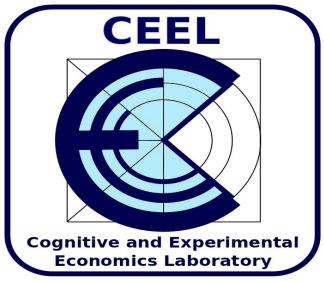

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Trust and trustworthiness in experimental organizations

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Abstract

In this paper we discuss two instruments through which corporate law attempts to promote trust and trustworthiness in business organizations: (i) monitoring of the manager by a principal, as in the agency approach; (ii) moral suasion, as in the approach according to which managers are "fiduciaries". We present the results of a laboratory experiment designed to investigate the effectiveness of these two instruments in promoting: (i) profitable, but at the same time risky, entrustments of assets to a manager from a group of investors earning their endowment through real effort; (ii) a higher payback for those investors who entrust more assets to the manager. The first is a measure of trust of the investors in the manager, while the second is a measure of the manager's trustworthiness. We find that moral suasion increases the investors' trust. Monitoring also increases the investors' trust, but only in the case in which the manager is not aware of the experimental identity of his/her principal. The manager is trustworthy up to a certain degree, regardless of the governance structure of the organization and of the accuracy with which she observes each investor's entrustment. Finally, we find a modest positive effect of noise on trust, but no strong effect of noise on effort or trustworthiness.

JEL classification system: K22, C92, L21

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1 Introduction

Trust has been defined as the "willingness to make oneself vulnerable to another, based on the belief that the trusted person will choose not to exploit one's vulnerability (i.e., will behave trustworthily)" (Blair and Stout 2001b, p.1739-1740). Trustworthiness is then the unwillingness to exploit a trusting person's vulnerability, even when profitable to do so.

Trust and trustworthiness play an important role in organizations and in markets[1]. In respect to business organizations, trust and trustworthiness are important because the discretion accorded to corporate managers by the law under the business judgement rule is wide enough to allow managers to engage in behaviour that we would deem as untrustworthy and opportunistic. There are at least three sources of expectations of trustworthiness that could tilt the motivational balance of managers away from self-interest with guile[2] and in the direction of trustworthiness. These sources are:

1. The corporate law feature that grants the shareholders the power to monitor the managing bodies of the organization.

2. The regulations against managerial self-dealing.

3. The manager's adherence to norms, especially fairness and reciprocity. These norms are reinforced by legal provisos[3] that describe the manager as a "fiduciary", or trusted party in a relation that typically involves the administration of some assets.

While the ability to prosecute managers that is essential to item 2 above is hard to reproduce in the lab, in this paper we study the effects of monitoring (item 1) and of the law's provisos concerning fiduciaries (item 3).

In this paper we present the results of a real-effort, real-leisure 3-trustor trust game, manipulated to include noise, moral suasion and punishment. We try to replicate an organization in which three investors repeatedly decide the extent to which they wish to trust the manager. Trust is operationalized as a decision regarding the

[1]Cf. K. Arrow: "Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time", cited in Algan and Cahuc (2013, p.522), a literature review of the many studies finding a causal relationship between trust and economic growth.

[2]Williamson (1975, p.7) uses these words to define the concept of opportunistic behaviour.

[3]I use the word "proviso" to mean a statement in the statutory or case law that clarifies the content of a duty, in this case the duties that managers owe the shareholders and the corporation.

fraction of the endowment that investors wish to pass along to the manager. We use the word investor throughout this paper to describe the vulnerable player of the trust relation, i.e. the player exposed to the risk of the manager's untrustworthiness. One of the investors in some of our treatments plays the role of a monitoring "principal". Notice that the principal is an investor, with some extra powers detailed below. These investors are a representation of anybody who contributes capital to the firm, be they shareholders (equity capital), workers (human capital), or customers (the capital of expectations of satisfactory products). In our experiment the capital that is invested is an amount of Experimental Currency Units (ECUs). We use the word manager for the trusted party of the trust relation. Depending on the treatment, the manager can be differently interpreted as being an agent or a trustee. These different portraits of the managers our treatments possibly build in the eyes of the manager himself/herself and of the investors should not be a source of confusion, as the manager plays always the same function and takes always the same decision in *all* of the experiments detailed below.

All players (investors and manager) earn their endowment through an actual exercise of effort. Once each player's endowment is determined, an amount of ECUs is transferred from each investor to the manager. We call the amount of points that each individual investor transfers to the manager his/her *entrustment*. The investors keep the remainder of their endowment for themselves. The experimenter then multiplies each entrustment by a multiplier equal to 3. The manager finally distributes the sum of all ECUs he/she has available between himself/herself and all investors, without any constraint placed on his/her ability to appropriate the points available to him/her. In this game the investors' decision to entrust ECUs to the manager is both rewarding and risky at the same time. It is rewarding because of the multiplier effect that boosts the value of their entrustments. It is risky because the manager might choose to be untrustworthy, returning little (or nothing) to each investor.

We manipulate the basic structure of the game we have just described in several ways. In the trusteeship treatment, it is common knowledge among all players that the manager is "a fiduciary. A fiduciary is held to a behaviour that is more rigorous than the one that would be acceptable in the marketplace; and to an honourable behaviour". This statement originates in the U.S. law on fiduciary duties. We call this statement the *trusteeship proviso* throughout the paper.

In the agency treatment with the ID of the principal unknown to the manager ($IDPU$), it is common knowledge that one of the investors will monitor the manager at the end of the basic game described above. We call the investor with monitoring powers the principal. Monitoring in our experiment is a bundle of four rights:

1. The principal sees the manager's payback to the principal;

2. The principal sees the manager's payback to the two non-monitoring investors;

3. The principal sees the manager's appropriation of points (*levy* for short), i.e. the number of ECUs that the manager has kept for himself/herself;

4. The principal can punish the manager at a small cost.

The manager is unaware of who in his/her group will monitor him/her. From the point of view of the manager, hence, any investor in his/her group could monitor him/her with equal probability. This is why we refer to this setup as featuring *shared* monitoring rights.

In the agency treatment with the ID of the principal known to the manager (*IDPK*), it is common knowledge that one of the investors will monitor the manager, and that the manager *knows* the identity of his/her principal. This setup features then *exclusive* monitoring rights.

We also study the effects of the degree of accuracy with which each investor's entrustment is observed by the manager. We study all treatments described above in both a low-noise setup, where entrustments as seen by the manager mirror closely what was originally sent by the investors; and a high-noise setup in which with high probability the entrustments are reduced by a percentage amount of what originally sent.

In this paper we use measures of trust and trustworthiness that follow closely our definitions. Trust is measured as the investors' entrustments to the manager. Trustworthiness is defined as the strength of the relation between points entrusted by each investor and points returned by the manager to that investor.

Regression analysis shows that virtual organizations exposed to the trusteeship proviso feature higher trust by investors. Shared monitoring also increases trust. We do not find any effect of exclusive monitoring rights on the trust decisions, a likely sign that the non-monitoring investors did not feel safeguarded by this feature, and that the principal did not feel the need to trust more, expecting a payback simply because of his/her special role in the experiment.

Managers are trustworthy, in that they return more ECUs to those investors who entrust them with more ECUs. We find that the manager's trustworthiness is not changed by the trusteeship proviso, the monitoring rights (shared or exclusive), or noise. Trustworthiness seems rather a behavioural trait of our experimental managers.

We find a modest positive effect of noise on trust and a small (at best) positive effect of noise on effort. Finally, we find that leisure time was unattractive for the

participants; and that punishment is frequent, but usually of a small, and probably only symbolic, magnitude.

We believe our results point to an interesting, and underexplored, feature of corporate governance regulations. Our results show that the moral suasion of the law, and the rules concerning the accountability of managers to certain constituencies, only affect the beliefs of the investors about the manager. The managers, on their side, seem mostly insensitive to these regulations, although we do find in our study that they make a modest attempt to "please" their principal, when they are aware of his/her identity.

Trust has been the subject of a rich experimental literature. Berg et al. (1995) study a two-player game in which an investor's assets can be entrusted to a manager; the manager can then decide whether to abuse the trust of the investor, or be trustworthy and reward him. This game has become popular under the name of *investment (or trust) game*. This study finds a substantial amount of trust and trustworthiness, neither of which can be justified on the grounds of Nash equilibrium analysis. Our findings in this paper provide further evidence that trust and trustworthiness play an important role in a modified investment game that is meant to reproduce some features of business organizations, like for example real effort.

Fischer et al. (2013) have questioned the purpose of organizational forms like the US benefit corporation, an organizational form adopted by several US jurisdictions that explicitly allows managers to take into consideration the interests of non-shareholder constituencies. This organizational form is puzzling in light of the fact that only the shareholders can *de jure* hire and replace the managers, and hence we would expect the managers to feel pressed to work in the shareholders' interest only.

