KOCHI UNIVERSITY OF TECHNOLOGY

Social Design Engineering Series *SDES-2018-8*

Intentions behind disclosure to promote trust under short-termism: An experimental study

Satoshi Taguchi
Doshisha University

Yoshio Kamijo
Research Institute for Future Design, Kochi University of Technology
School of Economics and Management, Kochi University of Technology

2nd October, 2018

School of Economics and Management
Research Institute for Future Design
Kochi University of Technology

Intentions behind disclosure to promote trust under short-termism: An experimental study

Satoshi Taguchi

Professor, Graduate school of Commerce, Doshisha University
Karasuma Imadegawa, Kamigyo-ku, Kyoto 602-8580, Japan
Email: staguchi@mail.doshisha.ac.jp

Yoshio Kamijo

Professor, School of Economics and Management, Kochi University of Technology
2-22 Eikokuji, Kochi City, Kochi 780-8515, Japan
Email: yoshio.kamijo@gmail.com

Acknowledgement
We would like to thank all the participants at 37th European Accounting Association Annual Congress (Tallinn), and 2014 American Accounting Association Annual Meeting (Atlanta).

Funding sources
This research was supported by JSPS KAKENHI Grant Number JP15H03403, JP16K13403. The experiments in this study have been approved by the institutional research ethical committee of Doshisha University.

Intentions behind disclosure to promote trust under short-termism: An experimental study

ABSTRACT

We experimentally examine the impact of varying intentions behind information disclosures on trust and reciprocity between an investor and a manager during short-term transactions where reputations cannot be established. To do so, we use a trust game with asymmetric information and conduct lab experiments, comparing one unintentional disclosure condition and two intentional disclosure conditions. The results reveal that information disclosure promotes investments and returns under all three conditions, even in short-term transactions. Further, compared with unintentional disclosure, intentional disclosure fosters greater trust and reciprocity between managers and investors. We also suggest that mutual trust can be developed even *before* reputation and a long-term relationship are formed. Our study sheds light on the merits of intentional disclosures from a short-term perspective and in particular, the practical importance of institutional design for investors to acquire information.

(134 words)

Keywords: Disclosure; Short-termism; Experimental economics; Trust game; Gift exchange; Intention

I. INTRODUCTION

Disclosure is a major component in corporate financial reporting (Dye [2017], Sunder [2012]). However, recent accounting scandals involving prominent companies including Enron, WorldCom, and HealthSouth have disrupted the fiduciary relationship between managers and investors in the context of information disclosure. Moreover, the recent financial crisis suggests that the rise of short-termism[1] has negatively impacted manager–investor relationships (Stiglitz [2015]). With such relationships becoming increasingly short-termed and given the loss of opportunities to build reputation in the long term, it has become difficult for managers and investors to develop a trusting relationship.

In the securities market, for instance, it is essential to build a trusting relationship between managers and investors. The Securities and Exchange Commission (SEC) states that it strives to promote a market environment that is worthy of public trust. Where is the origin of trust and reciprocity? Many related studies suggest that information disclosure fosters trust and reputation in a long-term relationship (e.g., Lunawat [2013a, 2013b]). However, the literature remains open on the effects of information disclosures on the trust between managers and investors during short-term transactions[2] where reputations cannot be established.

Even in the context of short-term transactions, information disclosure has an important function in that investors have better knowledge about companies and markets. Reducing information asymmetry between an investor and a manager is expected to promote transactions. However, the extent of their trust depends on the manner in which information is disclosed. Therefore, we expect mutual trust between managers and investors to differ by disclosure process, even if the same information is disclosed. Consequently, the level of trust between managers and investors may vary by the information disclosure system.

