

# Managerial Behavior in the Lab: Information Disclosure, Decision Process and Leadership Style

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ANGELA SUTAN, RADU VRANCEANU

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# **Managerial Behavior in the Lab: Information Disclosure, Decision Process and Leadership Style**

Angela Sutan<sup>1</sup> and Radu Vranceanu<sup>2</sup>

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## **Abstract**

This paper reports the results from a lab experiment in which subjects playing the manager role can implement either an efficient / inequalitarian allocation or an inefficient / egalitarian allocation of payoffs. The experiment simulates a stylized managerial context by allowing the manager to manipulate information and select the decision process and by allowing the stakeholders to retaliate against the manager given different choices in the decision process. We found that the inefficient allocation is often selected and that this choice depends on whether the employees can retaliate against the manager and on whether the manager can hide information about the payoffs. The social preferences of the manager also explain the choice of the option. However, the decision process and the managerial style based on self-reported attitudes have little influence on the choice of allocation. This is consistent with employee satisfaction essentially depending on the payoff and not being sensible to the process.

**Keywords:** Managerial decision; Decision process; Asymmetric information; Communication strategy; Management style.

**JEL Classification Index:** M12; C92; D39

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<sup>1</sup> University Bourgogne Franche-Comte, Burgundy School of Business-CEREN, 9, Rue Sambin, 21000 Dijon, France. E-mail: [angela.sutan@bsbeducation.com](mailto:angela.sutan@bsbeducation.com).

<sup>2</sup> ESSEC Business School and THEMA, 1 Av. Bernard Hirsch, 95021 Cergy, France. E-mail: [vranceanu@essec.edu](mailto:vranceanu@essec.edu).

## 1. Introduction

Effective management is considered by many scholars to be a science as well as an art that requires a subtle mix of technical skills, soft skills, good intuition, and high moral values (see for instance Lilienthal, 1967, Mintzberg, 1973; 1975; Solomon, 1993; Drucker, 2001; Kotter, 2001). The complexity of the problems to be decided, the uncertainty surrounding them and the associated ethical tensions all prompt managers to draw heavily on their own personality traits in making decisions. A substantial amount of the leadership theory literature has taken stock of these basic facts and strived to identify distinctive management styles, which has led to a proliferation of typologies (e.g., Levin, 1940; Vroom, 2000; Northouse, 2011, Sauer, 2011; Bockerman et al., 2012; see for a survey Anderson and Sun, 2017).

However, the research in experimental economics has developed around extremely stylized choices that focus on simple individual decisions or simple interactions, more so in the controlled environment of the lab than in field experiments. To quote Friedman, Cassar and Selten (2004), “an experiment actively engages some small piece of the world. We design and run an experiment and record the results to learn about that piece.” The complexity of managerial decisions and the high level of decision aggregation would therefore indicate against using lab experiments to study this topic. However, lab experiments bring the invaluable benefit of a controlled environment where causality can be detected. Consequently, several management scholars have called for the use of experimental methods to study managerial issues. For instance, Powel et al. (2011) wrote the following: “Nonetheless, behavioral economics and behavioral finance have led the way in generating new ideas and research methods and in building intellectual bridges with psychology and neuroscience. We believe behavioral strategy can do the same in strategic management.” This call was echoed by Foss et al. (2016) who suggest that experiments can help develop better micro-foundations for strategy. As emphasized by Croson et al. (2007), while lab experiments can never be a substitute for the traditional methods of analysis in management, based on observational data; they can be a worthy complement since (1) they can be useful in distinguishing among competing theories, and (2) help “for theory building in corporate strategy, suggesting modifications to existing disciplinary-based theories and exploring new theoretical directions efficiently”.

This paper aims to contribute to the emerging behavioral management research literature by studying, in the controlled environment of the lab, how business students make an elementary decision. The study further seeks to ensure that the essential features of the managerial context are represented in the experiment, including the possible manipulation of information by the manager and his/hers strategic choice with regard to the degree of team involvement. We implement the standard methodology in experimental economics: (1) by avoiding participant deception by providing them with a fully transparent set of instructions, and (2) paying subjects in cash depending on their choices to ensure the salience of the decisions; furthermore (3), anonymity was strictly enforced (Davis and

Holt, 1993; Friedman et al. 2004). The cash incentives also add a degree of realism to the experiment since the vast majority of managerial decisions have material consequences for companies and their stakeholders.

Figure 1 summarizes the key elements of the experiment, expressing the outcome (the decision) at the juncture between the personal characteristics of the person including tolerance to risk, inequality aversion and style of management, the available decision processes, and his or her ability and willingness to manipulate information.

Management involves a permanent stream of very diverse decisions. The traditional management literature used to emphasize that many top manager decisions are oriented toward value creation and resource optimization by the company. As stated by Porter and Millar (1985), “This optimization may require tradeoffs. For example, a more costly product design and more expensive raw materials can reduce after-sale service costs. A company must resolve such trade-offs, in accordance with its strategy, to achieve competitive advantage.” Since the early 1990s, companies have become increasingly concerned about their social and environmental footprint; thus, the scope of decisions and associated trade-offs have broadened in scope. Indeed, managerial decisions have a direct impact on people. They certainly have a bearing on the organization’s main stakeholders such as its shareholders, employees, customers, collectivities. As noted by Burnett (2019), these main stakeholders provide positive and negative feedback on managerial decisions. For instance, shareholders can review a manager’s compensation, customers can shun a firm’s products or provide good press, and employees can support or oppose decisions by adjusting their effort level. Beyond the main stakeholders, a company’s activities and choices can have consequences for society at large. In the last few years, large companies seem to be increasingly concerned about doing good in general.

Therefore, the nature of the decision selected for the current study is of utmost importance for meaningful conclusions to be drawn. Managers in “real” firms must implement a wide set of decisions related to the prices, product quality and innovation strategies of the firm with regard to areas such as the making of alliances, partnerships, hiring, training and compensation policies, and corporate social responsibility. The set of choices can be discrete – for instance, whether to launch a new product – or continuous – for instance, what the share of the communication budget should be in the year to come. All these choices involve various tradeoffs and tensions.

In our experiment, we will consider the traditional trade-off between “efficiency” and “equity” to which managers are quite often submitted. This tradeoff is an essential component of the modern debate about the social role of the firm. From a methodological perspective, distributional choices are interesting since they are easy for the participants to understand and easy to measure, which make them good candidates for lab experiments. In the lab, the stakeholders can best be seen as the firm’s employees, whose payoffs are directly related to the manager’s decision. Such a measure can involve

factors such as the reorganization of the production process with worker reallocation. Depending on the decision process (to be selected by the manager), employees can influence the decision. Furthermore, in some treatments, employees will be allowed to retaliate against a decision that they dislike. Thus, the manager should aim to anticipate all possible reactions and make the “best” decision given his or her expectations for stakeholder feedback.

