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Transparency, Empowerment, Disempowerment and Trust in an Investment Environment

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Transparency, Empowerment, Disempowerment and Trust in an Investment Environment

Abstract

In a laboratory-controlled environment we provide experimental evidence on the effects of transparency (complete over incomplete information) and empowerment on trust (investment by a principal) and trustworthiness (reciprocal behavior of an agent). We implement a simple two-person investment game. We find that when principals are empowered by being able to punish agents who may not act in a way the principal believes is in the principal's best interest, trust and investment increases over that which is realized in the absence of empowerment regardless of the degree of transparency. In transparent environments the effect of empowerment is about the same regardless of whether empowerment is introduced or removed. However, in opaque environments, the loss of empowerment has a substantially greater negative effect on trust than the positive effect associated with the introduction of empowerment.

While this environment is substantially abstracted from the naturally occurring environment, these results suggest that practical public policies designed to increase transparency in financial transactions are likely to have positive effects on investment. Furthermore, public policies designed to empower principals, such as the Say-on-Pay practices, are likely to increase investment while the limitation of the empowerment of principals with respect to their agents (consistent with deregulation) will have a much more dramatic negative impact on trust (and ultimately, investment).

Submission Classification: C7, C9, D3, D8

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1 Introduction

During the last two decades, the phenomena of arguably unwarranted compensation packages of corporate chief executive officers (CEOs) relative to their firms' performances and ever recurring corporate scandals (e.g., Enron, WorldCom, Global Crossing and Countrywide Financial) have resulted in a significant loss of shareholder confidence and trust in the integrity of corporate managers. This has created public perceptions that CEOs may use their power to exploit their firms' resources to maximize their own self-interest at the expense of their shareholders' interests. For example, in 2007, the CEO of Countrywide was paid \$103 million, while shareholders suffered an 80% decline in share value (Morgenson, 2010).

Arrow (1974) shows that trust plays an essential role in advancing economic growth and promoting business activities. Trust involves an economic interaction between at least two parties who need to collaborate to make the most of business opportunities. One party must put some economic resources at risk with an agent deemed trustworthy who uses his expertise to take actions with the objective of maximizing the joint wealth of both parties.¹ When the investor enters into such a relationship, she must have formed certain *expectations* about the potential actions of the agent and the likely related outcomes. These expectations reflect the degree

¹ Zand (1972) defines trust as the willingness of one person to increase her vulnerability to the actions of another person whose behavior cannot be controlled. In particular, trust is an action taken by a party to an economic transaction with the anticipation that the other party of the transaction will not exploit the vulnerability that the party has created for herself by taking an action with an uncertain outcome (James, 2002; Bohnet et al., 2008).

of confidence in the integrity of the agent and the likelihood that these expectations will be fulfilled.

Recent changes in corporate regulation are directed towards excessive CEO compensation and restoring investors' trust by empowering investors with the ability to veto excessive CEO compensation and impose automatic compensation claw backs for firms that misreport earnings. Recent regulations such as the Dodd-Frank Financial Reform Act of 2010 aim to rectify the balance of power between shareholders and CEOs by introducing stronger provisions for shareholders' to have input on CEO compensation (Say-on-Pay proposals) and permit automatic claw backs in CEO compensation for poorly performing firms or firms that misreport.

This paper presents the results of a laboratory-controlled experiment designed to study the effects of the introduction of an empowerment mechanism comparable to a binding Say-on-Pay practice into a simple investment environment in which information is incomplete. This extends earlier work on the effects of empowerment on trust in a transparent environment in a repeated investment game (Kanagaretnam et al., 2012) and the effects of the absence of transparency on trust in a repeated investment game (Kanagaretnam et al., 2010). The design permits us to study both the role of learning on the effect of a relatively costless veto and the effects of removing empowerment on the behavior of investors and their agents. Our results suggest that the loss of empowerment (similar to the removal of a Say-on-Pay practice) may lead to a precipitous drop in trust (and investment). While this environment is highly abstracted from the naturally occurring environment, it provides evidence that the loss of trust in the actions of CEO's may

lead to substantial reductions in investment in their enterprises. This may have significant ramifications for depressed economies suffering from lost trust in the leaders of their productive enterprises (Acemoglu, 2006).

2 The Literature on Say on Pay and Claw Backs

Although CEOs' compensation packages are determined by their Boards of Directors, previous studies provide strong evidence suggesting that CEOs have significant power to influence their own remuneration and extract economic rent by managing their Board members and their compensation decisions (Lippert and Porter, 1997; Elhagrasy et al., 1999; Firth et al., 2007; Young and Tsai, 2008). Research on the process of determining the CEOs' compensation packages contends that the periodic renegotiation over the compensation packages with the Boards of Directors is not usually done at arm's-length (e.g., Bebchuk and Fried, 2004; Khan et al., 2005; Mack, 2008; Fong, 2010).

The above arguments suggest that CEOs often fail to fulfill their fiduciary and moral responsibilities, which oblige them to place the interest of the shareholders before their own interests. The natural consequence of this phenomenon is that the general public's *trust* in corporate managers and their professional ethics has suffered significant erosion. During the past five years a significant number of investors withdrew their investments from stock markets and directed them into opportunities not reliant on an agent who must be trusted (Condon, 2012). This, in turn, may have significantly and adversely affected both the rate of economic

growth and the speed of recovery from the recent financial crises and the economic downturn.