The manager of the virtual organization in Fischer et al. (2013) plays a modified dictator game where the dictator allocates resources his/her principal and a charity. The authors find that the introduction of a market for managers decreases transfers to the charity, and that the introduction of a proviso taken from the German self-regulation corporate governance code does not produce any statistically significant effect on giving behaviour. As in Fischer et al. (2013), we find that provisos originating in the law do not affect the behaviour of the manager, but we find evidence that a similar proviso affects the investors' trust in the behaviour of the manager, an aspect that Fischer et al. (2013) are unable to investigate due to the non-strategic nature of the dictator game.

Rubin and Sheremeta (2012) find that gift exchange contracts without shocks encourage effort and wages well above standard predictions. The introduction of random shocks that can bias effort both up or down reduces wages offered by the

principal, effort exercised by the agent, the probability of fulfilling the contract by the agent, the payoff of the principal, and total welfare. Our experimental design features noise that erodes the value of the investors' entrustment to the manager. We find a modest positive effect of noise on trust, and a small (at best) positive effect on effort.

Monitoring can be viewed as an offspring of the agency approach to corporate law, known in economics as the principal-agent model. We survey this approach in Section 2. We then move to a discussion of the law on fiduciaries in Section 3. Section 4 presents our design, followed by our hypotheses (Section 5), and the results of our empirical analysis (Section 6). Final remarks follow.

2 Agency

The institutional analysis of the firm has greatly benefited from the principal-agent model, which has opened to study the "black box"-firm of neoclassical theory, unveiling in the process the conflicting interests of principals and agents within the firm (Hart 1995).

The principal-agent model is not explicitly concerned with the promotion of trust and trustworthiness within the firm, and any trust that does arise can be viewed as a secondary effect of the compensation-design process that constitutes the essence of this model.

Outside economics, the weight that the principal-agent model has on corporate law scholarship is pervasive, to the point that Hansmann and Kraakman (2004b, p.33) state that "corporate law prototypically deals with the basic agency problem between the firm's owners and its managers by providing for a multi-member board of directors that is elected (at least in major part) by the firm's shareholders and that is distinct both from the body of shareholders and from operational management".

There are at least two different levels in agency analysis. The first one is descriptive in nature: an agency relationship arises when one party grants discretion in decision-making to a second party, who is given incentives to take decisions in the principal's interest. The second is normative, in the sense that it concerns the attribution of the appellative of *principal*, which in turn determines in whose interest the agent should act. At the descriptive level, the corporate law scholarship has discussed *several* agency problems within the modern corporation. The first (and most studied) agency problem is the one between shareholders and managers.[4]

[4]Most models do not distinguish between directors and officers, even though the roles of the two types of "managers" are quite different, and covered by different legal provisions.

Other agency relationships are the one between minority stockholders (the principal) and controlling ones (the agent), and the one between managers (the agent) and other non-shareholder constituencies (all principals), such as employees and creditors (Hansmann and Kraakman 2004a). Agency relations entail two types of costs, first studied by Jensen and Meckling (1976). First, the principal will incur costs to monitor the conduct of the agent. Second, the agent will incur bonding costs, i.e. resources he will expend in order to create credible guarantees that he will not undertake actions detrimental for his/her principal.

We focus in what follows on some of the most controversial features of the agency approach. The first feature is the divergence of programs of the principal and agent. The standard claim is that the right payment scheme ensures that the agent acts similarly to the way in which the principal would like him/her to. The existence of diverging interests calls for continuous and professional monitoring of managerial actions. Having several principals, instead of a single one, results in an inefficient multiplication of agency costs (Lee 2006), and it increases the power of real control holders (the managers) with respect to formal control holders (usually, the shareholders, cf. Aghion and Tirole 1997).

The second feature of the model is the peculiar assumptions that are made on the motivational structure of the players. Both the agent and the principal are expected-utility maximizers, with the agent averse to both risk and effort, and (usually) a risk neutral principal. By focusing on the maximization of each player's *own* utility, agency theory has been blamed for creating a corporate atmosphere centred on greed and personal interest, where social norms of fairness, reciprocity and trustworthiness play no role (Gintis and Khurana 2010).

The third feature is the notion of a "principal", i.e. of someone who enjoys the authority to draft the contract offered to the agent, in the form of payment schemes and *ex post* accountability mechanisms.

In practice, Delaware [5] law grants shareholders a rather narrow list of powers: the power to bring derivative suits, vote on extraordinary operations, and appoint the Board of Directors. Several papers have found economic rationales for such powers: Dow and Skillman (2007), for example, point out that because the "exit" option is easily available to capital investors, capital markets induce unanimity. The Delaware jurisprudence has produced rulings in which the term "principal" has been explicitly used, for example in *Unisuper*:[6] "...the board's power–which is that of an agent's

[5] Over half of the Fortune 500 companies are incorporated in Delaware (Black 2007).

[6] *Unisuper Ltd. v. News Corporation*, C.A. No. 1699-N (January 2006). This case involved the reincorporation of News Corporation, the media company controlled by Rupert Murdoch, in Delaware from Australia.

with regard to its principal–derives from the shareholders, who are the ultimate holders of power under Delaware law".

3 Trusteeship

A minority tradition in corporate law interprets the prerogatives of corporate managers as fitting the trusteeship paradigm.[7] The word trusteeship originates in the English jurisprudence, and stands for the appropriate standard of conduct of an individual, the trustee (or fiduciary), who controls or manages assets that he/she does not beneficially own (Kay 1996, p.114). These assets are instead owned by the trustor (or beneficiary, or *cestui que trust*), who entrusts them to the trustee for different sorts of reason (e.g., lack of competency, as in the case of foundations, or death, as in the case of estates).[8] US Courts have often found that managers are trustees of the shareholders and of the corporation itself.[9]

An analysis of the language used in the case law on fiduciaries suggests that the motivational structure trustees are expected to assume is richer than the one we find in the standard principal-agent model. The trustee is supposed to exercise a disinterested and independent judgement in relation to the assets entrusted to him. An authoritative opinion on this matter comes from Judge Cardozo's ruling in *Meinhard*[10]:

> Many forms of conduct permissible in a workaday world for those acting at arm's length are forbidden to those bound by fiduciary ties. A trustee is held to something stricter than the morals of the market place. Not honesty alone, but the punctilio of an honor the most sensitive, is then the standard of conduct.

Cardozo continues by pointing out that the fiduciary relationship requires of business partners renunciation of self and abnegation. Blair and Stout (2001a) claim that to satisfy Cardozo's standard the fiduciary would need to be endowed with, or

[7] Cf. Clark (1985) and Blair and Stout (1999).

[8] The leading case is *Learoyd v. Whiteley* (House of Lords, August 1st, 1887): "as a general rule the law requires of a trustee no higher degree of diligence in the execution of his office than a man of ordinary prudence would exercise in the management of his own private affairs".

[9] Cf. *Pepper v. Litton* (208 U.S. 295, 84 L.Ed. 281 60 (S.Ct., 1939)): "A director is a fiduciary, [...] so is a dominant or controlling stockholder or group of stockholders. [...] Their powers are powers in trust".

[10] *Meinhard v. Salmon*, 164 N.E. 545 (N.Y. 1928).

assume, an other-regarding utility function. Frankel (1998, p.129) argues instead that fiduciary law requires honesty and not altruism.

Regardless of such differing opinions on the motivations that these rulings assume, when it comes to trustees Courts often indulge in psychological portraits that are hard to find in other areas of the law, creating "an aura faintly resembling that which churches try to put around the duties of ministers to their congregations or of parents to their children" (Clark 1985, p.75).

This type of language might be an instance of the expressive function of the law, i.e. the function of law in " 'making statement' as opposed to controlling behavior" (Sunstein 1996, p.2024). These statements seem able to motivate people who could be "crowded out" by the presence of monitors,[11] by possibly creating conformity to the standard of behaviour described in the law.[12]

Not all business relationships possess the features of trusteeship, which leads us to the question of when it is efficiency-enhancing to carry out transactions through trustees. Blair and Stout (2001b, p.55) argue that "fiduciary relationships are created by the law in situations where it is efficient or otherwise desirable to promote other-regarding, trusting and trustworthy behaviour". We argue that one such situation is the trust game played by a group of investors who entrust assets to a manager, who can appropriate the assets without bounds. This is the experimental design we present in the next section.

4 Experimental design

Our aim is to investigate the effects of two types of constraints on the manager's behaviour that are suggested by the agency and trusteeship approaches: monitoring in the first case, and the language according to which the manager is a "fiduciary", or trusted one, in the second. We study the effects of these constraints on investors and managers of a virtual organization. We start the description of our experimental design through simple two-player extensive-form games, and then illustrate the ways in which we enrich these simple games in our experimental design.