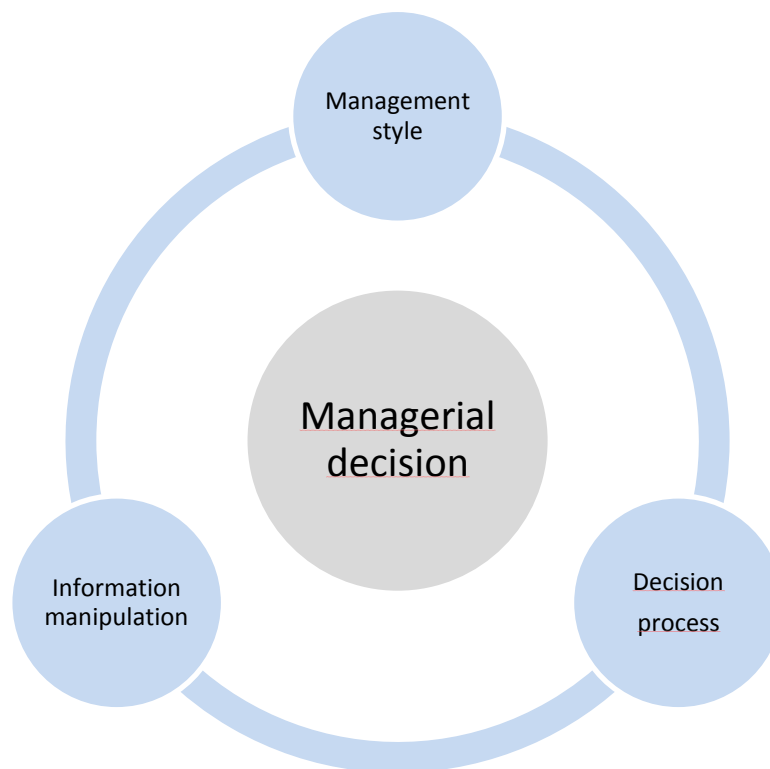


Figure 1. Key elements of the experimental design

Furthermore, the tensions between a manager’s own goals and stakeholder interests can be resolved or amplified through the decision process. The critical element of the managerial decision is not the decision itself but the choice of the process that allows for the implementation of the preferred choice in the best possible way for all participants. We will let the manager choose the decision process among a set of stereotypical processes that mimic real life processes.<sup>3</sup> Related to the decision process, managers will quite often exploit their information advantage with respect to stakeholders. The power of the CEO to set the agenda will be introduced in the experiment by allowing the participants to disclose only bits of information (about the payoff distribution).

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<sup>3</sup> Economists prefer to focus on the principal-agent contract, including the manager’s compensation scheme. Because the manager’s goals can diverge from the owners’ goals (Jensen and Meckling, 1976), in an imperfect information setting, the incentive compatibility constraint will provide the most efficient managers with an informational rent (Laffont and Martimort, 2009; Bolton and Dewatripont, 2005). We do not address here this topic; in the experiment, the manager has a direct incentive to choose the most efficient solution.

What is interesting in managerial decisions, and which is also a feature of our experiment, is that the preferences with regard to outcomes and processes are not independent. In other words, a given preference with regard to options can prompt a manager to choose a given process, and yet the process can have an impact on the final outcome, which might differ from the ex-ante preferred choice. To be sure, the manager will choose the process that maximizes the likelihood that the preferred outcome will be obtained at the least cost to him or her. In this experiment, the manager will first choose the amount of information he or she will disclose and the decision process; then the manager will use these factors to push for implementation of the preferred option among the set of feasible allocations.

Our design data will allow us to test several assumptions:

- a) When given the choice between an efficient/inegalitarian allocation and an inefficient/egalitarian allocation, students in business administration should prefer the former.
- b) The manager will more often respond to the threat of retaliation by making the decision that will satisfy the decision-bearers.
- c) When making a decision that the manager perceives as unpopular and against which the decision-bearers might retaliate, he or she should avoid the discretionary choice, and may also avoid the majority vote since his or her control over the outcome will be weaker.
- d) A manager who is subject to shame and guilt will hide information when making unpopular choices.
- e) Management styles will impact the decision process.
- f) Employee satisfaction depends on payoffs and on the method of imposing the decision.

In general, experimental economic studies can be criticized for their limited external validity, and this criticism is amplified by the nature of the topic under scrutiny; managerial problems are extremely difficult due to the complexity of the environment and the endemic uncertainty. Therefore, decisions are driven by a subtle combination of skills, moral values and intuition under the pressure of the time and subject to emotions related to status, competition and ultimately the survival of the firm. Is it possible to learn anything about managerial decisions from a lab experiment that requires dramatic simplifications to be implemented? A few management scholars have already taken up this challenge.

The behavioral management literature is expanding steadily, and it goes beyond the purpose of this short paper to provide an exhaustive survey. As relevant examples, such studies include reporting on managerial decisions in lab experiments under monopolistic competition such as pricing or excessive market entry (Camerer and Lovo, 1999, Iyer, 2015; Levine et al., 2017; Artinger and

Powell, 2015) or decision errors due to bounded rationality (Shapira and Shaver, 2014). Several papers have analyzed performance (Stermann, 1989; Apesteguia et al., 2012; Lamiraud and Vranceanu, 2018) in mass-attendance business games or the consequences of psychological biases such as optimism and overconfidence in explaining “abnormal” managerial choices (Kosegi, 2014).

Closer to our study, Kocher et al. (2012) use experimental data to show that managers who prefer efficiency are more likely to exercise an autocratic management style. Boulu-Reshef et al. (2015) analyze the relationship between leadership style, leadership communication and organizational performance in a lab experiment. Billinger and Rosenbaum (2019) analyze how managerial discretion over a firm’s resources and output can foster worker cooperation.

Our paper also contributes to the substantial body of literature in experimental economics as applied to social preferences. Experiments with the most celebrated dictator game reveal that people have a feeling of fairness and will retaliate against a decision-maker who offers them less than he or she will keep for him- or herself. Many theories (Fehr and Schmidt, 1999; Bolton and Ockenfels, 1998) and experiments (inter alia, Charness, and Rabin, 2002; Fehr and Schmidt, 2006; Falk et al., 2008) have confirmed what common intuition has already suggested: while people are self-interested, they are also concerned about the payoffs of the others. Many people seem to dislike situations in which their payoff is smaller or larger than the payoff of their partner. In our paper, the subjects with a strong preference for equality will, more often than others, avoid an efficient decision. In addition, the fear of retaliation (allowed in some treatments) is also a powerful factor that dissuades them from implementing an efficient solution.