The goal of regulations such as the Dodd-Frank Financial Reform Act of 2010 is to empower shareholders so as to defend themselves against excessive compensation by powerful CEOs and to build upon the Sarbanes-Oxley Act of 2002. In fact, shareholders have already started signaling a growing willingness to use their new powers as evidenced by Say-on-Pay proposals at recent Annual General Meetings of Citigroup, Best Buy (www.say-on-pay.com) and J. P. Morgan. At a recent J. P. Morgan meeting, shareholders rejected management's pay structure proposal in a non-binding vote. This vote has resulted in J. P. Morgan's Board working to bring its executives' pay structure in line with the shareholder proposals.

While the early claw-back provisions are adopted voluntarily, they are based on, and potentially have implications for, regulatory initiatives of the U.S. government (Denis, 2012). Section 304 of the Sarbanes-Oxley act (SOX), adopted in 2002, authorizes the Securities and Exchange Commission to recover bonuses paid to CEOs or CFOs whose financial statements are restated for reasons of material noncompliance with any financial reporting requirements. Moreover, Section 954 of the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act, signed in 2010 and scheduled to take effect in 2012, also provides for the recovery from executives of awarded compensation deemed erroneous ex post.

Chan et al. (2012) find that voluntary adoption of compensation claw-back provisions under SOX regulations is followed by fewer financial restatements and fewer auditor reports of material internal control weaknesses, higher earnings

response coefficients, and reduced auditing fees and lags. They conclude that voluntary adoption of claw-back provisions leads to increased financial integrity. Based on these findings Chan et al. (2012) suggest that U.S. government mandated claw-back provisions would be effective in reducing material financial misstatements.

In contrast to compensation claw backs, the Say-on-Pay provisions have been more controversial. Mangel and Magnan (2012) debate whether Say on Pay can solve executive excessive pay. They argue that Say on Pay curtails executive pay when shareholders' concerns offset CEO power and mitigates directors' information deficiencies. They also caution that Say on Pay may raise novel problems. The pay resulting from Say on Pay can harm stakeholders whose interests differ from those of shareholders influential in pay setting. Moreover, boards may resist shareholders' intervention in pay setting and, accordingly, manage compensation disclosures to ensure a passing shareholder vote. Consequently, Say on Pay may not only fail to remedy excessive CEO pay but also legitimize it (Mangel and Magnan, 2012).

Early evidence on the benefits of Say-on-Pay regulations is mixed. Cai and Walkling (2011) document that when the U.S. Congress passed the Say-on-Pay Bill, the market reaction was significantly positive for firms with high abnormal CEO compensation, with low pay-for-performance sensitivity, and responsive to shareholder pressure. However, Cai and Walkling (2011) point out that activist sponsored Say-on-Pay proposals target large firms, not those with excessive CEO pay, poor governance, or poor performance. The market reacts negatively to labor

sponsored proposal announcements and positively when these proposals are defeated. Their findings suggest that Say on Pay creates value for companies with inefficient compensation, but can destroy value for others.

The international evidence from United Kingdom (UK) is more supportive of Say-on-Pay regulations. Ferri and Maber (2012) examine the effect of Say-on-Pay regulation in the UK. Consistent with the view that shareholders regard Say on Pay as a value-creating mechanism, Ferri and Maber (2012) find that the regulation's announcement triggered a positive stock price reaction at firms with weak penalties for poor performance. UK firms responded to negative Say-on-Pay voting outcomes by removing controversial CEO pay practices criticized as rewards for failure (e.g., generous severance contracts) and increasing the sensitivity of pay to poor realizations of performance.

In summary, the evidence on the benefits on Say-on-Pay practices appears inconclusive. In particular, while Say on Pay has the potential to curtail excessive compensation, it can also target well-governed large firms and thus be open to abuse. Consequently, a careful examination of an instrument comparable to a Say-on-Pay practice in a controlled laboratory setting may provide insights about Say-on-Pay practices in the industry and possibly lead to a refinement of existing policy and regulations.

3 An Experiment to Address Say-on-Pay Practices: Theoretical Development, Hypotheses and Related Literature

Kanagaretnam et al. (2010, 2012) design and implement controlled laboratory settings to test the effects of reputation building and empowerment on participants in an investment game comparable to that in Berg et al. (1995). The laboratory environments that permit investors to veto decisions made by their agents utilize tools closely related to empowering investors with tools such as the Say-on-Pay practices.² Kanagaretnam et al. (2010, 2012) provide empirical evidence suggesting that building *reputation* through repeated period interaction with the same partner and empowering the investor to *punish* her agent for betraying trust are two key ingredients in building trust. The objective of this study is to extend the earlier work of Kanagaretnam et al. (2010, 2012) by permitting interactions between empowerment and transparency. The following sections provide the foundations for this experiment.