In the trusteeship design before the Trustor (TR) and the Trustee (TE) start playing, the experimenter announces the trusteeship proviso. This states that TE "is a fiduciary", and that "a fiduciary is held to a behaviour that is more rigorous

[11] Frey (1993) is an early discussion of the distrust effects of monitoring of the agent by a principal. Falk and Kosfeld (2006) find evidence that the principal's decision to exercise control rights over the agent negatively affects the agent's motivation, and find that most principals anticipate the rise of "hidden costs of control" by not exercising their control rights in the first place.

[12] On preferences to conform to principles of distributive justice, cf. Grimalda and Sacconi (2005).

than the one that would be acceptable in the marketplace; and to an honourable behaviour", as authoritatively stated in the case *Meinhard v. Salmon*. After the announcement, TR and TE play the investment game. This is a sequential game in which TR decides whether to entrust (E) TE with an investment, or not (OUT). TE, after having observed the decision of TR, can either abuse (AB) the trust, or be trustworthy (NO). The initial announcement is irrelevant from the point of view of the material payoffs earned by the players in the game, and is an example of cheap-talk. The equilibrium predictions for our modified investment game are then the same as those in the traditional investment game. The only Subgame-Perfect Nash equilibrium is (OUT, AB), with associated payoff (δ, δ), a Pareto inefficient result. This equilibrium entails that TR will not invest, out of the (justified) fear that TE might abuse his/her trust. Notice in fact that, if given the possibility to choose, TE always chooses AB as $\beta > \alpha$. Anticipating TE's choice, TR chooses then OUT as $\delta > \gamma$. The extensive-form representation of this game is shown in Figure 1.

Trusteeship proviso

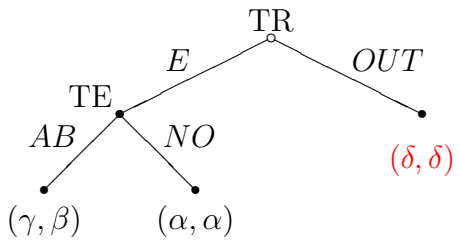

Figure 1: The trust game between a trustor (TR) and a trustee (TE), with the trusteeship proviso.

The agency design we study does not feature the trusteeship proviso, and it is represented in its broad features in Figure 2. As in the previous case, the Principal (P) can decide whether to entrust (E) the Agent (A) with an investment, or not (NO). The Agent then decides whether to abuse the trust (AB), or not (NO). After A has made his/her decision, P can impose a penalty $p > 0$ upon TE at a cost $c > 0$ (P or P', depending on A's choice), or abstain from punishing and simply

accept A's choice (NP or NP').[13]

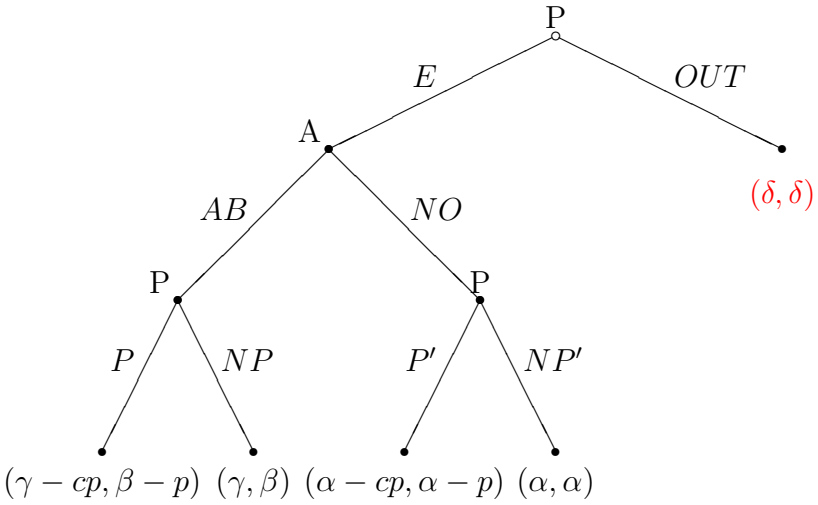

Figure 2: Trust Game between a principal with monitoring powers (P) and an agent (A).

Punishing is never on the equilibrium path as long as the cost of punishing c is greater than zero for the punisher. The Subgame-Perfect Nash equilibrium is $(OUT/NP/NP', AB)$, with payoff, again, (δ, δ). The two games are therefore equivalent from the point of view of the equilibrium payoffs, predicting that the TR (P) does not trust the TE (A). However, we will show below that investors typically do entrust the manager with a substantial share of their endowment, against the equilibrium predictions for this game.

We modify both the trusteeship and agency designs in two main ways. First, we have 3 players entrusting resources to a manager. In the agency treatments, only one of the three investors acts as the principal with monitoring powers (principal for

[13]A question we do not address here is who should be the subject in charge of monitoring. Easterbrook and Fischel (1993) argue that there is no need for such a monitor to be a specific class of people, as the market can monitor managers effectively. Alchian and Demsetz (1972) argue that the monitor should be an external figure, a "meter" for the members of the corporate team. An influential case, *In re Caremark Int'l Derivative Litig.* (698 A.2d 959, 967, Del. Ch. 1996), has invested the board of Directors with monitoring functions of the officers and employees of the organization. Hansmann (1996) views monitoring costs as a component of the costs of ownership, incurred by the contributors of equity capital in the capitalist form of organization. As further described below, in our experiment the principal with monitoring functions is one randomly extracted participant.

short), while the other 2 investors do not enjoy such powers. Having three investors, instead of only one, allows us to observe how the manager trades off one player's pay-off against another's. At the same time, we wanted to keep the number of investors small enough to makes it possible for the manager to balance the interests of different investors, if the manager so wishes, without incurring burdensome computations. In the agency game, the fact that there is only one principal in each group allows us to check for differences in trusting behaviour for the monitoring and non-monitoring investors.

The second modification is that both the trust and trustworthiness decisions are continuous, in the sense that, rather than giving each player two choices, investors can decide the share of their endowment they wish to give to the manager (a number between 0 and 1), and the manager can decide exactly how many points to return to each investor (including himself). This modification allows us to have a finer measure of both trust and trustworthiness.

We now describe the details of our experimental design, starting with the control study 1 (simply, Control), which is the common design of all our experiments. We then illustrate the several ways in which we manipulate this design.

1. Instructions are read by the experimenter aloud. Each participant is informed that he/she will be repeatedly interacting with 3 other players, chosen randomly at each round among those participants present in the room. The participants learn in the instructions that they will decide in the experiment how many experimental points they wish to entrust[14] to a manager, one of the group members *randomly* extracted to assume this role. The way in which the participants decide how many points to entrust to the manager is detailed below. These entrustments are subject to error in the transmission process. With probability $n = 0.01$, the manager observes each investor's entrustment diminished by $s = 40\%$. With probability $(1 - n) = 0.99$ the manager observes the entrustment accurately. Each entrustment is then a random variable from the point of view of the manager. Notice that in our study noise always erodes entrustments, and we do not allow the possibility that noise can also increase their value. This simplifies the interpretation of our results because we do not have to account for differences in responses to the type of noise participants believe they are facing. We set the investment erosion parameter s at 40% in an attempt *not* to make it obvious to the manager whether he is observing an entrustment noisily or not.

   After reading the instructions, the subjects complete a comprehension test that

[14]The more neutral word "transfer" was actually used in the experimental instructions.

is individually checked by the experimenter.

2. In every round of play, the participants can either be an investor or a manager. Participants are privately informed on their screen about their role in each round. The two roles are randomly attributed to the participants in each round of play. [15]

3. Investors and manager make a decision regarding a share $r_i \in [0, 1], i = (1, 2, 3, M)$, of their endowment that they wish to entrust to the manager. r_i is our measure of each player's trust. It is common knowledge that the points entrusted by each participant are multiplied by a parameter $m = 3$ by the experimenter.

4. All participants are informed of all the trust decisions r_j of their group members.

5. All participants earn their endowment e_i through an exercise of real effort: they are presented with a 14 rows $\times$ 10 columns matrix of 0 and 1, and they earn one ECU for every correct sum of the 1's appearing in each table (as in Abeler et al. 2011). If their sum is incorrect, they earn no credit for that table, and a new table appears. The subjects can also enjoy a leisurely alternative: they can press a button that takes them to an Internet browser (as in Corgnet et al. 2011 and Corgnet et al. 2013). They can revert to summing numbers at any point in time, and return to Internet at later points in time. The effort exertion period lasts for 10 minutes for all players in each session.

   We chose to elicit the participant's trust decision r_i before the endowment is determined in order to capture the players' level of trust in complete absence of information regarding the features of the other participants.

6. Each participant's entrustment, including the manager's own transfer to himself/herself, is computed as $r_i * e_i$. This entrustment is subject to noise that erodes its value in 1% of the cases ($n = 0.01$), and leaves its value unaltered in 99% of the cases. We write from now on $r\tilde{e}_i$ for each investor i's entrustment as seen by the manager, who cannot distinguish whether he is observing effort accurately or not. [16] Each investor's entrustment $r\tilde{e}_i$ is then multiplied by

[15] In our actual experiment, we never use the words "manager" and "investor". The investors were simply referred to as "participants", and the manager as the "blue participant".