In this study, we examine the effects of information disclosure on mutual trust and reciprocity in the context of short-term transactions. We focus on the entity who chooses to disclose information and whose intention underpins the discourse decision. If information disclosure is mandatory, neither the investors nor the managers intend to disclose information. In contrast, if managers voluntarily decide to do so, the disclosure occurs according to the managers' intention. Many previous studies have discussed both mandatory and voluntary disclosure (e.g., Einhorn [2005], Graham, Harvey, and Rajgopal [2005], Healy and Palepu [2001], Jamal, Maier, and Sunder [2005], Li and Yang [2016]) and have mainly demonstrated the usefulness of voluntary disclosure in a long-term relationship (e.g., Beaulieu [2014], Lunawat [2013a, 2013b]). We

[1] Short-termism is a post-1980s model based on corporate governance that focuses on shareholders' short-term profits and returns as opposed to investments in long-term sustainability, innovation, and growth (Stiglitz [2015]). In this experiment, we interpret short-termism as the lack of opportunities to build reputations.

[2] It is important to consider the influence of a short-term perspective on economic behavior. Gigler, Kanodia, Sapra, and Venugopalan [2014], for example, study this from a "real effects" perspective and show that price pressure created by high reporting frequency induces managers to adopt a short-term perspective when determining a firm's investments.

examine if the same result holds even in short-term transactions, which occur in a more realistic and severe environment. In addition, a disclosure system reflects an investor's intentions. From a short-term perspective, it is important for investors to independently obtain information and request information disclosures from managers. In a short-term transaction, it is natural for investors to request information disclosure given the drastic changes that economic and corporate activities undergo. However, previous research has overlooked these aspects.

We adopt an experimental approach to examine the origin of trust and reciprocity. In particular, we apply the key features of a classical trust game first developed by Berg, Dickhaut, and McCabe [1995]. The trust game is an appropriate method to measure trust and reciprocity between managers and investors and has been used in numerous accounting studies (Basu, Dickhaut, Hecht, Towry, and Waymire [2009], Davidson and Stevens [2013], Lunawat [2013a, 2013b]). We use a trust game with asymmetric information, that is, firm productivity is private information known to managers (Lunawat [2013a]), and accordingly, consider the option of information disclosure in the context of firm productivity.

We examine the impact of differences in the intention to disclose information on trust and reciprocity between managers and investors by eliminating the reputation effect. We compare the following three conditions through lab experiments: *random disclosure*, where a computer randomly determines whether to disclose information; *voluntary disclosure*, where managers can opt to make a voluntary disclosure; and *demanded disclosure*, where investors request disclosures from managers. Compared to empirical analyses conducted on the field, a laboratory offers tighter controls on disclosure mechanisms. By carefully selecting relevant parameters, we can directly compare actual behavior under the three disclosure systems, which are equally deterrent in theory. In addition, we can measure investors' and managers' behavior in a laboratory without errors that are otherwise observable in field data (for further discussions on experimental methodology, see, for example, Bloomfield, Nelson, and Soltes [2016], Camerer [2003], Libby, Bloomfield, and Nelson [2002], and Luft and Shields [2009]).

We hypothesize that in the context of a "gift exchange" paradigm, intention behind disclosure plays the role of a "gift" in the trust game. The literature on gift exchange is relevant here because the settings seem to have many similarities (e.g., Akerlof [1982], Berg et al. [1995], Fehr, Kirchsteiger, and Riedl [1993]). Applying the gift exchange paradigm to the voluntary disclosure condition, we predict that an investor views the manager's disclosure decision as a "gift" and thus, reciprocates accordingly. Under the demanded disclosure condition, however, we predict that the manager perceives the investor's intentional request for disclosure as a personal concern for him/herself (McAllister [1995]) and reciprocates accordingly. In other words, we examine how differences in a relationship that is based on "gift exchange" affects trust and reciprocity between managers and investors.

Our experiment shows that information disclosure promotes investments under all three conditions. This is because information disclosure reduces the uncertainty of investment and eliminating information asymmetry promotes investments. This is the pure effect of information

disclosure common to all three conditions. Similar to the findings of previous studies using trust games to explore long-term transactions, we find that information disclosure enhances trust between a manager and an investor even in short-term transactions.