The design of the experiment required many simplifying assumptions, some of which are more harmful than the others. Specifically, by focusing on one decision at a given moment, the experiment does not allow for the investigation of the intertemporal dimension of managerial choices, including a reputation building factor and the dynamic of adjustments to external shocks, which can make an organization resilient or fragile. However, in one treatment, the employees can retaliate against a decision that they disapprove; thus, the experiment allows for a simple form of strategic interaction. Learning processes, which are extremely important in organizations, have also been neglected. Using students in business administration instead of “genuine” managers can also create a selection bias since those who will become top-level decision-makers are only a subset of the population used for the analysis, and, with time and experience, their skills can also evolve. Despite its limitations, the experiment shows that experiments can provide a useful methodology for unveiling the micro-foundations of managerial decisions.

The paper is organized as follows. The next section describes the design of the experiment. Section 3 presents the results, and section 4 provides our conclusions.

## 1. Design of the experiment

All subjects were recruited from the student population of the Burgundy Business School in Dijon, France. As a "French Grande Ecole", BSB students are selected through a demanding national examination. This group is relatively homogenous in terms of cognitive abilities, age and educational background. The gender distribution is balanced. A large majority will find jobs after graduation in the private sector (in areas such as consulting and auditing, banking, finance and insurance, marketing).<sup>4</sup>

The experimental sessions were organized at the experimental lab of the school, the LESSAC, in October 2018, with a total of 477 subjects. The subjects were seated in cubicles. They made their decisions on a computer screen and could not establish eye contact with one another. The instructions (provided in the Appendix 2) and data collection were computerized.<sup>5</sup> A typical experimental session lasted for approximately one hour; subjects earned 12 euros on average.

The experiment is organized as a game between three agents. Agent 1 represents the manager; agents 2 and 3 can be seen as representing the firm's two employees. Agent 1 must first choose a **decision process** and then **make a decision** that bears material consequences for all three of them. Specifically, the manager (Agent 1) must choose between Option A and Option B. In Option A, the payoffs are (4, 4, 4), respectively: all agents receive 4 euros. In Option B, Agent 1 receives 6 euros. With a 0.5 probability, Agent 2 receives 8 euros, and Agent 3 receives 2 euros. The opposite allocation is implemented with a probability of 0.5, Agent 2 receives 2 euros, and Agent 3 receives 8 euros. Option B is thus (6, 8 or 2, 2 or 8). With this payoff structure, Option A is "fair" or egalitarian, as all persons in the group receive the same amount whereas B is "unfair" or inegalitarian since there is a positive variance between the individual payoffs. However, Option B is "efficient" as the total gain (6+8+2) exceeds the total gain in Option A (4+4+4). The *ex-ante* efficiency is greater considering the cumulated payoff of the 3 agents as well as at the type level: in the efficient allocation, not only does the manager earn more than in the egalitarian allocation (6>4), but so do the employees as a group (8+2 > 4+4).

Option A			Option B		
Agent 1	Agent 2	Agent 3	Agent 1	Agent 2	Agent 3
4	4	4	6	2/8*	8/2*
Legend * - Probability 0.5 to get the low/high payoff					

Table 1: The structure of payoffs

<sup>4</sup> See the annual report of the accreditation organization *Conférence des Grandes Ecoles* for the employability of business school students in France in 2018 (CGE 2018).

<sup>5</sup> The computer program was developed by Delphine Dubart at the ESSEC Experimental Lab using z-Tree (Fichbacher, 2007).



This structure of payoffs provides agent 1 (the manager) with an incentive to choose the efficient option B. If, instead, he or she chooses A, this could be explained either by fear of retaliation by the agent who will receive the low payoff or by a strong aversion to inequality.

The experiment allows managers to choose one of three decision **processes** that can be ordered from the most autocratic to the most democratic and involve different degrees of engaging employees in the decision-making.

- **Explain then chose.** Agent 1 can use a chat box to justify his or her choice and then decide by him- or herself which of Option A or B he or she will implement; a genuinely autocratic manager would probably adopt this method;
- **Listen then chose.** Agent 1 can open a chat box for the employees and observe what they write to each other, without interacting. The chat box stays open for 2 minutes. At the end of the discussion time, Agent 1 chooses between Option A and B.
- **Majority vote.** Agent 1 can implement a democratic choice process: he or she invites the two employees to cast a vote in favor of A or B, and, at the same time, he or she casts his or her own vote; the Option that receives at least 2/3 of the votes wins. The percent of votes in favor of each option is not communicated. In this latter process, the manager's control over the final outcome is weaker insofar as two votes against his or her decision would defeat it.

In the "Listen then chose" process, we read and manually coded the options that appeared to be preferred by the employees as "preference for A", "preference for B" or "no consensus".

The previous choice of a process (**a**, **b** or **c**) and of an option (**A** or **B**) will be implemented within four different treatments in a standard 2x2 design. The subjects who participated in one treatment cannot participate in another. Two conditions vary based on the amount of information that the managers can disclose to the employees.

One condition varies the ability of the employees to react to the decision process and its outcome at the very last stage of the game. In the "No sanction" setting, the employees have no option to impose sanctions on the manager. In the "Sanction possible" case, at the end of the experiment, the employees can impose a costly penalty on the manager. The penalty can be any amount between 0 and 2 euros. Each euro of penalty will cost the employee 0.25 euros; because of this cost, the penalty can be interpreted as a measure of the subject's dissatisfaction with the decision. The no-sanction treatment is of course less realistic because, in general, stakeholders can retaliate; the purpose of including a no-sanction treatment is to provide us with a measure of the effect of the threat on the manager's behavior.

The other condition varies the payoff information available to managers and employees. In the "full information" setting, the payoffs are common knowledge to both the manager and the employees:

the manager has no control with regard to the information about the payoffs. In the “asymmetric information” treatment, only the manager knows about the payoffs: he or she decides whether to hide the payoffs from employees in Option A, in Option B or in none of them. No decision can be made if no information at all is disclosed; thus, we ruled out this possibility.

The four main treatments are presented in Table 2, in which we also indicate the distribution of managers (agents 1) by main treatments. There were 93 agent 1s in the asymmetric information setting and 66 in the full information setting. There were 52 agent 1s in the no-sanction setting, and there were 107 remaining in the with-sanction setting.