3.1 Transparency

With transparency (complete information) in the investment game, both the investor (sender) and the agent (receiver, responder) know each other's initial endowments and the investment multiplier (technology). The amount invested by the investor signals her trust and the agent gets an unambiguous signal. With opacity (incomplete information) the participants' initial endowments are randomly picked from a uniform distribution known by both the investor and the agent, where the expected value of the endowment equals the known endowment in the complete-information condition.

² Kanagaretnam et al. (2012) use an instrument that is binding on the agent. Say-on-Pay votes are non-binding in nature. However, two majority-vote rejections may constitute grounds for breach of fiduciary duties on part of senior management in a litigation context.

Anderhub et al. (2002), Brandts and Figueras (2003), Bohnet and Huck (2003), Coricelli et al. (2006), Cox and Deck (2006) all introduce incomplete information into an investment game or similar environment and demonstrate that the information treatment is important. However, none identify transparency (or opacity) with the endowments of the participants. Kanagaretnam et al. (2010) show that in one-shot games opacity will lead to lower levels of trust and lower levels of reciprocity than will be realized with transparency.

Most investment activities and business transactions are conducted on an ongoing basis rather than as one time encounters. In a repeated interaction environment, one's reputation may be an effective a priori control on ex-ante opportunism. Sending credible signals (by investors to agents and by agents to investors) is likely to influence the adoption of strategies that enhance cooperation and lead to Pareto-superior outcomes (see Kreps et al., 1982; Fudenberg and Maskin, 1986; Fudenberg and Levine, 1992; Eckel and Wilson, 2003; Engel-Warnick and Slonim, 2004). However, even if the repeated game is capable of inducing cooperation, it may not be sufficient to offset any effects on trust or reciprocity that may be realized because of the lack of transparency.

Kanagaretnam et al. (2010) show that although repeated play results in increased trust in both transparent and opaque environments, differences in trust that arise in a one-shot investment game because of the lack of transparency are not offset with the introduction of four rounds of repeated play in an investment game. Repeated play also results in an increase in reciprocity in both information

conditions, however, the differences observed in reciprocity in one-shot investment games disappear with the introduction of repeated play.

3.2 Empowerment

In the two-person investment game, trust is constrained by the uncertainty involved in investing a positive amount that may or may not be reciprocated by the agent.

This is especially so in a one-shot investment relationship where there is no opportunity for investors to retaliate against perceived breach of trust or for agents to build positive reputations.

One way to provide opportunities for retaliation (empowerment) and reputation building into the investment game is to move from a one-shot game to a repeated game as described in the previous section. A more direct and perhaps more effective way of empowering investors is to permit them the opportunity to exhibit their objection to what is returned to them in the investment game by vetoing the response and voiding the contract. This veto could be costly to only the agent or to both the agent and the investor.³

Kanagaretnam et al. (2012) implement two veto mechanisms in a laboratory repeated investment game characterized by transparency and find that vetoes that are costless or costly to the investor (and always costly to the agent) significantly increase trust. They argue that fear of retaliation by investors who have acquired the ability to punish agents may increase the agents' propensities to reciprocate by

³ Costly vetoes are possible in the presence of inequity aversion. According to Fehr and Schmidt (1999) inequity aversion means that people resist inequitable outcomes; i.e., they are willing to give up some material payoff to move in the direction of more equitable outcomes. Fehr et al. (1997), Fehr and Gächter (2000), Andreoni (2005) and Rigdon (2009) have introduced punishment mechanisms in public good, gift exchange and investment game environments.

returning a greater portion of the grossed up investment. This may then result in the level of reciprocity in repeated game environments with a veto to be greater than the level of reciprocity in comparable environments without a veto. As the cost of punishment falls, the agent may expect the investor will be even more likely to veto an unacceptable return. Therefore, the level of reciprocity under a costly veto may be lower than the level of reciprocity under a less costly veto. Generally, the laboratory sessions reported by Kanagaretnam et al. (2012) support this result in a transparent environment and also find that the impact of the veto on trust is of comparable magnitude regardless of whether the opportunity to exercise the veto is provided to investors or taken away from investors.

3.3 The Introduction of Empowerment into Opaque Environments

Introducing incomplete information into a repeated investment game environment results in significantly lower levels of trust than in a comparable environment with transparency (Kanagaretnam et al., 2010). Introducing a veto into a repeated investment game environment with transparency leads to increased trust (Kanagaretnam et al., 2012). The same forces that lead to increased trust with empowerment and transparency should lead to increased trust when investors are empowered in an environment with incomplete information and to reduced trust when empowerment is denied.

Of particular interest is whether empowerment has the same positive impact on trust in opaque environments as in transparent environments and if the difference between trust in transparent and opaque environments is narrowed with the introduction of empowerment from the difference found in the repeated game

without empowerment. Because the naturally occurring environment is generally characterized by incomplete information, positive outcomes would provide added support for Say-on-Pay regulations than the evidence provided by using complete information environments. Arguments favoring the reduction of business regulation in the United States during the recently concluded 2012 election campaign threaten existing Say-on-Pay regulations. Although the election results may have dampened these arguments, a finding in a simple investment environment that removing empowerment, once provided, has little effect on trust would provide support for repealing Say-on-Pay legislation.