[16] In the case in which noise decreases the value of actually exerted effort, the difference $r_i(e_i - \tilde{e}_i)$ returns to the experimenter.

$m = 3$ by the experimenter. The value of the multiplier, equal to 3, is the one most commonly found in the literature on Voluntary Contribution Mechanisms. The manager's own transfer is also tripled, but is not made subject to noise. Applying noise to the manager's effort would not be sensible, as the manager is obviously aware of his/her own effort level.

7. The manager observes each investor's entrustment, without knowing if he is observing it accurately or not (but aware of the parameter n). He is also reminded of every investor's trust decision $r_i, i = 1, ..., 3$. The sum total of points available to the manager is $3[\sum_{i=1}^{3} r_i \tilde{e_i} + r_M e_M]$, an amount we call *pie*. The manager then decides how to divide *pie* between himself and all other players. The payback to every investor $i = 1, ..., 3$ is denoted $transf_{M,i}$. The manager's appropriation of points for himself/herself is denoted as $levy_M$. No bound is placed on $transf_{M,i}$ or $levy_M$. The only constraint for the manager is that $3[\sum_{i=1}^{3} r_i \tilde{e_i} + r_M e_M] = \sum_{i=1}^{3} transf_{M,i} + levy_M$, i.e. he/she must exhaust the *pie*.

8. Subjects are informed of their payoffs, thus calculated. For the investors, $p_i = (1 - r_i)e_i + transf_i$. For the manager, $p_M = (1 - r_M)e_M + levy_M$.

9. The experiment restarts from point 2 above. Subjects are aware that the groups are randomly formed at the beginning of every round of the game, and that new endowments are earned in the course of every round. The participants were not told the exact number of rounds of play they were going to be involved in. We hoped in this way to avoid end-game effects.[17]

10. Subjects were paid according to their earnings in one randomly extracted round of play. The exchange rate was set at 0.5 euro cents for each ECU.

Our control study 2 differs from the control study 1 described above in that it features a higher noise parameter $n = 0.4$. Effort in control study 2 is observed noisily in 40% of the instances.

Treatment 1 is our trusteeship proviso experiment. The participants are informed in the instructions that the manager is a fiduciary, before they learn their role in the experiment. The experiment then unfolds exactly as in control study 1, with $n = 0.01$.

Treatment 2 is equivalent to Treatment 1, with the only difference of a higher noise parameter $n = 0.4$.

[17]The number of rounds is actually 3 in all our sessions–this ensures we have the same number of observations per participant in every experimental session.

Treatment 3 is our agency experiment, with unknown principal ID. The instructions inform the participants that one of the investors, randomly chosen, will "observe" the conduct of the manager after the manager has made his/her decision regarding $transf_{M,i}$ and $levy_M$, i.e. after step 7 of the control study described above.[18] The principal observes every investor's and the manager's r_i; the noisily observed entrustments ($n = 0.01$), including the principal's own and the manager's; $transf_{M,i}$, i.e. the number of points each player received back from the manager; and the manager's appropriation $levy_M$. The principal can then decide to punish the manager at a cost.[19] In Treatment 3 the manager is unaware of the experimental identity of the principal: it is common knowledge only that there is a principal in the group, and that punishment has a cost $c = 0.1$ ECU. Every investor enjoys then an equal probability of $\frac{1}{3}$, from the point of view of the manager, to have monitoring power over the manager. The payoff of the principal is $p_P = (1-r_P)e_P + transf_P - 0.1punish_P$. The payoff of the manager is now $p_M = (1 - r_M)e_M + levy_M - punish_P$. We kept the cost of punishment c as low as possible, at 0.1 ECU for every ECU-worth of punishment imposed upon the manager.

Treatment 4 is equivalent to Treatment 3, save for a higher noise parameter $n = 0.4$.

Treatment 5 is equivalent to Treatment 3 ($n = 0.01$), apart from the feature that now the manager is informed, when allocating points at stage 7 of the experiment described above, of the experimental ID of the principal.

Treatment 6 is equivalent to Treatment 5, save for a higher noise parameter $n = 0.4$.

Particular care was taken not to frame the exchange in specifically business-like terms, although the organizational features of the environment were possibly apparent to the participants due to the presence of real effort. Also, in all treatments we avoided mentioning explicitly in whose interest the manager should work. In the agency treatments, we only brought to the players' attention the existence of the principal, but refrained from stating explicitly that the manager was supposed to work in the interest of, or on behalf of, the principal.

Table 1 summarizes all the treatments we studied, and the number of participants in each treatment and control study. In the next section we formulate theoretical hypotheses regarding the ways in which the trusteeship proviso, shared and exclusive monitoring, and noise affect trust, trustworthiness and effort in organizations. Table 2 summarizes all the relevant parameters and decisions in the experiment.

[18]The principal with monitoring functions is referred to as the "red" participant.

[19]We did not use the word "punishment" in the instructions, stating simply that the principal can subtract points from the manager at a cost.

	Trusteeship proviso	Monitoring (ID of principal unknown, IDPU)	Monitoring (ID of principal known, IDPK)	Control
Low noise ($n = 0.01$)	Treatment 1 "Trustee" N =20	Treatment 3 "IDPU" N =20	Treatment 5 "IDPK" N =20	Control 1 "Control" N =20
High noise (H) ($n = 0.4$)	Treatment 2 "H-Trustee" N =20	Treatment 4 "H-IDPU" N =20	Treatment 6 "H-IDPK" N =24	Control 2 "H-Control" N =16

Table 1: Summary of all treatments and controls, and number of participants for each study (P).

5 Hypotheses

The coexistence in the law of instruments akin to the agency and trusteeship approaches is indicative that corporate law uses several instruments to promote trust and trustworthiness in organizations. In such environments it is typically too costly or cognitively impossible to agree *ex ante* on a way to distribute the cooperative surplus produced by the organization. On one side we have the "moral suasion"[20] of the trusteeship proviso, and on the other the monitoring rights enjoyed by the principal.[21] These two instruments can be viewed as safeguards meant to decrease the frequency of Nash equilibria in the trust game, and increase the frequency of trusting/trustworthy, and efficiency-enhancing, behaviour.

We briefly consider the incentive effects of these two instruments, using the dis-

[20]We do not address here the question regarding which channels the law uses to to shape preferences. Different possibilities include conformity, authority, and normative expectations. We use moral suasion in what follows as a catch-all term for these different aspects of the complex relationship between rules and human psychology.

[21]This mix of instruments is likely superior to the traditional remedy proposed by the New Institutional Economics literature (e.g. Hart and Moore 1990), i.e. authority. Dow (1987, p.20) notices that: "Transaction cost theorists tend to see authority primarily as a remedy for opportunism, rather than as a device which might be abused in an opportunistic fashion", pointing out the perverse effects of any residual-control structure on non-controlling constituencies.

Parameter	Explanation	Type
r_i	Trust	Decision
e_i	Endowment (earned through real effort)	Decision
$Internet$	Internet time	Decision
$\tilde{e}$	Noisily observed effort	Controlled by n
pie	Sum of all entrustments	See text
$transf_{M,i}$	Payback (absolute)	Decision
$transfperc_{M,i}$	Payback (percentage)	Decision
$levy_M$	Points kept by the manager (absolute)	Decision
$levyperc_M$	Points kept by the manager (percentage)	Decision
$steal_M$	Points kept by the manager (percentage), net of manager's own transfer	Decision
p	Payoff in each round	See text
$punish$	Punishment	Decision
$return$	Return on investment	See text
$pMINe$	$(p - e)$	See text
n	Noise level	Parameter
m	Multiplier	Parameter
s	Erosion of the investment	Parameter

Table 2: Summary of all the decisions and parameters of our experiment.

tinction drawn by Williamson (1998, Ch.6) between high-powered and low-powered incentives. High-powered incentives are typical of, but not exclusive to, markets, where the efficiency gains from a particular transaction flow directly to the parties transacting, who have strong incentives to monitor performance. Low-powered incentives are typical of firms, where changes in effort exercised have little immediate effect on outcomes for the worker.

Williamson's analysis provides rationales for the existence of organizations featuring both types of incentives. High-powered incentives exacerbate opportunism in the pursuit of increasing one's share of the gains from trade, but usually increase efficiency. Low-powered incentives can entail an efficiency loss, but are more effective if opportunistic behaviour would be very costly for the organization, or if the managers have intrinsic motivations that could be crowded out by high-powered incentives. [22]

We take the monitoring powers of the principal as an instance of high-powered incentives offered to the manager, as the principal has voice over the resources the manager appropriates. We take the moral suasion of the trusteeship proviso as an example of low-powered incentives, as the investors have no direct voice over the manager's decisions. The investors rely on the trusteeship proviso alone in order to constrain the self-interest of the manager, and promote his/her trustworthiness. We formulate three testable hypotheses regarding the way in which our manipulations affect trust, trustworthiness, and effort.