	Sanction not allowed	Sanction allowed	Total
Asymmetric information	39	54	93
Full information	13	53	66
Total	52	107	159

Table 2. Main treatments and number of agent 1s in each treatment.

At the end of the experimental session, we use two incentivized tasks to elicit risk and inequality aversion.

Since the main experiment relied on a relatively complex design, we used the risk aversion task developed by Eckel and Grossman (2008), which distinguishes itself from other standard tasks by its simple structure. The participants are asked to make ten choices between an equal chance (0; 5 euros) lottery (i.e., 2.5 euros expected gain) and a safe choice, increasing from 0.50 cents to 5 euros in increments of 0.50 cents. Under the expected utility assumption, the number of times an individual chooses the safe choice is a measure of his or her risk aversion. The computer will draw one row at random, and the subject will receive the payment for this row in cash at the end of the experiment. We converted the number of safe choices into an index, with 1 for the maximum risk aversion.

Several scholars have used variants of the modified dictator game to elicit aversion to favorable inequality (e.g., Balafoutas et al., 2012; He and Villeval, 2017; Vranceanu and Dubart, 2019).<sup>6</sup> The dictator must make binary choices among various payoff distributions with a multiple price list structure; the rows vary the benefit of the dictator in an unequal allocation, who must weight it against a lower benefit for him or her in an equal allocation. In this paper, we adopt a different-but-related variant of the dictator game to measure the general rate of substitution of the dictator between the sum (efficiency) and variance (inequality) of a gift to a pair of anonymous persons. This approach often gauges the dictator’s general preference for fairness relative to efficiency.

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<sup>6</sup> In the standard dictator game, an active player (the dictator) is paired at random with a passive player and is given the choice of how to share his or her endowment. The latter takes no other action, he or she is a passive player.

To elicit this special form of inequality aversion, we asked the participants how they would allocate a sum of money to two other agents, chosen at random from the participant pool.<sup>7</sup> At the end of the experiment, the computer draws one line at random and implements the chosen allocation, and two participants matched at random with agent 1 will receive the payment in cash. The task is presented in Table 3.

Nb. row	Allocation		Please chose		Allocation	
	Player A	Player B	left	right	Player A	Player B
1	0	0	<input type="checkbox"/>	<input type="checkbox"/>	5	0
2	0.50	0.50	<input type="checkbox"/>	<input type="checkbox"/>	5	0
3	1.0	1.0	<input type="checkbox"/>	<input type="checkbox"/>	5	0
4	1.5	1.5	<input type="checkbox"/>	<input type="checkbox"/>	5	0
5	2.0	2.0	<input type="checkbox"/>	<input type="checkbox"/>	5	0
6	2.5	2.5	<input type="checkbox"/>	<input type="checkbox"/>	5	0
7	3.0	3.0	<input type="checkbox"/>	<input type="checkbox"/>	5	0

Table 3. The inequality aversion task

The number of times the individual choses the equalitarian distribution (left) is a good measure of his or her preference for equality relative to efficiency, or, in this special context, inequality aversion. This score has also been converted into an index, with 1 as the maximum inequality aversion.

In both these multiple price list choices, subjects with transitive preferences must switch at most once from one option to the other. When “inconsistent” subjects switch more than once, we consider these observations to be missing variables.

The participants had to complete the questionnaire by Northouse (2011) including 18 items to identify three common styles of leadership: autocratic, democratic and laissez-faire leadership (see the Instructions in the Appendix). The intensity of the preference for each of these tendencies was also expressed as 0-1 indices.

The subjects were also asked to indicate their age, gender, and admission track.

Immediately after the decision task (and after learning their payoffs), the employees were asked to report their *satisfaction* with respect to the outcome of Agent 1’s decision on a scale from 1 (very unsatisfied) to 5 (very satisfied).

## 2. The results

Appendix Table A1 presents the characteristics of the subject sample, overall and by the subjects’ roles (318 agent 2s and 3s (employees) and 159 agent 1s (managers)). The subject characteristics are evenly distributed across the two types of agents, confirming the quality of the randomization.

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<sup>7</sup> We ensure that one player is matched with two other distinct players.

In this first part of the text, the analysis will focus on the choices of the managers, or Agent 1s, in our notation. As we already mentioned above, the main treatments differ as to whether the manager is obliged to disclose the payoffs associated with each option and whether the employees can retaliate by imposing a costly sanction on the manager. The main treatments and the distribution of the participants in the role of managers by treatment are presented in Table 2.

As mentioned above, the essential decision of the manager is the payoff distribution; more precisely, he or she must choose between Option A (4; 4; 4) and Option B (6; 8 or 2; 2 or 8). The first option is egalitarian but Pareto inefficient, and the second is inequalitarian but efficient. Furthermore, the manager has a direct incentive to choose the efficient allocation B insofar as his or her direct gain is larger, and the would-be sanction cannot exceed 2 euros.

**In our data, the participants preferred the egalitarian option, which was chosen 53.46% (85/159) of the time whereas the efficient option was implemented 46.54% (71/159) of the time.**

Several sociologists have criticized business school education for its alleged emphasis on “managerialism”, i.e., a nurtured bias for efficiency at the expense of any other socially valuable goals (Khurana, 2007; Parker, 2018). Our results do not support this claim.

#### **What prompts the manager to choose the efficient decision?**

The data in Table 4 show that if the employees could punish the manager in a last move, the latter will more likely choose the egalitarian option whereas the reverse occurs if there are no sanctions (Pearson chi-squared: 5.30;  $p=0.02$ ). The threat of the sanction thus supports the egalitarian choice. In other words, regardless of their own preferences over the two allocations, managers are prompted to choose the egalitarian option because they believe that ex-post workers prefer the equalitarian distribution.

In the no-sanction condition, the equalitarian Option A is still chosen in 40% of the cases, and this frequency rises to 60% in the with-sanction case.

		Option A	Option B	Total
Sanction not allowed	N	21	31	52
	%	40.38	59.62	100.00
Sanction allowed	N	64	43	107
	%	59.81	40.19	100.00
Total	N	85	74	159
	%	53.46	46.54	100.00

Table 4. Number and frequency of times Option A (B) is chosen, by sanction condition

However, when allowed, sanctions were applied only in a very small number of cases. Sanctions can be applied by 214 subjects (employees in the with-sanction case); they were implemented in only 12 cases, or 5.6% (among whom 9 subjects received the low 2-euro payoff).