In addition, we observe that the disclosure effect differs by disclosure intention, as expected: the levels of investment and returns in the case of intentional disclosure (voluntary and demanded conditions) are higher than those for unintentional disclosure (random condition), indicating that intentional disclosure fosters mutual trust between investors and managers during short-term transactions. This is because intentional voluntary disclosure and intentional disclosure request are recognized as a type of "gift" and the levels of investment and returns increase in line with the "gift." Furthermore, a comparison of intentional disclosures with each other reveals that the levels of investment and returns are higher under the demanded disclosure condition than the voluntary condition. This result is in contrast to our expectations but can be reasonably understood because an investor's information request functions not only as a "gift" under the hypothesis of a gift exchange between disclosure request and returns, but also as a priming to promote managers' fair behavior (e.g., Andreoni and Rao [2011], Yamamori, Kato, Kawagoe, and Matsui [2008]).

This study makes the following contributions. First, it contributes to the literature on information disclosure. There are various arguments about the type of information disclosure that is considered desirable and thus far, considerable attention has been given to the reputation effect of voluntary disclosure in the long-term relationship (e.g., Lunawat [2013a, 2013b]). In contrast, our study attempts to compare all three conditions by controlling for the reputation effect. Our experimental results show that intentional disclosure fosters trust and reciprocity between managers and investors even during short-term transactions and indicate the possibility of mutual trust being formed even *before* developing one's reputation or a long-term relationship. Therefore, our study sheds light on the merit of intentional disclosure from a short-term perspective, particularly the practical importance of institutional design that assists investors in acquiring information under, for example, the demanded condition. To this effect, if economic conditions are expected to be short-term in the future, the current Regulation Fair Disclosure,[3] among others, may lead to unintended consequences since it uniformly requests disclosures without intention.[4]

Second, this study contributes to the literature on trust and reciprocity in social science and economics (Camerer [2003], Fehr, Hart, and Zehnder [2011], Fehr, Kirchsteiger, and Riedl [1993], Fehr and Schmidt [1999], Kuang and Moser [2009], Luft and Shields [2009]). A traditional trust game assumes the economic rationality of human beings and does not anticipate differences in trust and reciprocity among the three disclosure conditions. However, the gift exchange hypothesis in our study highlights differences in trust and reciprocity among the three conditions. That is, the

[3] Heflin, Kross, and Suk [2016] document the consequences of the Regulation Fair Disclosure concerning the use of management earnings forecasts and their influence on a firm's information environment.

[4] In this regard, Bushee, Jung, and Miller [2017] indicate that selective access can lead to profitable trading opportunities. Their empirical evidence suggests that selective access to management conveys benefits to certain investors even in the post-Regulation FD period.

intention behind information disclosure affects trust and reciprocity between managers and investors. This result extends the findings of Douthit and Stevens [2015], who experimentally propose that an authority's identity is an important factor affecting the interdependent relationship between principals and agents. The present study also encourages future debate on the factors promoting trust and reciprocity. The literature comprises extensive studies on social norms in accounting and auditing systems (Cardinaels and Yin [2015], Davidson and Stevens [2013], Maas and Rinsum [2013], Tayler and Bloomfield [2011], Wysocki [2011]). For example, using Bicchieri's [2006] model of social norm activation, Davidson and Stevens [2013] remark that a code of ethics with a certification activates social norms that control opportunistic behavior. Our study, which shows that three types of disclosure systems lead to varying outcomes of trust and reciprocity between investors and managers, expands the extant understanding of social norms in accounting and auditing systems.[5]

The remainder of this paper is organized as follows. Section II proposes the model. Section III reviews the related literature. Section IV presents our hypotheses. In Section V, we explain the experimental design employed to test our hypotheses. Section VI describes our empirical results and Section VII discusses the results of our additional analyses. Section VIII concludes the paper.