4 Experimental Design

A total of 182 subjects were recruited from undergraduate classes at a medium-sized university. During the recruitment phase, the students were told that the sessions in which they would participate would involve simple decision-making, and that the details would be given to them during the session. They were also informed that during the course of the session they would earn money that would be paid to them in cash at the conclusion of the session.

4.1 The Investment Game

Each individual participated in a session consisting of a series of twenty or twenty-two periods of a computer-mediated investment game. In this paper we are reporting the results from the last eighteen periods (last three of four phases) of these sessions. We are reporting only the data from the repeated-game treatments. There were two information conditions (complete and incomplete) and two

sequences (forward and backwards). Participants were included in only one of four combinations of information treatment and sequence.

In the first eight periods of the forward sequence (both with complete and incomplete information), the second phase of the session, the participants played a repeated investment game with anonymous partners. In the next six periods, phase three of the session, participants played a repeated investment game and each investor had the opportunity to exercise a costly veto of her agent's response. In the last phase, the final four periods, participants played a repeated investment game and each investor had the opportunity to exercise a costless veto of her agent's response. Participants knew that there would be different phases in the session and that the rules of the game in each phase may be different from the other phases. Participants did not know how the rules would be adjusted from phase to phase and they did not know the number of rounds in each phase.

In the backwards sequence (both with complete and incomplete information), the repeated game with the costless veto, the repeated game with the costly veto and the repeated game with no veto were played in the first four, next six and final eight periods (the second, third and fourth phases of the session).

The following describes the way a forward-sequence complete-information session was conducted, beginning with the first period of the first phase. In the first period, half of the participants played the role of the investor (sender). The participants were reassigned to different partners for the second period, during which the people who were investors in the first period took the role of agent (responder). At the start of the third period, the beginning of the second phase,

participants were reassigned to new partners, their roles are reversed, and they are told that they will be playing the same game repeatedly for an unknown number of periods. After four periods, a new assignment of partners was made and the roles were reversed. Again, the participants were told that the game would be repeated for an unknown number of periods. The phase was ended after four periods and a new assignment of partners was made and the costly-veto treatment was introduced. The process followed for the no-veto treatment was repeated and after six rounds participants were reassigned and the costless-veto treatment began. The backwards sequence sessions followed a similar pattern, only they began with a one-shot game and proceeded to the costless-veto treatment for four rounds, the costly-veto treatment for six rounds and finished with the no-veto treatment for eight rounds.

At the beginning of the session all subjects were assigned ID numbers (i.e., their experimental identities) by drawing index cards from a set of shuffled cards numbered from 1 to N , where N is the total number of the students attending the session. Students were told that the ID number is private information and that they should not show it to or share it with anyone. Individuals were then told to select a computer workstation at which they would remain for the duration of the session. After the participants were seated, the instructions were shown on the screens of the participants' monitors and read aloud to them by the experimenters. Subjects were given an opportunity to ask questions for clarification.

In addition to the veto characteristic of the game, information was also a treatment variable. The endowments that investors and agents had each round

were either fixed at 100 laboratory euros (L€) or were randomly assigned from the set $e = [L€0, L€50, L€100, L€150, L€200]$. Individuals knew if they were in a complete-information or incomplete-information environment. Participants in the complete-information sessions knew that the person with whom they were matched had an endowment of L€100. Participants in the incomplete-information sessions knew the distribution from which endowments were selected, but did not know the endowment of the individual with whom they were matched.

At the beginning of each decision-period, subjects were endowed with laboratory euros and were told whether they would assume the role of an investor or an agent for the period. Investors were asked to make a decision about how much of their endowment they wished to invest with their paired anonymous person. They were told that they have the choice of investing some, all, or none of their endowment. They were instructed to enter this number on the appropriate place on their computer screen. This investment was multiplied by three and reported to the person with whom the investor was paired. After the agents received this information, they decided how much of the resources they controlled (the sum of their own endowments *plus* three times any investments made by the investors) they would return to the investors. Agents entered this amount onto their computer screen through their keyboards. These values were reported to the investors and the total payoffs to the investors and agents appeared on their screens. Each participant could calculate what the other person received, but was not explicitly told this value.⁴

⁴ Please see Figures 1.1 and 1.2 for computer screen shots.

At the end of the session, subjects completed a short questionnaire. The purpose of this questionnaire was to collect background information as well as information concerning the subjects' perceptions of the session in which they participated. Subjects were then paid privately, where laboratory euros were converted into dollars at the rate L€100 = 1.00 dollar. The average earnings for the eighteen rounds reported in this paper were \$30.86.

4.2 Trust and Reciprocity

Investors' decisions in the investment game provide a measure of trust. The Nash equilibrium of the one-shot game played by income-maximizing risk-neutral individuals has nobody investing any endowment resources because investors anticipate that income-maximizing risk-neutral agents will keep everything they receive, leaving the investors with less than their initial endowments. Sending anything implies some measure of trust by the investor that the agent will not keep everything. Trust is measured as the proportion of the endowment that is invested.