As shown in Table 5, when managers cannot hide information (full information condition), they more often tend to choose the inequalitarian option B, which is not statistically significant (Pearson chi-squared: 1.91;  $p=0.17$ ). The only explanation for this counterintuitive result lies in the fact that in the hide information condition, many managers choose to disclose all information and then choose the egalitarian option A. This preference for honesty or transparency is a positive characteristic of future managers, with the caveat that these are generalized results based on a population of students in management school compared to a population of actual managers.

		Option A	Option B	Total
Asymmetric information	Nb	54	39	93
	%	58.06	41.94	100.00
Full information	Nb	31	35	66
	%	46.97	53.03	100.00
Total	Nb	85	74	159
	%	53.46	46.54	100.00

Table 5. Number and frequency of times Option A (B) is chosen, by information condition

In this experiment, we did not explicitly model the shareholders' behavior or how they exert control over the manager to ensure that they pursue the goal of efficiency. However, this fundamental relationship is implicit in the payoff structure of the manager, the latter being "incentivized" by his or her higher gain in the efficient option B.

In the following, we are interested in the "micro-foundations" of the decision; more precisely, we seek to understand how the choice of the efficient option A is related to elements of the context and the personal characteristics of the player, going beyond pure monetary gain.

Table 6 presents the results of several OLS regression models where the dependent variable is an indicator variable taking the value of 1 if the manager chose Option B and 0 otherwise.<sup>8</sup>

The explanatory variables are as follows: A dummy variable, *Full information*, takes the value of 1 in the condition in which the manager cannot hide information and 0 otherwise. Another condition dummy, *Sanction allowed*, takes the value of 1 if the employees can punish the manager and 0 otherwise.

<sup>8</sup> A probit model delivers similar results.

We create three dummy variables for the process used for this decision; each takes the value of 1 if the process was “explain and decide”, “listen and decide”, “majority vote,” respectively. Because one subject must use one of these processes, these three variables are not independent; therefore, we use the first as the benchmark.

The dummy *Hide option B* takes the value of 1 if managers choose to hide this inequalitarian option, conditional upon having this possibility. Another dummy (Eco track) takes the value of 1 if the subject had economics as the admission track. Other variables are the risk aversion and inequality aversion scores (continuous, 0 to 1) as well as the three scores of the Northouse scale of managerial styles.

	Model 1	Model 2	Model 3
Full information=1	0.196** (0.07)	0.104* (0.06)	0.252** (0.11)
Sanction allowed=1	-0.239*** (0.07)	-0.222*** (0.06)	-0.190*** (0.06)
Listen and decide	0.076 (0.10)	0.089 (0.11)	0.071 (0.11)
Majority vote	0.068 (0.08)	0.101 (0.09)	0.048 (0.10)
Female=1	-0.008 (0.07)	0.060 (0.07)	0.059 (0.07)
Age	-0.019* (0.01)	-0.021 (0.02)	-0.021 (0.02)
FiliereEco=1	-0.079 (0.07)	-0.034 (0.09)	-0.062 (0.09)
Risk aversion		-0.294 (0.21)	-0.165 (0.20)
Inequality aversion		-0.548*** (0.13)	-0.460*** (0.14)
Style autocratic		-0.010 (0.01)	-0.003 (0.01)
Style democratic		-0.033* (0.02)	-0.032* (0.02)
Style laissez-faire		0.020 (0.01)	0.026* (0.01)
Hide option B=1			0.334** (0.14)
Constant	0.935*** (0.27)	1.905*** (0.40)	1.431*** (0.45)
r2	0.077	0.205	0.257
N	159	137	137

Legend: \*\*\* significant at 1% \*\* significant at 5% \* significant at 10%; (s.e.) within parentheses. OLS, errors clustered by session

Table 6. Choice of option B (efficient)

As expected, the degree of inequality aversion of the manager is an important factor in explaining why the latter would avoid option B. However, even if controlling for his or her social preferences, managers more often choose option B in the full information setting; however, when they hide option B (in the asymmetric information setting), opportunities to implement it will increase. As shown above, the threat of sanction dissuades managers from choosing Option B.

No decision process seems to back option B more than option A. The managerial styles have a weak impact. Managers with a democratic leadership orientation tend to prefer option A, and laissez-faire managers tend to prefer option B, which is in line with intuitive reasoning.

### **When managers can hide information, which communication strategy do they adopt?**

We now study the choices of the 93 managers in the asymmetric information condition (with and without sanctions). Recall that, in this condition, only the manager knows the payoffs associated with the two options and can decide whether to disclose the payoff of option A, of option B or of both options (fully transparent).

Table 7 shows that there is a neat difference in communication strategy – those who hide B will likely implement B; those who hide A, or disclose both, will likely choose A (Pearson chi-squared 26.64;  $p < 0.01$ ). The “transparent” manager will choose the egalitarian option, and the “opaque” one will rather choose the inequalitarian one.

		Hide			
		Disclose both	A	Hide B	Total
Option A	N	36	5	13	54
	%	85.71	45.45	32.50	58.06
Option B	N	6	6	27	39
	%	14.29	54.55	67.50	41.94
Total	N	42	11	40	93
	%	100.00	100.00	100.00	100.00

Table 7: Communication strategy in asymmetric information condition by option

From Table 8, we note that “listen and decide” is the preferred process of the managers in the asymmetric information condition, regardless of the communication strategy.

		Disclose both	Hide A	Hide B	Total
Explain and decide	N	8	2	3	13
	%	19.05	18.18	7.50	13.98
Listen and decide	N	27	7	25	59
	%	64.29	63.64	62.50	63.44
Majority vote	N	7	2	12	21
	%	16.67	18.18	30.00	22.58
Total	N	42	11	40	93
	%	100.00	100.00	100.00	100.00

Table 8: Communication strategy in asymmetric information condition by process

We now further investigate the driver of the choice to hide B in the asymmetric information condition (40 out of 93 subjects).

