believed to exist, the reason for adopting the particular remedy and the purpose or end sought to be achieved are all relevant facts.

Rules of reasons are very widespread in the US where jurists more easily accept the greater uncertainty resulting from the inclusion of economics in

antitrust law. *Per se rules* instead are prevalent in the European law, where the legislators' concern is much more on ensuring legal certainty. Consistent with our results, in the US antitrust proceedings are heavily dominated by the parties, which are responsible for presenting the evidence whereas in Europe most of the investigation is done by the Commission, with the parties playing a more limited role.

8   Concluding Remarks

We have considered a decision-making process where a maybe opportunistic decision-maker must rely on other agents for the supply of information and the environment is so complex that contracts are necessarily incomplete. In this setting, we have investigated the contractual design problem faced by a principal who has to choose a decision rule and allocate information provision.

The paper has yielded a number of general insights, which can be summarized as follows. First, there exists a trade off between truthful disclosure of information and incentives to monitor. The greater the degree of manipulation at the information provision stage, the higher the incentives of the parties to challenge the decision made and the greater the degree of control from below. Thus, the more the interested parties are involved in the information provision process the greater the level of monitoring. How the trade-off between monitoring and manipulation is solved depends on the extent of the discretionary power given to the decision-maker. High discretion calls for monitoring; thus information provision by the interested parties is optimal although it comes at the expense of some manipulation. Low discretion renders monitoring less relevant and therefore calls for a more impartial information collector.

Second, as contract incompleteness becomes more pervasive discretion becomes both more valuable and more risky. Therefore, it should be preferred when the environment is highly complex and the parties' stake are sufficiently high relative to their monitoring costs.

Because of the difficulty in building a model that accounts for all stages of the decision-making process (i.e. information collection, information revelation, decision making and monitoring) our insights have been generated using a highly stylized set up. A discussion of its main assumptions follows.

· We have assumed throughout the paper that *either* the parties *or* the neutral agent can submit the evidence to the decision maker. In fact, all is needed for our results to hold is that the possibility of information ma-

nipulation increases parties' incentives to appeal. Thus, the results should extend to settings where parties are always informed but their information is not perfect.

· In our setting, the assumption that the agent is perfectly "neutral" can be seen as a proxy for those situations where the agent is *on average* less biased than the parties directly involved in the decision.[13] We expect more bias to induce more manipulation and thus more monitoring even in more general settings.

· We have ruled out monetary incentives and assumed that the agents are only driven by their private nonmonetary benefits. The motivation for this assumption is that monetary incentives are hardly observed in practice, for they can be very distorsive. This is especially true for judges and antitrust regulators who tend to be given job life positions and fixed salaries in order to preserve their independence (see also next point). One may argue though that monetary incentives could be used to motivate the agent to exert some monitoring. For example, the principal could promise the agent a compensation conditional on the decision being reversed in appeal. However, this would induce the agent to distort the information in the first place.

· We have put an upper bound on the loss suffered by the decision-maker after a reversal, interpreting it as a purely reputation loss. In our setting this is not optimal, since reversals occur only when the decision-maker intentionally pursued his private interests at the expense of the principal. Hence, imposing a very harsh punishment to the decision-maker would be sufficient to avoid opportunistic behaviors. In practice, however, wrong decisions might occur for a number of other reasons: lack of information, incompetence, errors, and so forth. In this world, imposing harsh penalties would paralyze the decision process and prevent decisions from being taken, which is the main reason why we do not observe them in practice. Our assumption should then be interpreted as capturing this fact.

· Finally, we have not allowed for new information to be discovered at the

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[13]To see this, suppose that the agent, like the decision-maker, is incongruent with probability α. Under discretion, the introduction of a biased agent would only increase the welfare loss L^{DNA}. Indeed, when the decision-maker is congruent, the fact that the agent may be incongruent is irrelevant: the efficient decision is taken and there is no appeal. By contrast, when both the agent and the decision-maker are incongruent, an inefficient decision is taken with probability 1. This is because the agent reports $\widehat{h} = (\underline{\theta}, \underline{\theta})$ regardless of what he has observed and the decision-maker takes $d \neq (\theta, 0)$. Clearly, parties' appeal never occurs. Under *Rules*, the expected welfare loss becomes:

$$L^{RNA} = [(1-\alpha)(1-\mu)^2 + \alpha]l^0$$

which is still smaller than L^{RP} for $\alpha < \frac{1-\mu}{2-\mu}$.

appeal stage. Clearly, if this was not the case, the incentives to appeal would be stronger but our results should not be affected, for greater manipulation in the disclosure game would still result in greater incentives to exercise monitoring.