Hypothesis 1 *The trust decision r_i is bigger in magnitude in the trusteeship treatments, and in the treatment with a principal of unknown ID, compared to a control with the same noise level.*

We hypothesize that the investors will entrust assets to the manager in the presence of low-powered incentives. We hypothesize that high-powered incentives might produce the same result, but only when the manager cannot attempt to establish a tacit agreement with the principal. The terms of this tacit agreement between the manager and the principal of known ID likely entail that the manager divides the *pie* between himself/herself and the principal, abusing the trust of all the other investors in the process. We expect the trust level in the agency setup with a principal of known ID, and the trust level in the control, to be close.

We suspect that in the treatment with a principal of known ID not even the principals' trust might be increased by their special role in the game. To the contrary, principals might try to maximize their payoff by keeping all their endowment for themselves, and expecting the managers to assign points to them simply because of their role in the game. Managers might assign points to their principals, even in

[22] Intrinsic motivation "involves people doing an activity because they find it interesting and derive spontaneous satisfaction from the activity itself" (Gagné and Deci 2005, p.331).

the presence of low entrustments by the principals, in the fear of being otherwise punished.[23]

Hypothesis 2 *The manager is more trustworthy in the treatments compared to a control.*

We expect that some form of incentive is needed in order to promote the manager's trustworthiness. Depending on the motivational structure of the manager, low-powered or high-powered incentives might perform better in increasing the manager's trustworthiness. The literature has in this regard found an heterogeneity of responses of managers to high-powered incentives. Dickinson and Villeval (2008) find that principals frequently engage in costly monitoring, and most participants react to monitoring by increasing effort. Effort decreases, however, when monitoring passes a certain threshold.

Notice that the trustworthiness of the manager cannot involve a single parameter as in the case of trust. Trustworthiness is tied to the strength with which the manager reciprocates the investor's trust with a payback to that investor, in the treatments versus the control study. We describe in further details our measures of trustworthiness in the next section.

Hypothesis 3 *Noise depresses effort e_i, trust r_i and trustworthiness.*

We believe we might replicate the finding in Rubin and Sheremeta (2012) that noise depresses effort. We also hypothesize that noise might discourage trustworthiness, as the manager might feel he/she does not have adequate information to be trustworthy; and that noise might also discourage trust, if trust is based on the expectation of trustworthiness.

6 Results

160 subjects participated in total in our experimental sessions. All sessions took place at the Cognitive and Experimental Economics Laboratory of the University of Trento (Italy), using a computerized interface. The subjects were all undergraduate students of the University of Trento, all majoring in one of the Social Sciences. We ensured all the sessions were gender balanced upon enrolment of the participants. The participants won on average 14 euros, including a 3 euro show up fee. The top earning manager won about 100 euros in the course of the experiment. The experiment lasted on average 1 hour and 10 minutes. No participant took part more

[23]Rajan and Zingales (1998) study a similar scenario, in which an entrepreneur who owns an asset may not invest optimally in the organization that employs the asset. This is because the entrepreneur may threaten the other contributors of organization-specific investments to sell his stake to a third party.

than once in our study. Instructions for all treatments and controls are available from the corresponding author upon request.

Table 3 shows the descriptive statistics for all the variables of interest in our study. The mean of the trust decision r_i is 57%. The variable features a high coefficient of variation $c_v = 0.65$. e_i is the endowment, with $c_v = 0.39$, and subjects earning on average one ECU per minute. $Internet$ measures the seconds participants spent browsing the Internet. At 5 seconds on average out of 10 minutes, the mean of $Internet$ is a clear sign that the leisure option was rarely used in our experiment. pie is the number of points available to the manager for redistribution, equal on average to 73 ECUs, highly dispersed with $c_v = 0.44$. The variables $transf_{M,i}$ and $transfperc_{M,i}$ show the number of points, in absolute and in percentage terms of pie, that individual investors receive back from the manager. Both variables are highly dispersed, with coefficients of variation equal to 1 in both cases. Individual investors receive back on average 15% of the pie. $levy_M$ and $levyperc_M$ are the amount of points, in absolute and in percentage terms of pie, that the manager keeps for himself/herself. Managers keep on average about 50% of the points available, well below the pure self-interest scenario in which they keep all points for themselves. The difference between $levyperc$ and $transfperc$ amounts to about 37%. We find initial evidence that the managers have assigned more ECUs to themselves than to investors. When we subtract from $levyperc_M$, however, the fraction of points that were directly transferred by the manager (i.e., $\frac{(3*r_M e_M)}{pie}$), managers appropriate about 20% of the points on average (variable $steal_M$). p is the payoff, also highly dispersed.

Punishment occurs in about 50% of the sessions, but it is usually of a small magnitude, about 4 points on average. Principals seem almost to be making a symbolic gesture, rather than a decision able to impact the payoff of the manager. Figure 3 shows that no punishment at all is the modal choice in our experiment, both in the sessions with high noise and with low noise. The variable $return$ is computed as the difference between $transf_{M,i}$ and the number of points entrusted by every investor to the manager, multiplied by 3 (i.e., $3 * r_i * e_i$). This return is on average negative, both in the low noise and the high noise sessions. We observe that only 27% of all investors earn a positive return on their investment (cf. also Figure 4). $pMINe$ is an alternative measure of return on investment, computed as the difference between the payoff p actually earned by the investors and their endowment of points e_i. $pMINe$ measures the extent to which the players have been better off investing what they actually invested, compared to the alternative (counterfactual) scenario in which they would have chosen the OUT strategy, setting $r = 0$, and keeping all their endowment e_i for themselves. Using this measure of return, the investors have earned a modest positive return on their investment of about 5 points, in absolute

Table 3: Summary statistics

Variable	**Mean**	**Std. Dev.**	**N**
r	0.571	0.371	460
e	11.23	4.655	453
Internet	4.643	25.327	460
pie	72.922	32.431	456
transf	10.99	10.711	342
transfperc	0.154	0.141	342
levy	39.207	31.369	114
levyperc	0.528	0.258	114
steal	0.198	0.304	111
p	22.779	21.081	456
punish	3.873	8.528	63
return	-6.46	11.92	338
pMINe	5.11	8.82	339

terms.