Regression analysis (Table 9), using the dummy hide option  $B = 1$  and 0 otherwise as a dependent variable, reveals that subjects with a strong inequality aversion will avoid hiding B; this finding is consistent with the previous observation that agents who implement option A will adopt the transparent communication strategy. The nature of the decision process is not significant; however, managerial styles have a small influence, with the autocratic and laissez-faire managers being less prone to use the information manipulation strategy, probably for different reasons. As expected, the coefficient of risk aversion is negative and statistically significant. Possibly, the risk-averse managers have an amplified perception of the punishment threat, which will temper their desire to pass on option B.



	model 1	model 2	model 3
Sanction allowed	-0.201 (0.12)	-0.159 (0.14)	-0.150 (0.15)
Listen and decide	0.136 (0.22)	0.098 (0.26)	0.061 (0.22)
Majority vote	0.238 (0.22)	0.217 (0.26)	0.195 (0.23)
Female=1	0.034 (0.08)	0.012 (0.10)	0.003 (0.11)
Age	-0.011 (0.06)	-0.004 (0.06)	-0.000 (0.05)
FiliereEco	-0.029 (0.09)	0.126 (0.11)	0.142 (0.11)
Risk aversion		-0.620*** (0.12)	-0.607*** (0.14)
Inequality aversion		-0.408* (0.18)	-0.503*** (0.15)
Autocratic			-0.040* (0.02)
Democratic			-0.006 (0.03)
Laissez-faire			-0.032* (0.01)
_cons	0.601 (1.15)	1.018 (1.09)	2.416* (1.07)
r2	0.076	0.193	0.293
N	93	79	79

Legend: \*\*\* significant at 1% \*\* significant at 5% \* significant at 10%; (s.e) within parentheses. OLS, errors clustered by session.

Table 9: Factors determining the choice of hiding option B

### A further investigation of the choice of the decision process

Recall that, in this study, managers can choose to either make a discretionary decision after sending employees some brief information or monitor a brief chat among the employees and then decide or implement a voting mechanism where the option that obtains at least 50% of the votes is implemented.

The data in Table 10 show the frequency of using one of the three processes, overall and depending on the option chosen. The most preferred process is the second (59.75%).

We found little correlation between the choice of option B and the type of process (Pearson chi-squared=1.18, p=0.55). The data suggest that the discretionary process (explain and decide) might be weakly associated with option A.

		Explain and decide	Listen and decide	Majority vote	Total
Option A	N	17	49	19	85
	%	20.00	57.65	22.35	100.00
Option B	N	10	46	18	74
	%	13.51	62.16	24.32	100.00
Total	N	27	95	37	159
	%	16.98	59.75	23.27	100.00

Table 10: Use of decision process by option to be implemented

Quite intriguingly, when no sanction is possible, the managers will resort less to the discretionary process and relatively more to the participative processes, which is to some extent counterintuitive (Pearson chi-square=7.16,  $p=0.03$ ).

		Explain and decide	Listen and decide	Majority vote	Total
Sanction not allowed	N	3	34	15	52
	%	5.77	65.38	28.85	100.00
Sanction allowed	N	24	61	22	107
	%	22.43	57.01	20.56	100.00
Total	N	27	95	37	159
	%	16.98	59.75	23.27	100.00

Table 11: Use of decision process by possibility of retaliation

We also estimate three regression with three distinct dependent variables: dummies 1/0 for each choice of process – explain and decide (discretion) (1/0), listen and decide (1/0), majority vote (1/0). The output of these regressions presented in Appendix Table A2 reveals that none of the elements of our analysis (contextual factors, personal characteristics) can explain the choice of process.

We now study whether the manager who implements the listen and decide process (he or she monitored the chat exchange before making his or her decision) implemented the consensus of the two “employees”. As mentioned above, the chat was recorded so we could read it and determine whether players 2 and 3 reached a consensus for option A or for option B, or they reached no agreement (we manually coded the three outcomes). It turns out that when a consensus was reached, most of the time, the manager followed it (Pearson chi-squared = 25.2;  $p<0.01$ ). This would suggest that managers chose the listen and decide process when they were unsure of what to do yet wanted to retain full control with regard to the decision. Otherwise, they would adopt the vote procedure that also favored the consensus of the employees but partly removes his or her control.

		No consensus	Consensus for option A	Consensus for option B	Total
Option A	N	19	27	3	49
	%	38.78	55.10	6.12	100.00
Option B	N	18	7	21	46
	%	39.13	15.22	45.65	100.00
Total	N	37	34	24	95
	%	38.95	35.79	25.26	100.00

Table 12: Choice of option in the listen and decide process by consensus of the group

Finally, we analyze the outcome of the decision process considering the perspective of the employees, i.e., agents 2 and 3.

### Who is the happiest employee?

Recall that, at the end of the experiment, the subjects in the employee role (318 subjects) could use a scale from 1 to 5 to express their satisfaction with the outcome of the experiment, with 1 for extremely discontented to 5 for extremely satisfied.<sup>9</sup>

Unsurprisingly, the most satisfied participant is the one who earns the most. However, the relationship between payoffs and satisfaction is nonlinear as shown in Table 13. If earning 2 euros is associated with a low satisfaction level (a statistically significant difference from earning 4 euros), the satisfaction of earning 8 euros is almost close to that of earning 4 euros. This low difference is probably not only the outcome of a concave utility function; in line with the standard social preference assumption, the winners of the large payoff might attach some disutility to the gap between their large gain (8 euros) and the low gain (2 euros) of their partner.

Payoff	Satisfaction	s.e.	[95% conf. Interval]	
2 euros	2.59	(0.16)	2.28	2.90
4 euros	4.06	(0.10)	3.88	4.24
8 euros	4.40	(0.12)	4.16	4.63

Table 13: Satisfaction level of agent 2 and 3 by end-of-experiment payoff

Table 13 presents the results of regression models with satisfaction as the dependent variable. They confirm that the payoff is the most important explanatory variable. The process used to implement the decision has no impact on the satisfaction.<sup>10</sup> Furthermore, controlling for profit, the employees truly do not appreciate having option B hidden, which the managers seemed to dismiss as they often used this possibility.

<sup>9</sup> In some treatments, they could also impose a sanction; however, as we mentioned, the monetary sanction was imposed in only very few occurrences.

<sup>10</sup> We also checked and found that the choice of the process does not matter for the subset of players who earn the low payoff (2 euros).

A somewhat unexpected result is that the subjects with a high aversion to inequality appear to be happier (while controlling for their gains).