II. MODEL

Trust Game

We use a trust game developed by Berg et al. [1995] because it simply and accurately represents the strategic relationship between managers and investors (Davidson and Stevens [2013]).[6] The original trust game is a two-step sender–receiver game. In the first step, the sender/investor receives some wealth (E) and determines the amount of money (M) to invest with a receiver/manager within the limit of the initial endowment ($0 \leq M \leq E$).[7] In the second step, the receiver/manager is endowed with multiplier e ($e > 1$), which is a production technology or a firm's productivity. The manager puts the investment to productive use, thereby generating a strictly

[5] In addition, several empirical studies on information disclosure focus either on investors' actions (Barron and Qu [2014], Elliott, Hobson, and Jackson [2011], Fanning, Agoglia, and Piercey [2015], Hales, Kuang, and Venkataraman [2011], Han and Tan [2010], Hirst, Koonce, and Venkataraman [2008], Nelson and Rupar [2015], Thayer [201]) or managers' actions (Dickhaut, Ledyard, Mukherji, and Sapra [2003], King [1996]). As a result, thus far, strategic correlations between investors and managers have been neglected. Our study addresses this gap in the literature by analyzing direct trust and reciprocity that emerge from strategic correlations between investors and managers.

[6] Davidson and Stevens [2013] present the three advantages of utilizing the trust game in Berg et al. [1995]. First, the trust game examines the same investment setting as that explored in the corporate governance literature (Bushman and Smith [2001]). Second, the underlying agency theory incorporated in the trust game is the foundation of the corporate governance literature (Shleifer and Vishny [1997]). Third, the trust game has clear economic predictions that may be compared with and contrasted to behavioral predictions (Brown, Evans, and Moser [2009]).

[7] We consistently use the terms "investor" and "manager" in this study to describe the roles of the two players. However, in our experiments, we used the labels ''sender'' and ''receiver'' to avoid the potential effect of context-laden terms (Berg et al. [1995], Davidson and Stevens [2013]).

positive income (eM) for the firm. Information on productivity (multiplier e) is known to both managers and investors. From the firm's income, the manager determines the amount of money (K) to pay the investor as dividend within the limit eM ($0 \leq K \leq eM$). The residual amount at the end of the second step is the net gain in this game; the sender's gain is $E - M + K$ and the receiver's is $eM - K$. All information about the game is common knowledge, but the investor's and manager's identities remain anonymous. This is a game of trust, that is, the sender explicitly puts money at risk. The receiver either negatively or positively reciprocates the sender's behavior (Dickhaut [2009]).

We predict the consequences using game theory. Using the principle of backward induction, we assume the investor is aware that the manager is motivated to keep all the investor's money; therefore, the equilibrium prediction is that investors will not transfer any resources to the manager.

Despite this prediction, numerous experiments have observed that investors provide a positive amount of money to managers, who then repay investors a part of the money earned (Berg et al. [1995]). Thus, in certain cases, the experimental results contradict the prediction made using game theory.[8] This highlights the need to not only develop a model but also conduct experiments.

Trust Game with Disclosure Option: Random, Voluntary, and Demanded Conditions

This study modifies the traditional trust game by focusing on multiplier e. We introduce information asymmetry and the disclosure regime in the traditional trust game.

First, we introduce information asymmetry (Lunawat [2013a]). In the traditional trust game, information on productivity (multiplier e) is known to both managers and investors. In reality, however, this information may be naturally considered as private to managers. Therefore, we assume multiplier e is managers' private information and there are two types of firm productivity: high productivity ($e = 5$) and low productivity ($e = 3$).[9] The firm's deterministic productivity is contingent on the state of nature. Unlike the investor, the manager always observes the state of nature.

Second, we consider the effects of the information disclosure option on firm productivity. This type of information is important because it largely concerns firms' future profitability, which is related to investors' investment decisions. In reality, such information disclosure may be considered a disclosure of management forecasts (Elliott, Hobson, and Jackson [2011], Graham et al. [2005], Hirst, Koonce, and Miller [2008]). Disclosures of management forecast are voluntary in the United States but mandatory in Japan (Kato, Skinner, and Kunimura [2009]).

Executing the disclosure option makes firm productivity common knowledge. In other words, when the disclosure option is executed, managers and investors observe the realized value

[8] See Bohnet [2010], Cox [2004], and Johnson and Mislin [2011] for explanations on the frequent deviation from equilibrium.

[9] Prior studies (e.g., Basu et al. [2009]) assume that multiplier e is fixed and equal to three. Lunawat [2013b] assumes that e is variable and ranges from 1 to 5. For the sake of simplicity, we assume two values for e: 3 and 5.

of firm productivity; however, when the option is not exercised, investors remain unaware of the realized value.