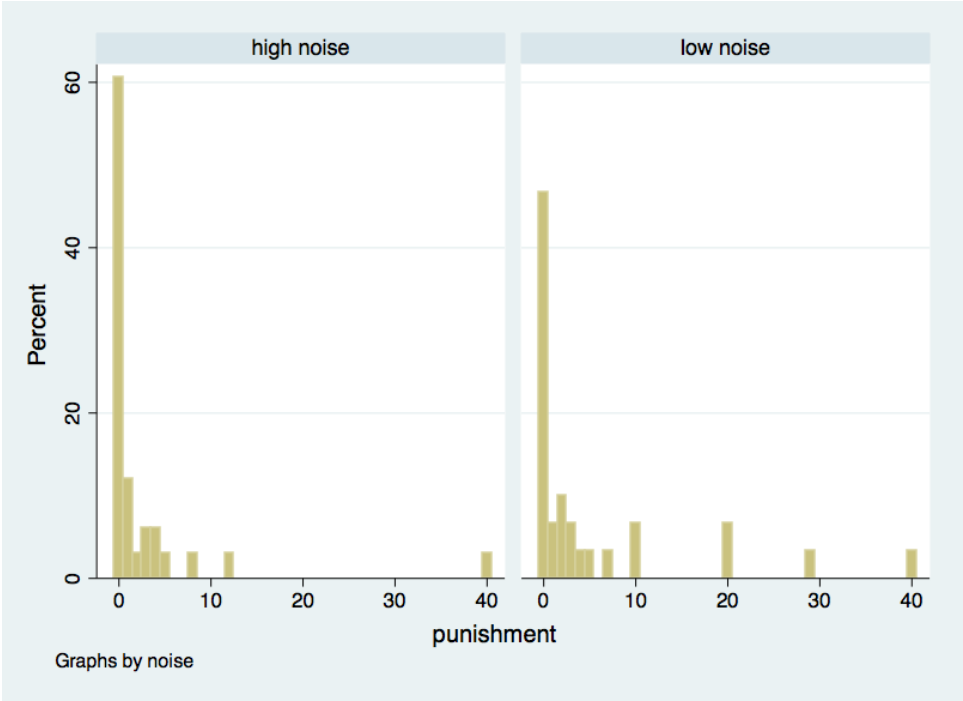

Figure 3: Histogram of the punishment decision *punish*

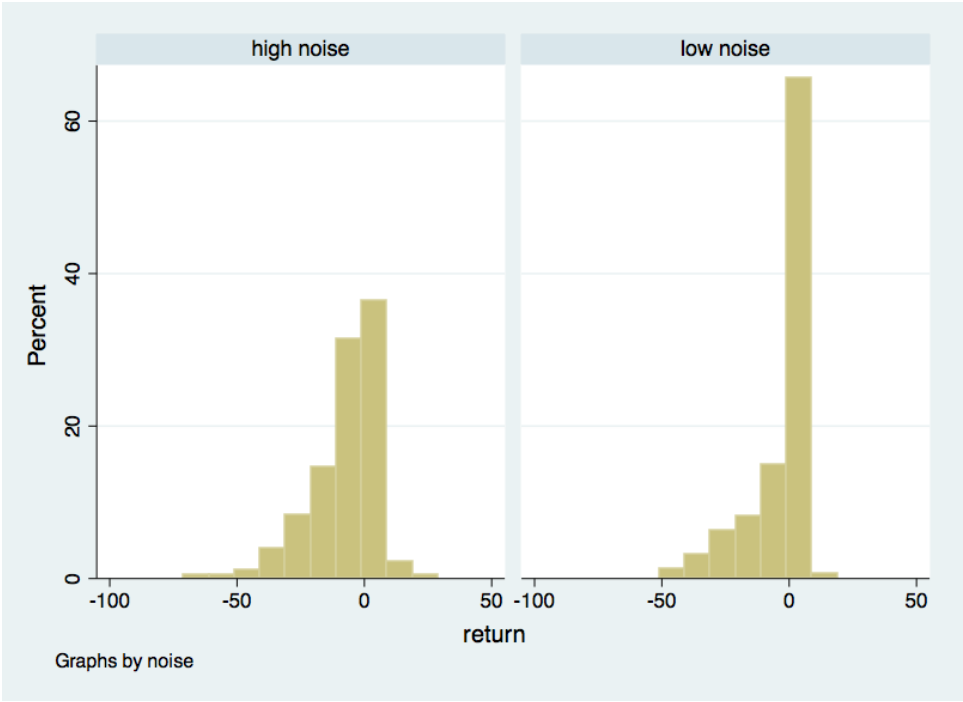

Figure 4: Histogram of the return on the investors' investment

We turn now to the analysis of the trust of investors.

6.1 Trust

Investors rarely choose the OUT option in our experiment, setting $r = 0$ only in 16% of the cases. Investors[24] instead set $r = 1$ in 25% of the cases, making themselves completely vulnerable to the trustworthiness of the manager. Figure 5 is a histogram of the variable r_i, which shows that $r = 1$ is the modal choice in the high-noise sessions, and close to the modal choice in the low-noise sessions.

Figure 6 shows the mean of the investors' trust decision r_i in all our treatments and controls, using the notation for the different treatments and controls introduced

[24]Although managers also choose r_M in the game, knowing their role in the experiment, we exclude their r_M from the analysis in this section. The managers' choice cannot in fact be viewed as an expression of trust, being instead simply a transfer of points from the manager to the manager. We choose to let the managers pick r_M, as the other investors, to avoid confusions in the participants as to the working of the experiment and the computation of the payoffs, considering that the players play the game for several rounds, and can assume different roles (manager/investor) in the course of the experiment.

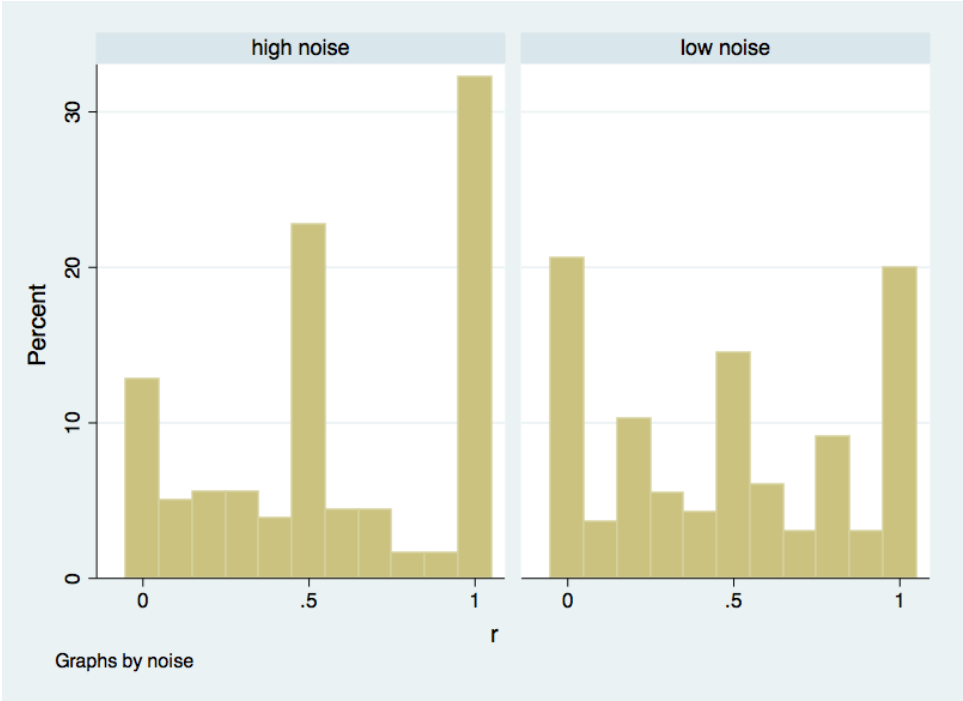

Figure 5: Histogram of the trust decision r_i

in Table 1. An initial visual inspection of the panel shows that trust decision r_i is highest in the trusteeship-proviso treatments, followed closely by the treatments with a principal of unknown ID.

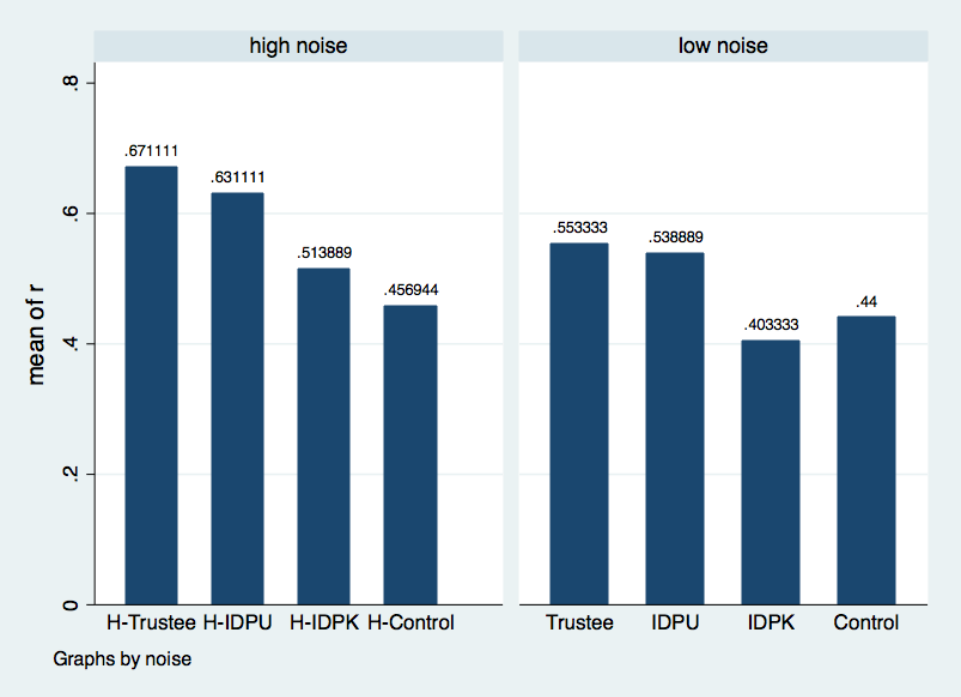

Figure 6: Mean trust decision r_i in all treatments and controls. The labels of each column are explained in Table 1

Motivated by this finding, we look for further evidence of the effectiveness of our manipulations through regression analysis. We first regress the trust decision r_i of every investor $i = 1, ..., 3$ on the variable *trustee*, a dummy equal to one for treatments 1 and 2 where the trusteeship proviso is used; on the variable *principunknown*, equal to one for treatments 3 and 4, where there is a principal of unknown ID; on the variable *principknown*, equal to 1 for treatments 5 and 6 where there was a principal of known ID; and on the variable *noisehigh*, equal to 1 for treatments 2, 4, 6, and for control 2, where $n = 0.4$. The dummy variables capture the marginal effect of our trusteeship, agency, and noise manipulations on trust, compared to the baseline control study with low noise (Control). We also include in the regression time dummies for the second and third repetition of the game. We estimate the coefficients through ordinary least squares, and always cluster the standard errors at the level of the group of players interacting in a particular round, in order to correct

for correlation of the error terms within a cluster. Table 4 displays the estimation output.