Typically, reciprocity is measured as the proportion of the grossed-up (in this case, tripled) investment returned by the agent to the investor. This measure lies between unity and zero. However, in our environment the agent also has an endowment, and so the potential amount returned to the investor could be as much as the grossed-up investment plus the agent's endowment. Thus, it is possible for the ratio of what is returned to the sender divided by the grossed-up investment to exceed unity. This occurs 17 times out of 496 observations. We considered reporting these values as unity but to avoid having to deal with a censored dependent variable, we have dropped these observations from the analysis reported

here. It also is possible for this measure to be undefined if the sender invests nothing. In these cases, the observations also are dropped from the analysis of reciprocity measures.

5 Results

5.1 Trust

Table 1 and Figure 2 summarize the average trust indices for the three veto treatments by information condition and sequence. Analyses of these data are conducted following an OLS regression analysis of a fully saturated model with the three *veto* treatments, the two *information* conditions and the design variables *sequence* (with two levels) and *order* (with two levels). The data are clustered on subject identification numbers (ID) to account for the repeated observations that characterize the within-subject design given the information condition and sequence characterizing each session.

The significance of the *order* variable is tested using the fully saturated model and the null that there is no significant *order* effect is maintained ($F(10, 181) = 0.72, p = 0.702$). The data are pooled across *order* and an OLS regression, clustered on ID, is estimated for the fully saturated restricted model using all of the variables identified above other than *order*. The restricted regression results are presented in Table 2.

Visual inspection of Figure 2 suggests that moving from no veto to a costly veto to a costless veto increases the investor's trust in the agent. This pattern is reflected in the complete and incomplete information conditions and in the

backward and forward sequences. There appears to be an information effect, with lower trust associated with the less transparent environment. This is the case across *veto* treatments. There may be a sequence effect and an interaction effect between *sequence* and the *information* condition.

5.1.1 Information and Sequence Effects

The coefficients in Table 2 indicate that although the marginal effect of *sequence* is not significant there are significant interaction terms between *sequence* and the *veto* treatments. On the other hand, the marginal effect of *information* is significant and two of the second-order and third-order interaction terms are also significant. F-tests run to identify the significance of the main effects of *sequence* and *information* permit us to reject the null hypotheses that there are no significant main effects (for *sequence*, $F(6, 181) = 4.67$, $p = 0.000$; for *information*, $F(6, 181) = 6.72$, $p = 0.000$).

5.1.2 Veto Treatment Effects

The summary average trust indices presented in Figure 2 and the summary statistics in Table 1 do not reflect their dependence across veto treatments. The results of the OLS regression reported in Table 2 allow us to test for differences across veto treatments accounting for the repeated observations of the within-subject design that has been used.

The statistics in Table 1 show that the steady increase in the average trust indices with the introduction of investor empowerment through the costly and then costless veto is statistically significant at each stage in the forward sequence with complete information ($F = 37.50$, $p = 0.000$ for the increase from the no veto to costly veto and $F = 15.54$, $p = 0.000$ for the increase from the costly to costless veto).

This pattern is followed with incomplete information, although the introduction of the costly veto does not result in a statistically significant increase in the average trust indices ($F = 0.70$, $p = 0.405$). However, the move to the costless veto leads to a significant increase in the average trust indices ($F = 11.33$, $p = 0.001$).

Referring to the backwards sequence, the average trust indices with the costless veto are at comparable levels as they are at the end of the forward sequence. These are 0.95 versus 0.92 for the complete information condition and 0.81 versus 0.77 for the incomplete information condition. The values in each of these pairs are not statistically different from one another ($F = 0.51$, $p = 0.476$ for the complete information condition and $F = 0.24$, $p = 0.627$ for the incomplete information condition).

With the backward sequence, the move from the costless to costly veto does not lead to a significant change in the average trust indices ($F = 0.04$, $p = 0.848$ and $F = 0.00$, $p = 0.979$ for the complete and incomplete information conditions). However, the move from the costly veto to the no veto option results in a significant reduction in the average trust indices ($F > 14.50$, $p = 0.000$ for both conditions).

Trust is compromised by the absence of transparency. Empowering investors with the ability to veto an agent's distribution decision increases trust even in the absence of transparency, but the introduction of the empowerment mechanisms presented in this laboratory environment do not restore the trust lost to opacity. For the forward sequence, the gap between trust with and without complete information is 0.096 for the repeated game without the veto. When the veto is introduced, trust rises. However, the gap between trust with and without

complete information rises to 0.139 for the repeated game with the costless veto. The difference between these differences is not significant ($F = 0.55$, $p = 0.459$). Empowerment does not narrow the gap in trust attributed to the absence of transparency.

This result also holds for the backwards sequence. The gap between complete and incomplete information treatments widens from 0.145 to 0.298 when the costless veto is withdrawn and the environment returns to the repeated game without a veto. The conjecture was that empowerment may reduce the opacity gap and these numbers suggest consistency with the data from the backward sequence (the gap with empowerment is smaller than for the repeated game without empowerment), the difference in the gaps is not statistically significant. There is sufficient variance in the data that we cannot reject the null hypothesis that the absence of empowerment increases the gap ($F = 2.55$, $p = 0.112$).