	Model 1	Model 2	Model 3	Model 4	Model 5
Payoff (2, 4, 8)	0.255*** (0.04)	0.257*** (0.04)	0.262*** (0.03)	0.263*** (0.04)	0.260*** (0.04)
Sanction allowed = 1	0.192 (0.14)	0.105 (0.14)	0.122 (0.17)	0.045 (0.16)	0.030 (0.16)
Full information = 1	-0.038 (0.11)	0.068 (0.13)	-0.245* (0.12)	-0.114 (0.17)	-0.216 (0.22)
Listen and decide = 1	0.148 (0.20)	0.108 (0.20)	0.181 (0.21)	0.151 (0.19)	0.179 (0.17)
Majority vote = 1	0.058 (0.20)	0.179 (0.20)	0.133 (0.19)	0.252 (0.17)	0.258 (0.17)
Female = 1	0.080 (0.19)	-0.124 (0.17)	0.057 (0.20)	-0.135 (0.18)	-0.167 (0.17)
Age	0.059* (0.03)	0.082** (0.03)	0.062* (0.03)	0.085** (0.03)	0.070 (0.04)
Risk aversion		0.412 (0.55)		0.463 (0.55)	0.517 (0.58)
Inequality aversion		0.814* (0.41)		0.790* (0.41)	0.845** (0.39)
Hide option B = 1			-0.523** (0.20)	-0.460** (0.19)	-0.494** (0.18)
Style autocratic					-0.002 (0.03)
Style democratic					0.059 (0.04)
Style laissez-faire					0.034 (0.03)
Constant	1.116 (1.00)	0.261 (1.10)	1.283 (1.04)	0.361 (1.13)	-1.198 (1.24)
r <sup>2</sup>	0.156	0.193	0.176	0.208	0.228
N	318	257	318	257	256

Legend: \*\*\* significant at 1% \*\* significant at 5% \* significant at 10%; (s.e) within parentheses. OLS, errors clustered by session

Table 14: The employee satisfaction equation

### 3. Conclusion

Despite the frequent calls by management and strategy scholars for a more active application of experimental methods to the analysis of managerial situations, progress in the field has been relatively slow. This hardly comes as a surprise given the substantial distance between the extremely complex reality of management and the methodological constraints of the experimental research, which generally requires keeping complexity at low levels.

In this experiment, we strived to obtain a reasonable compromise between the requirements of external and internal validity. We studied an elementary-yet-fundamental choice between efficiency and equality, as applied to a payoff allocation among three agents, one “manager” who is in charge of the decision and two “employees” who are exposed to the consequences of the decision. In some treatments, the latter can retaliate against an unsatisfactory decision, which brings a strategic dimension to the relationship between the two types of agents. The experiment elicits those personal characteristics that are important for economic decision making: aversion to risk, aversion to inequality and management style. Allowing for contextual differences allows the manager to manipulate the information he or she delivers to the employees and the process through which the decision is implemented. This approach acknowledges that the three elements should be analyzed in an integrated way as noted in the introduction (Figure 1).

In this experiment, the negative results teach us about managerial decision making as much as the positive results. The prevalence of the egalitarian decision came as a surprise; the inequality aversion of the participants explains this result, but not fully; the managers not only prefer the egalitarian distribution, but they also believe that the decision-bearers (employees) also do so; thus, they will implement it more often when employees can retaliate.

While all the three decision processes (discretionary, listen and decide, voting) were used, the analysis did not reveal any pattern of choice in the process. Only further research will be able to determine whether the participants allowed their inspiration to be based on the “art” component of management or whether the experiment failed to capture one important rationale. Furthermore, managerial styles as captured by the traditional self-declared survey question had only a modest influence on the choice of the option.

When the managers can hide some of the payoff information, interestingly, the managers who implement the egalitarian option tend to be “transparent”, i.e., they fully disclose the payoff information; however, the managers who implement the efficient inequalitarian decision tend to conceal it. A satisfaction analysis reveals that the employees express significant dissatisfaction with this strategic manipulation of information, which raises the question of why the managers implemented this strategy in the first place.

Some of the assumptions used to build the experiment might have been too restrictive. Keeping the same design, it would be interesting to see a study of whether “real” managers make different choices compared to our sample of young business students. Other payoff distributions can also be considered; future studies could set a stronger incentive for managers to implement the efficient allocation, in line with the ubiquitous performance pay systems for managers in real companies. Despite these limitations, this paper should be seen as an attempt to bring to the lab economic

decision-making with a managerial flavor and thus contribute to the nascent literature in behavioral management research.

\* \* \*

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## Online Appendix

### A. Instructions in brief: the “full information with sanction treatment”<sup>11</sup>

Slide 1

Good morning,

Thank you for participating in this experiment.

In this experiment, which should last approximately 30 minutes, you can earn money. It is important to carefully read the instructions because the gains will depend on your decisions.

The main experiment includes three tasks. For each task, you will receive specific instructions. These instructions indicate the decisions you can make and how your gains are related to the decisions of the participants. Each task is remunerated.

The total gain will be paid in cash at the end of the session.

Your choices are strictly anonymous. No other participant will know your decisions or your identity.

You will receive all instructions on the screen, and you will make your decision on the computer screen.

From now on, please do not communicate in other way than allowed by the instructions. Stay focused and turn off your cellular phone; otherwise, you will be asked to leave the room.

If you have any questions, please raise your hand and wait for the Administrator.

Slide 2

In this task, you will be assigned to a group of 3 anonymous participants, selected at random. They are denoted agent 1, agent 2 and agent 3. The roles will be assigned at random at the outset of the experiment.

Agent 1 must choose between Option A and Option B. The related payoffs are indicated in the table below.

In option A, agent 1 obtains 4 euros; in option B, agent 1 obtains 6 euros.

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<sup>11</sup> In the *Asymmetric information* situation, the agents know that there are two options, A and B, with payoffs (a1, a2, a3) and (b1, b2, b3). Agent 1 is the only one who knows the true monetary payoffs. In a first step, he or she must decide whether to disclose some or all information about the payoffs.

Agents 2 and 3 will be paid depending on the decision of player 1 and a random drawing. If agent 1 chooses option A, both agents receive 4 euros. If player 1 chooses option B, agent 2 receives 8 euros and agent 3 gets 2 euros with a probability 0.5, and agent 2 receives 2 euros and agent 3 receives 8 euros with probability 0.5.

Option A			Option B		
Agent 1	Agent 2	Agent 3	Agent 1	Agent 2	Agent 3
4	4	4	6	2/8*	8/2*
<i>Legend * - Probability 0.5 to get the low/high payoff</i>					

Agent 1 can implement his or her decision using one of the following decision processes:

- **Process 1.** Agent 1 can use a chat box to send a message to agents 2 and 3, then chose option A or B
- **Process 2.** Agent 1 allows agents 2 and 3 to chat with respect to their preferences for one of the options. He or she monitors the chat without intervening, then decides by him- or herself which of Option A or B he or she will implement.
- **Process 3.** Agent 1 informs agents 2 and 3 that the decision will be the outcome of a majority vote involving the three of them. The percent of votes in favor of the majority option is not disclosed.

Once the Option is chosen, all participants are informed about their payoffs.

Finally, agents 2 and 3 can, if they wish, impose a sanction on agent 1, for an amount between 0 and 2 euros. Each euro of sanction will cost the agent 0.25 cents.