Table 4: Estimation results : regressand is trust decision r_i

Variable	**Coefficient**	**(Std. Err.)**
trustee	0.163***	(0.049)
principknown	0.011	(0.050)
principunknown	0.136**	(0.056)
noisehigh	0.088**	(0.036)
t2	0.055	(0.043)
t3	0.052	(0.045)
Intercept	0.369	(0.045)

*** significant at 1%; ** significant at 5%; * significant at 10%;

We find that the trust decision r_i is significantly higher when the trusteeship proviso is used, compared to the Control. We find also that r_i is higher when there is a principal whose ID was not known to the manager, compared to the Control. [25] The marginal effects are of an interesting magnitude, higher than 10% in both cases. r_i in the treatments with a principal of known ID is no different than in the Control. The investors seem to have felt differently in the case of shared monitoring rights, where the manager cannot attempt to tacitly collude with the principal. This finding suggests that making the conduct of the manager accountable to the broadest set of investors might effectively foster trust in organizations. The trusteeship proviso commonly found in the case law on managerial duties is able to increase trust in the behaviour of the manager, likely in the belief that the manager will be sensitive to the moral suasion of the law, and behave trustworthily.

We find also evidence that noise increases trust, by a modest amount.[26]

A non-parametric Jonckheere-Terpstra test confirms that r_i is higher in the trusteeship treatments compared to the control, for both the low- and high- noise sessions (p-values=0.041 and 0.001, respectively).

We next explore whether noise had an effect on the effort. In this case we use $e_i, i = 1, ..., 3, M$, as the dependent variable, i.e. the effort exerted by both the

[25] We find *no* evidence that r_i in the trusteeship proviso sessions is higher than r_i in the sessions with a principal of unknown ID.

[26] Estimating the standard errors through bootstrapping, 200 repetitions, leads to equivalent inferences. We also estimate the same model through a random effect panel estimator with robust standard errors. All coefficients and signs are unchanged, the only difference being that the standard errors of the coefficients of *principunknown* and *noisehigh* become larger, making the coefficient significant only at 10%.

investors and the manager. We regress effort e_i on each player's own r_i, on the mean r_i chosen by the other three group members ($meanr_{-i}$), on treatment, manager and time dummies. The estimation results are displayed in Table 5.

Table 5: Estimation results : regressand is effort e_i

Variable	**Coefficient**	**(Std. Err.)**
r	-1.599**	(0.654)
meanr	-3.509***	(1.146)
manager	-0.035	(0.481)
trustee	-0.105	(0.649)
principknown	0.000	(0.646)
principunknown	-0.234	(0.575)
noisehigh	0.764*	(0.411)
t2	2.245***	(0.464)
t3	3.717***	(0.508)
Intercept	11.949	(0.913)

*** significant at 1%; ** significant at 5%; * significant at 10%;

Participants who entrust a higher share of their endowment to the manager exert significantly less effort. Conversely, participants that entrust a smaller share of their endowment to the manager decide to work significantly more, appropriating hence to a larger degree the fruits of their own labour. We interpret this finding as a result of the loss of control over their endowment of the participants, once a share of their endowment is entrusted to the manager. This loss of control might be bigger for those investors who trust the manager more, depressing the effort level of these participants.

The finding that a higher level of the other participants' mean r_j significantly depresses e_i, by a magnitude that exceeds the marginal effect of the participant's own r_i, is puzzling. In a standard Voluntary Contribution Mechanism, in which the *pie* is divided in equal shares among all participants, this finding could be interpreted as an example of free-riding behaviour. In our setup, where no contractual rule of redistribution exists, we did not expect to find this attempt to free-ride on the other players' trust. Our hypothesis is that participants belonging to groups with higher $meanr_{-i}$ expected a larger payback from the manager, who would reward the (generally trustful) investors. In creating this expectation, a higher level of average trust in the group might have reduced the incentives of the participants to exert higher effort.

Finally, the subjects seem to have become more expert at the task in the course

of the experiment. [27]

6.2 Trustworthiness

While three investors in each group, in each round, are relevant for the purposes of trust analysis, only the manager's choices are relevant for the analysis of his/her trustworthiness. As we have mentioned in Section 5, trustworthiness is concerned with the strength with which the manager returns more ECUs to those players who entrust him/her more ECUs, in the treatments versus the control studies. Figure 7, a scatterplot of points sent by each investor versus points received back by the same investor, shows that managers have been generally trustworthy. The relation appears less strong in the treatments featuring high noise ($n = 0.4$). The first measure of trustworthiness we use is the strength of the relation between $transfperc_{M,i}$ on the left-hand side of a regression equation, and e_i and r_i on the right-hand side, with $i = 1, ..., 3, M$. We also include in the regression $meanr_{-i}$, treatment and time dummies. The estimation output is reproduced in Table 6.

Table 6: Estimation results : regressand is $transfperc_{M,i}$, no cross-interaction terms between r_i, e_i and the treatment dummies

Variable	**Coefficient**	**(Std. Err.)**
e	0.006***	(0.001)
r	0.189***	(0.022)
meanr	-0.048	(0.049)
trustee	-0.004	(0.025)
principknown	0.035	(0.022)
principunknown	0.011	(0.025)
noisehigh	-0.005	(0.015)
t2	-0.050***	(0.018)
t3	-0.073***	(0.019)
Intercept	0.039	(0.042)

*** significant at 1%; ** significant at 5%; * significant at 10%;

The manager reciprocates higher trust with a richer payback. The coefficients of

[27] It is possible that both the dependent variable e_i and the player's own r_i are expression of some underlying characteristic of the players that determines both their trust and their effort. If this is the case, r_i would not be an exogenous regressor. In light of this possibility we carry out the same regression, but without r_i as a regressor. The coefficient of $meanr_{-i}$ in this regression is still negative and significant at 1%, and of a magnitude very similar to the one shown in Table 5.

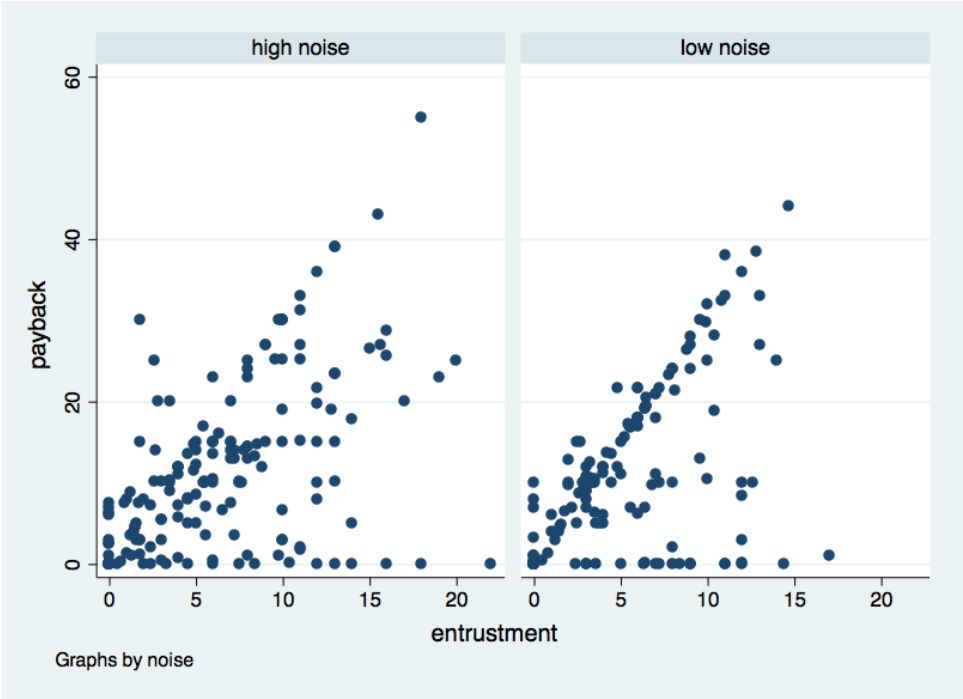

Figure 7: Scatterplots of points sent by each investor versus points received back from the manager, for the sessions with high and low noise.

e_i and of the time dummies are significant, but of a small magnitude. This finding can be taken as further evidence of the pervasive role of reciprocity in strategic interactions. The manager's baseline trustworthiness, as observed in the Control, seems not to have been modified by our manipulations.