A final question with respect to trust is “what is the relative effect that introducing or removing empowerment has under the different information conditions?” Is the increase in trust realized with empowerment matched by the reduction in trust realized with the removal of empowerment? Figure 2 (and Table 1) shows trust rising by 0.236 (0.193) when empowerment is introduced in the transparent (opaque) setting and falling by 0.229 (0.382) when empowerment is removed. All of these changes are statistically significant. However, the difference between 0.236 and 0.229 is not significant ($F = 0.01$, $p = 0.9181$) but the difference between 0.193 and 0.382 is significant ($F = 4.41$, $p = 0.037$). In the absence of

transparency, the gains in trust that are realized by empowering investors will be more than lost if empowerment is removed.

In summary, the trust data do not support a significant order effect but they do support significant information and sequence effects. Empowering investors will increase trust but this will not offset the trust lost to opacity in the absence of empowerment. Finally, with transparency the gain in trust realized with empowerment is fully lost with the removal of empowerment but with opacity the gain in trust realized with empowerment is more than fully lost with the removal of empowerment. The effects of empowerment and disempowerment on trust are asymmetric.

5.2 Reciprocity

Table 3 and Figure 3 summarize the average reciprocity indices for the three veto treatments by information condition and sequence. Analyses of these data are conducted following an OLS regression analysis of a fully saturated model with the three *veto* treatments, the two *information* conditions and the design variables *sequence* (with two levels) and *order* (with two levels). The data are clustered on subject identification numbers (ID) to account for the repeated observations that characterize the within-subject design given the information condition and sequence characterizing each session.

The significance of the *order* variable is tested using the fully saturated model and the null that there is no significant *order* effect is maintained ($F(10, 181) = 0.47, p = 0.905$). The data are pooled across *order* and an OLS regression, clustered on ID, is estimated for the fully saturated restricted model using all of the

variables identified above other than *order*. The restricted regression results are presented in Table 4.

Visual inspection of Figure 3 suggests that introducing empowerment has a small positive effect on agent's reciprocity in the transparent environment but very little effect on reciprocity when information is incomplete. When empowerment is withdrawn, there appears to be a clear reduction in reciprocity as the costly veto and then no veto treatments are introduced. This pattern is reflected in the complete and incomplete information conditions. There appears to be an information effect, with lower reciprocity associated with the less transparent environment. This is the case across veto treatments. There may be a sequence effect and an interaction effect between sequence and the information condition.

5.2.1 Information and Sequence Effects

The coefficients in Table 4 indicate that the marginal effect of *sequence* is significant and there are significant interaction terms between *sequence* and the *veto* treatments. On the other hand, the marginal effect of *information* is not significant and none of the second-order and third-order interaction terms are significant. However, F-tests run to identify the significance of the main effects of *sequence* and *information* permit us to reject the null hypotheses that there are no significant main effects (for *sequence*, $F(6, 181) = 2.55$, $p = 0.021$; for *information*, $F(6, 181) = 6.49$, $p = 0.000$).

5.2.2 Veto Treatment Effects

The summary average reciprocity indices presented in Figure 3 and the summary statistics in Table 3 do not reflect their dependence across veto treatments. The

results of the OLS regression reported in Table 4 allows us to test for differences across veto treatments accounting for the repeated observations of the within-subject design that has been used

The statistics in Table 3 show that very small increase in the average reciprocity indices with the introduction of investor empowerment with the costly veto (from 0.58 to 0.65) is significant in the forward sequence with complete information ($F = 7.56, p = 0.007$). The introduction of the costless veto does not change the level of reciprocity significantly (reciprocity falls from 0.65 to 0.64, $F = 0.64, p = 0.425$). This pattern of quantitative changes is followed with incomplete information (0.52 to 0.57 to 0.56). The move from no veto to costly veto is significant ($F = 4.85, p = 0.029$) and the move from costly to costless veto is not significant ($F = 0.03, p = 0.870$).

Referring to the backwards sequence, the average reciprocity indices with the costless veto are at comparable levels as they are at the end of the forward sequence. These are 0.64 versus 0.69 for the complete information condition and 0.56 versus 0.51 for the incomplete information condition. The values in each of these pairs are not statistically different from one another ($F = 2.07, p = 0.152$ for complete information and $F = 1.29, p = 0.258$ for incomplete information).

With the backward sequence, the move from the costless to costly veto does not lead to a significant change in the average reciprocity indices ($F = 1.71, p = 0.193$ with complete information and $F = 0.04, p = 0.835$ with incomplete information). However, the move from the costless veto to the no veto option results in a

significant reduction in the average reciprocity indices ($F = 7.28$, $p = 0.008$ and $F = 6.27$, $p = 0.013$ for complete and incomplete information respectively).

Reciprocity is compromised by the absence of transparency. Empowering investors with the ability to veto an agent's distribution decision leads to increases in reciprocity even in the absence of transparency, but the introduction of the empowerment mechanisms presented in this laboratory environment do not restore the reciprocity lost to opacity. For the forward sequence, the gap between reciprocity with and without complete information is 0.06 for the repeated game without the veto. When the veto is introduced, reciprocity rises. However, the gap between reciprocity with and without complete information rises to 0.07 for the repeated game with the costless veto. The difference between these differences is not significant ($F = 0.01$, $p = 0.914$). Empowerment does not narrow the gap in reciprocity attributed to the absence of transparency.