In line with the disclosure option, we define three conditions that differ by intention behind information disclosure: *random disclosure* (control condition), *voluntary disclosure*, and *demanded disclosure*. Under the random disclosure condition, a computer randomly determines whether to exercise the option. Under voluntary disclosure, managers have the option to make a voluntary disclosure. As for the demanded disclosure condition, investors can request managers to make a disclosure. Our research extends Douthit and Stevens [2015], who experimentally propose that the authority's identity is an important factor affecting the interdependent relationship between principals and agents. For simplicity, we assume there is no cost associated with the execution of the option.[10] We verify which condition promotes investors' trust and managers' reciprocity.[11] Figure 1 presents the timeline of the game and the experimental conditions.

[Insert Figure 1 about here]

III. RELATED LITERATURE

Our setting draws on Lunawat [2013a, 2013b], who theoretically and experimentally examines the role of reputation building through voluntary disclosure using a trust game. The difference between our study and those of Lunawat [2013a, 2013b] is that the latter follows repeated game theory to explore the role of voluntary information disclosure as a reputation builder in a finitely repeated trust game using sequential equilibrium. Our model excludes reputation building through the voluntary disclosure condition to conduct a fair comparison of the three conditions; the random and demanded disclosure conditions have no scope for reputation building. Lunawat's [2013a, 2013b] voluntary disclosure model assumes that the manager decides whether to commit to disclosing private information *before* he/she observes the realized productivity value and thus, the manager's disclosure serves as ex-ante commitment, which builds reputation in a repeated game. Conversely, our voluntary disclosure model assumes that the manager decides whether to disclose private information *after* he/she observes the realized productivity value in a single-period game. Our voluntary model excludes the ex-ante commitment function of disclosure.

Further, our experimental design (Section V) adopts the random-matching protocol as the matching method for participants to eliminate reputation building in a repeated game. Therefore,

[10] We adopt this assumption because we focus on the costless effect of disclosure intention and not the impact of costly signals (Spence [1973]). Thus, we examine if the initiative to disclose information without a disclosure cost affects trust and reciprocity between managers and investors. However, when there is a cost attached to the execution, we find that our model bears a similar structure to that of the disclosure cost model (Verrecchia [1983]), which refers to several types of cost sharing.

[11] Our study extends Hirst, Koonce, and Miller [1999], who experimentally examine how prior forecast accuracy moderates the effects of the forecast form. They conclude that when prior forecast accuracy is high, the forecast form influences investor judgments. In our model setting, prior management forecast accuracy is "high" and thus, disclosure influences investors' judgments.

we compare three conditions at the same level and restrict our analysis to the effect of intentions behind information disclosure. Our setting is also consistent with that in the real world, where a manager–investor relationship becomes short-term and opportunities for long-term reputation building are lost (Stiglitz [2015]).

Our setting also extends Coletti, Sedatole, and Towry's [2005] study, which examines trust and cooperation between two parties with varying levels of information asymmetry. The authors show that trust and cooperation increase in a strongly controlled environment wherein information asymmetry between two parties is reduced. The difference between our study and that of Coletti et al. [2005] is that the latter suppose the superiority of the strong control environment is the Nash equilibrium in game theory and that their result is a natural consequence of game-theoretical prediction. By contrast, our study supposes that the equilibria of the three conditions predicted by game theory are the same, and thus, the superiority of demanded (or voluntary) disclosure is not a natural consequence of game-theoretical prediction.

IV. HYPOTHESES

We propose the following three hypotheses for investors' investment behavior and managers' returns behavior.

First, we predict that information disclosure positively affects investment and returns. We expect the levels of investment and returns to be higher when the disclosure option is exercised than when it is not. When information about productivity is disclosed, investment uncertainty decreases and investments are promoted by eliminating information asymmetry. In addition, the manager will return dividends in good faith since the investor accurately knows about the amount of money the manager possesses.[12] Thus, we predict that information disclosure benefits both the sender and receiver in a trust game with information asymmetry. We term this *the pure effect of information disclosure* common to all three conditions.