Our second measure of trustworthiness builds on the first, and it tries to measure not only the strength of the relation between $transfperc_{M,i}$ on one side, and e_i and r_i on the other, but also whether this relation is stronger in the treatments compared to the baseline control with low noise (Control). We regress $transfperc_{M,i}$ on e_i, $r_i, meanr_{-i}$, treatment and time dummies, and 8 interaction terms between r_i, e_i on one side, and the treatment dummies and the high noise dummy on the other. The estimation output is shown in Table 7. We find evidence of a strong positive relation between the participant's trust in the manager r_i and the participant's payback. The magnitude of the coefficient is very similar to the one shown in Table 6. Also in this specification we find no evidence of our manipulations having an effect on the strength of the manager's trustworthiness. A non-parametric Jonckheere-Terpstra Test, for the low noise sessions, confirms that $transfperc_{M,i}$ is not higher, nor lower, in our Treatment 1 (trusteeship proviso, $n = 0.01$), compared to the Control ($n = 0.01$). The same test finds that $transfperc_{M,i}$ is significantly higher in Treatment 2 (trusteeship proviso, $n = 0.4$) compared to the Control with $n = 0.4$ (p-value=0.007). Non-parametric testing therefore provides some evidence of the trusteeship language increasing the average payback, but only for the high noise sessions.

Finally, a regression of payoffs on manager, treatment and time dummies provides only strong evidence of players doing better in rounds 2 and 3, and of the manager doing better compared to other investors (Table 8).

6.3 Behaviour of the principal

We look for differences in behaviour between the principal, in those treatments where his/her ID is known to the manager, and the other investors without monitoring rights. Jonckheere-Terpstra tests find that principals do not trust the manager more, and they do not exert higher effort. Principals enjoy, however, a higher $transfperc$ compared to the other players, by a magnitude of about 8%. This difference is significant according to the Jonckheere-Terpstra test. Considering that principals have not invested more than other investors, it seems that this (modest) extra payback was the result of the manager's fear of being punished by the principal.

The same nonparametric tests find that principals whose ID is not known to the manager do not trust the manager significantly more, do not work significantly more, and they do not have a significantly higher payback compared to the investors

Table 7: Estimation results : regressand is $transfperc_{M,i}$, with cross-interaction terms between r_i, e_i and the treatment dummies

Variable	**Coefficient**	**(Std. Err.)**
e	0.002	(0.004)
r	0.220***	(0.060)
meanr	-0.045	(0.050)
trustee	-0.044	(0.060)
principknown	-0.032	(0.054)
principunknown	0.017	(0.069)
noisehigh	0.013	(0.037)
t2	-0.047**	(0.019)
t3	-0.072***	(0.019)
rIDPU	-0.002	(0.064)
rIDPK	0.006	(0.069)
rtrustee	-0.039	(0.065)
eIDPU	-0.001	(0.005)
eIDPK	0.006	(0.004)
etrustee	0.006	(0.004)
noiser	-0.038	(0.043)
noisee	0.001	(0.003)
Intercept	0.065	(0.052)

*** significant at 1%; ** significant at 5%; * significant at 10%;

Table 8: Estimation results : regressand is $payoff$

Variable	**Coefficient**	**(Std. Err.)**
manager	24.416***	(3.291)
trustee	1.899	(1.947)
principknown	-0.982	(1.701)
principunknown	-1.283	(1.762)
noisehigh	0.498	(1.270)
t2	5.938***	(1.376)
t3	8.138***	(1.475)
Intercept	12.005	(1.882)

*** significant at 1%; ** significant at 5%; * significant at 10%;

without monitoring rights.

6.4 Discussion

In line with the past literature (Berg et al. 1995), we find a substantial amount of trusting behaviour in our study.The introduction of a mere sentence in the trusteeship treatments increases significantly the willingness of the i to contribute to the manager. Shared, as opposed to exclusive, monitoring rights by the investors produce similar effects. We find evidence then in support of Hypothesis 1 from Section 5. The fact that the trusteeship proviso significantly increases trust can be taken as evidence that the proviso has modified the expectations of the players regarding the behaviour of the manager. Abeler et al. (2011) manipulate the reference point in a simple effort provision game, finding ample evidence that reference points play a role in effort provision. The finding that exclusive monitoring rights do not increase the investors' trust, not even the investor/monitor's, can be considered as a case in favour of an open corporate governance system, whereby all stakeholders can potentially challenge the behaviour of the manager, in the perspective of the manager.

Regarding Hypothesis 2, we find strong evidence that the manager is trustworthy, i.e. he returns more points to those investors who entrust him with more points. The finding that players are trustworthy is in line with previous studies by Berg et al. (1995) and Fehr and Gächter (1998). The strength of the manager's is trustworthiness, however, is not enough to guarantee a positive return on investment to most of the investors. This is due to the fact that the manager appropriates about 50% of the available points, and the remaining 50% of the points are not enough to guarantee most players a positive return on investment. We could summarize this articulated answer to the question whether managers are trustworthy or not by saying that managers are "50% trustworthy".

We do not find any effect of our manipulations on the managers' trustworthiness. The finding that the manager's behaviour is not affected by the trusteeship proviso we introduce is similar to the finding in Fischer et al. (2013) that the introduction of a multi-stakeholder clause in the manager's contract does not significantly modify transfers to a charity. This finding should, however, not be taken to mean that corporate governance institutions are in general irrelevant in the promotion of the managers' trustworthiness. In our environment managers faced two simple forms of incentives, while managers of real world business organizations face a mix of different high-powered and low-powered incentives, often reliant on monetary, status, reputation, honourability and career concerns managers typically exhibit.

A further concern is that simply reading the trusteeship proviso to the players,

stating that the manager is held to an honourable behaviour, might not be enough to change the nature of the interaction for the manager, who could still view himself/herself as unbound to any specific notion of fairness and trustworthiness to the investors. At the moment, the correct interpretation of our finding regarding the managers' trustworthiness is that in an environment characterized by one-shot interactions, and complete anonymity, the managers are trustworthy but not sensitive to moral suasion and costly *ex post* monitoring. It will be a subject for further research to isolate minimal requirements for institutions to effectively play a role in leveraging the managerial trustworthiness. We suggest in the final remarks section one possible, conservative avenue through which this could be achieved.

Regarding Hypothesis 3, we find that noise has at best a modest positive effect on trust and a small positive effect on effort, the latter only significant at 10%. This finding goes against our expectations in Hypothesis 3, based on the recent literature on noise in virtual organizations. It seems that the players have made an attempt to neutralize the effect of noise that erodes the value of their investments, by trusting the manager more, and working slightly more. Overall, our findings confirm that noise plays a role in behaviour observed in virtual organizations, albeit in a direction that we did not expect. The increased willingness of the players to trust and exert effort in the face of high noise that we uncover is likely an artefact of the particular type of noise we use, which *negatively* affects the entrustments of the investors. It will be interesting to verify in future research whether the introduction of positive and negative shocks to entrustments changes the direction of the effect of noise on trust and effort.

We do not find any effect of noise on trustworthiness. We believe this to be an interesting finding, in its own way: the manager dos not take advantage of the noise in effort provision to return fewer ECUs to each investor, and most likely uses each investor's r_i as guidance in deciding how to redistribute points.

In our study leisure seems to have been an unappealing option for participants. Corgnet et al. (2011) and Corgnet et al. (2013) find that in the presence of individual-incentive schemes leisure loses appeal compared to the treatments with team-incentive schemes. Still, subjects spend on average about 15% of their time browsing the Internet even with individual-incentive schemes, well above our finding (less than 1% of time).

Participants who trust the manager more earn smaller endowments than groups who entrust less ECUs to the manager. Punishment is frequent, but of a very small magnitude. We estimate that principals enjoy a premium, in the redistribution process, of about 7%. Managers seem hence not to feel pressed to reward the principal in any sizeable way, in the likely expectation of small punishments. The finding that

punishment is often of a symbolic amount is striking in light of the previous literature on punishment in Public Good Games (cf. Fehr and Gächter 2000). One possible explanation is that the roles of principal and agent were actually flipped in the mind of the two categories of players, i.e. the principal framed himself as subordinate to the manager, because the latter had decision making power over the distribution of points. This framing might have made punishment of a smaller magnitude than we would have expected.[28]

7 Final remarks

Notice that in the agency treatment studied here principals cannot offer reward schemes to agents, and there is no bargaining between the two sides over the appropriation of quasi-rents arising from the relationship, as customary in principal-agency models. Our experimental game of choice to study the two types of constraints outlined above cannot easily capture those contractual features of the relationship between principals and agents. At the moment, therefore the agency study captures only one aspect of the complex relationship between principals and agents, namely the accountability of the agent to the principal.

It would be interesting to verify if the possibility to form a non-binding agreement between investors and managers about the rules of redistribution of the entrustments could increase the managers' trustworthiness.

A further limit of the experimental design presented here is the lack of a market for managers, and of a market for the ownership of the business organization (corporate control). Untrustworthy managers can typically expect a reputation loss if future business owners can observe the manager's past trustworthiness accurately. Similarly, poorly managed organizations can expect a loss in market value, and be subject to takeovers, and to a change in management. We hypothesize that in the presence of a market for managers or for corporate control the beliefs of the investors about the manager, and the observed behaviour of the manager, would be more closely aligned than we observe in this paper.

[28]Milgram (1963) was among the first to document the pervasive role of obedience in decision-making.

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