This result also holds for the backwards sequence. The gap between complete and incomplete information treatments widens from 0.17 to 0.19 when the costless veto is withdrawn and the environment returns to the repeated game without a veto. The conjecture was that empowerment may reduce the opacity gap and these numbers suggest consistency (marginally) with the data from the backward sequence (the gap with empowerment is smaller than for the repeated game without empowerment), the difference in the gaps is not statistically significant. We cannot reject the null hypothesis that the absence of empowerment increases the gap ($F = 0.04$, $p = 0.840$).

A final question with respect to reciprocity is “what is the relative effect that introducing or removing empowerment has under the different information conditions?” Is the increase in trust realized with empowerment matched by the reduction in trust realized with the removal of empowerment? Figure 3 (and Table 2) shows reciprocity rising by 0.05 (0.04) when empowerment is introduced in the transparent (opaque) setting (one-tail tests, $p = 0.048$ with complete information and $p = 0.071$ with incomplete information) and falling by 0.14 (0.24) when empowerment is removed (one-tailed tests, $p = 0.038$ for complete information and $p = 0.007$ for incomplete information). All of these changes are statistically significant. However, the difference between 0.05 and 0.14 is not significant ($F = 2.68$, $p = 0.1034$) and the difference between 0.04 and 0.19 is not significant ($F = 2.58$, $p = 0.1103$). In the absence of transparency, all of the gains in reciprocity that are realized by empowering investors will be lost if empowerment is removed; the effects of empowerment and disempowerment on reciprocity are symmetric, unlike the asymmetric effects of empowerment and disempowerment on trust.

Reciprocity is compromised by the absence of transparency, but not significantly so in the forward sequence. In the backwards sequence, there is a greater difference between reciprocity displayed by agents under the different information conditions. Transparency fosters greater reciprocity. In the absence of transparency, moving from a no veto environment to an environment in which it is possible to exercise a veto has no significant affect on reciprocity. However, if investors and agents begin in an environment in which there is a costless or costly

veto, the move to a no veto environment brings a significant reduction in reciprocity.

In summary, the reciprocity data do not support a significant order effect but they do support significant information and sequence effects as well as a significant interaction between sequence and information. Empowering investors will increase reciprocity but this will not offset the reciprocity lost to opacity in the absence of empowerment. In the absence of transparency, empowering investors leads to an increase in agent reciprocity. Disempowering investors leads to a symmetric reduction of reciprocity rather than the asymmetric loss of trust experienced with disempowerment.

6 Conclusions

Our laboratory-controlled environment characterized by complete or incomplete information permits us to provide controlled laboratory evidence on the effects of transparency and empowerment on trust (investment by a principal) and trustworthiness (reciprocal behavior of an agent) in a simple two-person investment game. We find that when principals are empowered by being able to punish agents who may not act in a way the principal believes is in the principal's best interest, trust and investment increases over that which is realized in the absence of empowerment. We also find that when incomplete information characterizes the investment game, the levels of trust (investment) and reciprocity are lower than when information is complete (the environment is transparent).

These relationships are maintained regardless of whether the empowerment instrument most favorable to the principal is implemented first or whether it is introduced after the participants experience less favorable environments. In transparent environments the effect of empowerment is about the same regardless of whether empowerment is introduced or removed. However, in opaque environments, the loss of empowerment has a substantially greater negative effect on trust than the positive effect associated with the introduction of empowerment. With complete information the effect is symmetric but with incomplete information the effect asymmetric. This is not the case for reciprocity. Symmetry is observed under both information conditions.

While this environment is substantially abstracted from the naturally occurring environment, these results suggest that practical public policies designed to foster increased transparency in financial transactions are likely to have positive effects on investment. Furthermore, public policies designed to empower principals, such as the Say-on-Pay practices, are likely to increase investment if these policies permit binding empowerment (rather than moral suasion). A particularly notable result is related to the removal of empowerment in the laboratory environment. If this is carried over to the field, it suggests that policies directed towards deregulation and the limitation of the empowerment of principals with respect to their agents will have a much more dramatic negative impact on trust (and investment) than their original implementation. In the context of a sluggish economy, these may be policies for practical policy makers to avoid.