H1: Pure effect of information disclosure

The levels of investment and returns will be higher when the information disclosure option is exercised rather than excluded under all three conditions.

Second, we hypothesize that, in the context of the "gift exchange" paradigm, information disclosure or the intention behind it plays the role of a "gift" in a trust game. The gift exchange paradigm posits that people reward kind behavior and punish unkind behavior even in situations

[12] Koch and Normann [2008] indicate that recent bargaining experiments, such as a dictator game, evidence that a key driving force in seemingly altruistic behavior is whether the responder can observe a proposer's action. When introducing information asymmetry about the size of pie to be divided by the proposer, a typical finding is that subjects are concerned others will perceive them as abiding by social norms (even under inter-subject anonymity) but otherwise selfishly exploiting their informational advantage (Croson [1996], Guth, Huck, and Ockenfels [1996], Kagel, Kim, and Moser [1996], Mitzkewitz and Nagel [1993], Pillutla and Murnighan [1995], Rapoport and Sundali [1996], Straub and Murnighan [1995]).

where standard economic theory predicts they would not (Akerlof [1982], Fehr et al. [1993]). In line with trust games, the literature on gift exchange hypotheses would be relevant here because the settings seem to share many similarities. Berg et al. [1995, p.138], for example, show that the trust game demonstrates that people are willing to reward appropriate behavior and also that people act in anticipation of a reward.[13] Therefore, in a traditional trust game, investors' investment behavior and managers' returns behavior constitute the relationship of a "gift exchange." We compare the relationship under the random condition, in which a computer unintentionally exercises the disclosure option, with that of a gift exchange under the voluntary or demanded conditions, in which managers or investors intentionally exercise the disclosure option.

Applying the gift exchange paradigm to the voluntary disclosure condition, we derive *the hypothesis of gift exchange behavior between voluntary disclosure and investment*: the investor perceives the manager's disclosure decision as a kind "gift" and reciprocates accordingly. Thus, under the voluntary disclosure condition, investors respond generously to managers' "favorable" actions by increasing their investments with managers who voluntarily disclose information. In other words, when a manager voluntarily exercises the disclosure option, an effect attributable to intentional disclosure is expected to occur in addition to the pure effect of disclosure. We deem this the *strategic effect of managers' voluntary disclosure* and distinguish it from the previous pure effect of disclosure. Assuming that firms have the same productivity, we predict that investment value is higher in the case of voluntary information disclosure than under the random disclosure condition (H2a).[14] Furthermore, we know from previous studies (e.g., Berg et al. [1995]) that if investment amount increases, the rate of returns from the manager is expected to rise accordingly (H2b).

H2a: Investors' investment behavior under the voluntary condition

At the same level of productivity (i.e., multiplier *e* is unchanged), the amount of investment is higher when the disclosure option is exercised under the voluntary disclosure condition than the random disclosure condition.

H2b: Managers' returns behavior under the voluntary condition

[13] Rabin [1993] incorporates a "kindness" function in subjects' utility to capture the following behavior: as one's counterpart increases his or her "kindness," the utility maximizing response is to be kinder in return.

[14] H2a is consistent with the findings for self-disclosure reciprocity effects in the social psychology literature (e.g., Collins and Miller [1994], Cozby [1973], Jourard [1959], Sprecher et al. [2013]): that is, the person receiving shared information positively responds by disclosing information him/herself. Further, H2a is consistent with the findings of Slovic [1993], who experimentally shows the effects of voluntary "hostage posting" by organizations (nuclear power plants) to restore public trust following adverse events. Using scenario-based experiments, Nakayachi and Watabe [2005] demonstrate that voluntary hostage posting with monitoring provisions and self-sanctions increases participants' trust perceptions regarding organizations that are guilty, whereas imposed or involuntary hostage posting does not result in more positive evaluations. In our study, under the voluntary condition, exercising the disclosure option serves as "self-disclosure" or "hostage posting" and increases investors' trust perceptions toward managers who take "favorable" action and encourage investors to respond similarly.

At the same level of productivity (i.e., multiplier *e* is unchanged), the rate of returns is higher when the disclosure option is exercised under the voluntary disclosure condition than the random disclosure condition.