· At a more general level, we have abstracted from moral hazard consideration, by taking the agents' effort to search for information as given. We believe that extending our analysis in this direction, by taking a more internal organization view point, would be an interesting topic for future research.[14]

9   Appendix

Derivation of equation (9).   Since party a never incurs H if she has observed $h = \overline{\theta}$ and/or party b has disclosed either $\widehat{h} = \underline{B}$ or $\widehat{h} = \overline{B}$ we only need to consider the case where $h = \underline{\theta}$ for party a and $\widehat{h} = \underline{A}$ for party b. Moreover, since party a has no interest to see the decision reversed if $d = A$, we can confine attention to the case where $d = B$. If party a does not incur H or if she does but there was no manipulation, then $d = B$ is implemented. On the contrary, if party a incurs H and discovers manipulation from party b, she can appeal and ask for correction of the proposed decision. Therefore, party a's expected pay-off is

$$
\begin{aligned}
\Pr(h \;=\; & \overline{A} \;/\; \widehat{h} = \underline{A}, \; d = B)(1 + \lambda)U^0 - H = \qquad (14) \\
& \frac{\mu \alpha x}{\mu \alpha x + \frac{1}{2}(1 - \mu)}(1 + \lambda)U^0 - H
\end{aligned}
$$

where $\Pr(h = \overline{A} \;/\; \widehat{h} = \underline{A}, \; d = B)$ is the probability that party b observed $h = \overline{A}$, given that she reported $\widehat{h} = \underline{A}$ and that the decision was $d = B$. Notice that the equation above makes use of our assumption that $\rho_p = \frac{1}{2}$. ∎

Proof of Proposition 3.   Suppose that there are no punishments for detected manipulation so that parties always conceal unfavorable evidence. Note that $H < \frac{\mu \alpha}{\frac{1}{2} + \mu \alpha}[(1 + \lambda)U^0 - K]$ implies that condition (10) does not hold. Hence, the equilibrium strategies of the appeal game under *Discretion-Parties* are given by (11) and (12) and expression (13) yields

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[14]However, see Dewatripont and Tirole (1999) for a very insightful analysis of moral hazard consideratons when incentives are indirect, i.e. they can only be made contingent on the final decision.

$$L^{DP} = (1-\mu)^2 \alpha x^*(1+\delta)l^0 + \mu(1-\mu)[\alpha x^*(1-y^*)(1+\delta)l^0 + \alpha x^* y^* C] =$$

$$\frac{\frac{1}{2}\alpha(1-\mu)^2 H}{\mu\alpha[(1+\lambda)U^0 - H]}\{(1-\mu)(1+\delta)l^0 + \mu[(1-y^*)(1+\delta)l^0 + y^* C]\}$$

Recalling that $C < \alpha(1+\delta)l^0$, from (7), a sufficient condition for $L^{DP} < L^{DNA}$ is

$$\frac{\frac{1}{2}H}{\mu\alpha[(1+\lambda)U^0 - H]} < 1$$

Trivial calculations prove the result.

Now suppose that a punishment P is imposed to a party that is caught manipulating her information and let $\beta(P) \leq 1$ denote the associated probability of manipulation. Then, from (8), the expected payoff from appealing becomes

$$\frac{\beta\alpha x\mu}{\beta\alpha x\mu + \frac{1}{2}(1-\mu)}(1+\lambda)U - H$$

which implies, $x^* = \frac{HF}{\beta\alpha\mu[(1+\lambda)U-H]}$, with $\frac{\partial x^*}{\partial\beta} = -\frac{x^*}{\beta} < 0$: the higher the probability of manipulation, the higher the monitoring and the lower the probability of cheating. It is easily shown that the expected loss under *Discretion-Parties*, as given by

$$L^{DP} = (1-\mu)^2 \alpha x^*(1+\delta)l^0 + \frac{1}{2}\beta\mu(1-\mu)[\alpha x^*(1-y^*)(1+\delta)l^0 + \alpha x^* y^* C]$$

is decreasing in β ($\frac{\partial L^{DP}}{\partial\beta} = (1-\mu)^2\alpha(1+\delta)l^0\frac{\partial x(\beta)}{\partial\beta} < 0$). Thus, punishments that reduce the probability of manipulation are not desirable. ∎

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