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Figure 1.1 Experimental Screen Shot: Sender Investment Decision

McEEL Participant1 Round 1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History Print

Address <http://130.113.124.23/Setting1/Sender/init1.php> Go Links

General Information		
You are a Sender		
Round: 1		
Paired with: Anonymous		

Stage I: Investment Decision		
A	How much do you wish to invest with your Receiver? You have €100.	<input type="text" value="80"/>
B	This is the amount you will keep (automatically calculated)	<input type="text" value="20"/>
C	Result of investment (Multiply row A*3)	<input type="text" value="240"/>
<input type="button" value="Submit"/>		

[Setting Instructions](#) [General Instructions](#)

Start | Gospelcom... | choprasp... | McEEL Par... | 130.113.1... | Document... | setting15e... | MySQL Co... | Local intranet | 6:18 PM

Figure 1.2 Experimental Screen Shot: Receiver Decision

McEEL Participant2 Round 1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History

Address <http://130.113.124.23/Setting1/Receiver/makeDecision1.php> Go Links

General Information	
You are a Receiver	
Round: 1	
Paired with: Anonymous	

Stage II:	
You have been endowed with €100. The tripled amount the sender gave you was €240. In total you have €340 to allocate between you and the person you are paired with.	
C	How much do you wish to keep for yourself? <input type="text" value="250"/>
D	This is the amount you will send to the sender <input type="text" value="90"/>
<input type="button" value="Submit Answer"/>	

Done

Start

Gospelcom.net :... choprasp@univm... McEEL Particip... 130.113.124.23 ... Document1 - Mic... Untitled - Paint

Local intranet

6:22 PM

Figure 2. Average Trust by Sequence, Information Condition and Veto Treatment

	Forward Sequence				Backward Sequence		
	No Veto	Costly Veto	Costless Veto		Costless Veto	Costly Veto	No Veto
Complete Information	0.7115 (0.2465) [60]	0.8427 (0.1907) [60]	0.9471 (0.1285) [34]		0.9162 (0.1908) [26]	0.8669 (0.2516) [26]	0.6875 (0.3116) [26]
Incomplete Information	0.6157 (0.3080) [72]	0.6430 (0.3112) [70]	0.8082 (0.2825) [48]		0.7717 (0.3091) [24]	0.7735 (0.2834) [23]	0.3895 (0.2770) [24]

Table 2. Restricted Regression for Average Trust Index

Variables	Coefficient	Robust Standard Error	p-value
Repeated Game with No Veto (rg)	-0.192	0.047	0.000
Costly Veto (v1)	-0.165	0.049	0.001
Costless Veto (v2)	dropped		
Sequence (S)	-0.036	0.075	0.627
Information (I)	0.200	0.045	0.000
rgS	-0.190	0.090	0.037
v1S	0.167	0.084	0.049
v2S	dropped		
rgI	-0.104	0.039	0.009
v1I	dropped		
v2I	-0.061	0.056	0.277
SI	0.006	0.086	0.949
rgSI	0.197	0.112	0.082
v1SI	-0.112	0.091	0.223
v2SI	dropped		
Constant	0.808	0.041	0.000

Number of clusters (ID) = 182

Number of observations = 493

F(11, 181) = 17.73

Prob > F = 0.0000

R-squared = 0.1981

Root mean square error = 0.2663

Note: rgS, v1S and v2S are the interactions between rg, v1, v2 and Sequence (S = 1 is the Backward sequence), rgI, v1I and v2I are the interactions between rg, v1, v2 and Information (I = 1 is complete information), SI is the interaction between Sequence and Information, rgSI, v1SI and v2SI are the third order interactions of treatments, Sequence and Information and Constant is the estimated mean for the no veto treatment with incomplete information in the forward sequence.

Figure 3. Average Reciprocity by Sequence, Information Condition and Veto Treatment

Table 3. Average Reciprocity							
	Forward Sequence				Backward Sequence		
	No Veto	Costly Veto	Costless Veto		Costless Veto	Costly Veto	No Veto
Complete Information	0.5845 (0.1722) [51]	0.6490 (0.0917) [60]	0.6350 (0.0940) [34]		0.6881 (0.1749) [25]	0.6180 (0.1192) [25]	0.5447 (0.2179) [25]
Incomplete Information	0.5163 (0.1920) [65]	0.5669 (0.1417) [67]	0.5621 (0.1878) [45]		0.5133 (0.1538) [22]	0.5064 (0.1049) [22]	0.3537 (0.2557) [21]

Table 4. Restricted Regression for Average Reciprocity Index

Variables	Coefficient	Robust Standard Error	p-value
Repeated Game with No Veto (rg)	-0.046	0.031	0.143
Costly Veto (v1)	0.005	0.029	0.870
Costless Veto (v2)	dropped		
Sequence (S)	-0.049	0.043	0.258
Information (I)	0.068	0.034	0.047
rgS	-0.114	0.071	0.110
v1S	-0.012	0.044	0.791
v2S	dropped		
rgI	dropped		
v1I	0.014	0.033	0.673
v2I	0.005	0.043	0.914
SI	0.102	0.057	0.074
rgSI	0.021	0.091	0.819
v1SI	-0.072	0.057	0.206
v2SI	dropped		
Constant	0.562	0.028	0.000

Number of clusters (ID) = 182

Number of observations = 462

F(11, 181) = 7.13

Prob > F = 0.0000

R-squared = 0.1634

Root mean square error = 0.1612

Note: rgS, v1S and v2S are the interactions between rg, v1, v2 and Sequence (S = 1 is the Backward sequence), rgI, v1I and v2I are the interactions between rg, v1, v2 and Information (I = 1 is complete information), SI is the interaction between Sequence and Information, rgSI, v1SI and v2SI are the third order interactions of treatments, Sequence and Information and Constant is the estimated mean for the costless veto treatment with incomplete information in the forward sequence.