Third, we examine the effects of investors' intention under the demanded disclosure condition on the gift exchange relationship. We consider *the hypothesis of gift exchange behavior between disclosure request and returns*, in which the manager perceives the investor's intentional disclosure request as a personal concern for him/herself and thus reciprocates accordingly. To this effect, Lewis and Weigert [1985] indicate that interpersonal trust has cognitive and affective foundations and affect-based trust is an emotional form of trust, wherein one party exhibits genuine care and concern for the welfare of another. McAllister [1995, p.53] shows empirical evidence from organizational psychology literature that affect-based trust is associated with affiliative citizenship behavior such as a personal interest to the individual. Thus, under the demanded disclosure condition, managers respond generously to investors' affiliative behavior by increasing returns to investors who request for information disclosure. In other words, when an investor exercises the disclosure option, an effect attributable to the intentional disclosure request is expected to occur in addition to the pure effect of disclosure. We call this the *strategic effect of investors' disclosure request* and distinguish it from the pure effect of disclosure. Assuming that firms have the same level of productivity, we assume that the rate of returns is higher under the demanded disclosure condition than the random disclosure condition (H3b). Further, previous studies (e.g., Berg et al. [1995]) suggest that an increase in the rate of returns will cause investment level to rise accordingly (H3a).

H3a: Investors' investment behavior

At the same level of productivity (i.e., multiplier *e* is unchanged), the amount of investment is higher when the disclosure option is exercised under the demanded disclosure condition than the random disclosure condition.

H3b: Managers' return behavior

At the same productivity (i.e., multiplier *e* is unchanged), the rate of return when the disclosure option is exercised is higher under the demanded disclosure condition than the random disclosure condition.

Figure 2 summarizes the gift exchange hypotheses presented in this section.

[Insert Figure 2 about here]

First, under the random condition, both the investment and returns constitute the gift exchange relationship (normal gift exchange hypothesis). This is because a computer randomly decides to exercise the disclosure option and there is no intention behind it under the random

condition, and therefore, managers and investors do *not* regard information disclosure as a kind "gift."

Second, under the voluntary condition, both the manager's intentional voluntary disclosure and the investor's investments constitute the relationship (*hypothesis for gift exchange between voluntary disclosure and investment*). This is because the investor perceives the manager's disclosure decision as a kind "gift" and reciprocates accordingly (the boxes in Figure 2 represent this relationship). In addition, the correlation between the investment and the returns shown in the previous studies is expected to hold (see the parentheses in Figure 2 for the relationship).

Finally, under the demanded condition, both the investor's intentional disclosure request and returns by the manager constitute the relationship (*hypothesis for gift exchange between disclosure request and returns*). This is because the manager treats the investor's intentional disclosure request as a personal concern for him/herself and reciprocates accordingly (see the boxes in Figure 1). It is also expected that the correlation between the investment and the returns shown in the previous studies holds (see the parentheses in Figure 2).

V. EXPERIMENTAL DESIGN

To test our hypotheses, we conduct a trust game experiment with the disclosure option described in the previous section. We adopt a 3×1 experimental design in which the intention to disclose information is manipulated among participants under three conditions: random disclosure (control condition), voluntary disclosure, and demanded disclosure.

We performed this experiment in three waves: February 2013, April 2014, and April 2018. The laboratory experiment is programmed using Z-Tree software (Fischbacher [2007]) and it was conducted at Doshisha University's experimental lab. Participants are enrolled students recruited from the campus through the laboratory's website. We recruited a total of 246 graduate and undergraduate students[15] as participants. We conducted 20 sessions of computerized experiments: five for the random condition, eight for the voluntary condition, and seven for the demanded condition. The random condition was included in the third wave (April 2018) and the disclosure probability in the random condition was determined with reference to the actual average disclosure rate estimated during the first and second waves under the voluntary and demanded conditions. In particular, we set the disclosure probability under the random condition to 75%.