Do you have any questions before continuing? If so, please raise your hand and wait for the administrator.

Slide 3 a – Task 1: decision agent 1

You are agent 1.

You must choose between these two allocations. The gains for each player associated with each option are presented in the Table below (the same as above).

What process do you want to implement?

- 1 I send a message to the two players, then choose the option
- 2 I allow them to chat and monitor their exchanges without intervening, then I choose the option
- 3 I implement a majority vote decision process.

I choose the process [...]

Slide 3b – Task 1: decision agents 2 and 3

You are agent 2 (or 3).

[Depending on the process, they receive one of the messages and required actions]

Agent 1 / sent you this message ..... He or she will decide which of option A or B to implement.

Or

You can exchange by chat during 2 minutes with your partner about your preferences on these two allocations. Agent 1 will monitor the exchange but cannot intervene. He will then determine which of option A or B to implement.

Or

Agent 1 decided to implement a voting procedure. The three of you will cast a vote in favor of one of the two options. The option that receives the majority of votes will be implemented.

Slide 4. Agent 1

I choose / vote for option A / B

Slide 5

Results – Your gain from this task is: ...

[Only for players 2 and 3]

Do you want to impose a sanction on agent 1 ? Y/N

Amount (...) (max 2 euros)

Your net gain for this first task is: ..

The complementary tasks for eliciting risk aversion and the preference for equality relative to efficiency were presented in the main text. These tasks were incentivized.

Last, the participants were asked to indicate on 5-item scales their agreement with each of these statements (from 1 = total disagreement to 5 = full agreement).<sup>12</sup>

1. Employees must be supervised closely, or they are unlikely to do their work.

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<sup>12</sup> From Northouse (2011). Scoring: sum the responses on items 1, 4, 7, 10, 13, and 16 to gauge *authoritarian* leadership; sum the responses on items 2, 5, 8, 11, 14, and 17 to gauge *democratic* leadership; sum the responses on items 3, 6, 9, 12, 15, and 18 to gauge *laissez-faire* leadership.

2. Employees want to be part of the decision-making process.
3. In complex situations, leaders should let subordinates work problems out on their own.
4. It is fair to say that most employees in the general population are lazy.
5. Providing guidance without pressure is the key to being a good leader.
6. Leadership requires staying out of the way of subordinates as they do their work.
7. As a rule, employees must be given rewards or punishments to motivate them to achieve organizational objectives.
8. Most workers want frequent and supportive communication from their leaders.
9. As a rule, leaders should allow subordinates to appraise their own work.
10. Most employees feel insecure about their work and need direction.
11. Leaders must help subordinates accept responsibility for completing their work.
12. Leaders should give subordinates complete freedom to solve problems on their own.
13. The leader is the chief judge of the achievements of the members of the group.
14. It is the leader's job to help subordinates find their "passion."
15. In most situations, workers prefer little input from their leader.
16. Leaders give orders and clarify procedures.
17. People are basically competent, and if given a task, they will do a good job.
18. In general, it is best to leave subordinates alone.

## B. Summary statistics and addition regressions

		Gender	Age	Filiere	Risk av.	Ineq. av.	Autocratic	Democratic	Laissez-faire
Employees	N	318	318	318	284	282	317	317	317
	Mean	1.53	20.42	0.53	0.55	0.55	17.60	22.90	17.77
	s.d.	0.03	0.09	0.03	0.01	0.02	0.19	0.15	0.19
Managers	N	159	159	159	143	147	159	159	159
	Mean	1.45	20.48	0.58	0.55	0.54	18.14	22.60	17.65
	s.d.	0.04	0.19	0.04	0.01	0.02	0.28	0.22	0.26
Total	N	477	477	477	427	429.00	476	476	476
	Mean	1.50	20.44	0.55	0.55	0.55	17.78	22.80	17.73
	s.d.	0.02	0.09	0.02	0.01	0.01	0.16	0.12	0.15

Table A1. The personal characteristics of the subjects, by role played in the experiment

	Explain and decide = 1	Listen and decide =1	Majority vote =1
Sanction allowed =1	0.187** (0.08)	-0.017 (0.13)	-0.170 (0.10)
Full information = 1	0.083 (0.06)	-0.043 (0.10)	-0.040 (0.09)
Option B=1	-0.059 (0.06)	0.030 (0.08)	0.029 (0.05)
Female =1	-0.099 (0.07)	0.009 (0.09)	0.090 (0.08)
Age	0.006 (0.02)	-0.033*** (0.01)	0.027* (0.01)
Style autocratic	-0.003 (0.01)	0.007 (0.01)	-0.004 (0.01)
Style democratic	0.004 (0.02)	0.012 (0.01)	-0.016 (0.01)
Style laissez faire	-0.017 (0.01)	0.002 (0.02)	0.015 (0.01)
Ineq. aversion	0.192 (0.17)	-0.224 (0.19)	0.032 (0.18)
Risk aversion	-0.332* (0.18)	0.138 (0.19)	0.194 (0.19)
Constant	0.415 (0.64)	0.885** (0.35)	-0.300 (0.49)
r2	0.105	0.040	0.069
N	137	137	137

Legend: \*\*\* significant at 1% \*\* significant at 5% \* significant at 10%; (s.e.) within parentheses. Std errors clustered by session

Table A2: The determinants of the type of decision process



### **ESSEC Business School**

3 avenue Bernard-Hirsch  
CS 50105 Cergy  
95021 Cergy-Pontoise Cedex  
France  
Tel. +33 (0)1 34 43 30 00  
**[www.essec.edu](http://www.essec.edu)**

### **ESSEC Executive Education**

CNIT BP 230  
92053 Paris-La Défense  
France  
Tel. +33 (0)1 46 92 49 00  
**[www.executive-education.essec.edu](http://www.executive-education.essec.edu)**

### **ESSEC Asia-Pacific**

5 Nepal Park  
Singapore 139408  
Tel. +65 6884 9780  
**[www.essec.edu/asia](http://www.essec.edu/asia)**

ESSEC | CPE Registration number 200511927D  
Period of registration: 30 June 2017 - 29 June 2023  
Committee of Private Education (CPE) is part of SkillsFuture Singapore (SSG)

### **ESSEC Africa**

Plage des Nations - Golf City  
Route de Kénitra - Sidi Bouknadel (Rabat-Salé)  
Morocco  
Tel. +212 (0)5 37 82 40 00  
**[www.essec.edu](http://www.essec.edu)**

## **CONTACT**

**RESEARCH CENTER**

[research.center@essec.edu](mailto:research.center@essec.edu)