Participants were 20.77 years old on average (SD = 2.04). The maximum and minimum ages were 34 and 19 years respectively, and 57.8% of the participants were male. We incentivized

[15] The use of students as surrogates for employed adults and professionals has long been an issue in business research (Dickhaut, Livingston, and Watson [1972]). However, several studies have suggested that business students are appropriate proxies for professionals when assessing basic traits or perceptions (Ward [1993]). Remus [1986] and Greenberg [1987] address the student-as-surrogates issue by simultaneously studying business students and employed adults. Both researchers conclude that the results show no differences. Further, Geiger and Smith [2010] argue that the use of business students as surrogates for employed professionals is appropriate.

participation through monetary rewards. The allocation of participants to the conditions was random: 78, 84, and 84 subjects participated under the random, voluntary, and demanded condition, respectively. Since we adopted a between-subject design, no individual participated in more than one experimental session.

Each subject participated in one session comprising 20 decision-making rounds. Participants were assigned the role of an investor or a manager, which was randomly predetermined by the computer at the beginning of the experiment. The roles remained unchanged throughout the 20 rounds. Under the random condition, half the participants (39 participants) were assigned the role of an investor and the other half that of a manager. Similarly, under the voluntary and demanded conditions, half the participants (42 participants) were assigned the role of an investor, and the other half that of a manager. In the experimental instructions, the investor was labeled a "sender" and the manager was labeled a "receiver" (see Appendix). The participants interact anonymously through a computer network.

We informed all participants that their partner would be randomly determined by a computer at the beginning of each of the 20 rounds. We adopted random matching as a matching protocol for the participants to eliminate reputation building in a repeated game. This was because, as previously explained, we intended to compare the three conditions with a focus on the impact of the intention behind information disclosure.

The participants were separated by dividers in each experimental session. At the beginning of each session, the experimenter read aloud an initial set of instructions (see Appendix) while the participants followed along using their own instruction copies. The explanation of the game structure for the participants used neutral terminology. Once the instructions were read, participants were asked to respond to the questions about the experiment. Participants were required to answer all the questions correctly before they started an experimental task. In this way, we ensured that all the participants accurately understood the experiment's details.

The feedback information at the end of each round was as follows: his/her own action, partner's action, and his/her own payoff. During all the treatments, participants received no information, individually or in aggregate, about the results of the other pairs of subjects.

The experiment's parameters were standardized for both conditions as follows. The value of initial endowment E was 10. Productivity (multiplier e) in each period was low (e = 3) or high (e = 5) with a 50% probability. To control for the realizations of productivity across sessions, we chose one set of the 20-period productivity realizations before the first experiment and applied it to every session.

At the end of the experiment, participants were asked to fill out an exit questionnaire that gathers demographic information and personal perceptions. The duration of each session, including the reading of the instructions, was about 90 minutes. The participants received a JPY 1,000 show-up fee plus their earnings from the game in cash. The average earnings were JPY 2,269: JPY 2,136 for the random condition, JPY 2,235 for the voluntary condition, and JPY 2,426 for the demanded condition. Table 1 summarizes the experiment design.

[Insert Table 1 about here]

VI. RESULTS

Manipulation Checks and Summary Statistics

To test the effectiveness of our experimental manipulation and controls, we asked participants to respond to two questionnaires: ex-ante check questions and an exit questionnaire. Once the instructions were read, participants answered the ex-ante check questions about the experimental structure. All 246 participants responded to the check questions correctly. Thus, the experiment details were clear to and well-understood by all the participants.

The participants responded to numerous statements in the exit questionnaire, designed to test the effectiveness of our experimental manipulation and controls using a seven-point Likert-type scale, where 1 = strongly disagree and 7 = strongly agree. The manipulation and controls tests measure the mean difference from the neutral response of 4 (for all, $p < 0.01$). The participants admitted to not knowing their partner during the experiment, indicating that we effectively controlled for reputation effects ($p < 0.01$). In sum, the manipulation and controls were effective for our experiment.

Table 2 reports the descriptive statistics for each experimental condition. Panels A, B, and C, present the descriptive statistics for the rate of disclosure, investors' investment behavior, and managers' returns behavior, respectively.

[Insert Table 2 about here]

Panel A in Table 2 presents the rate of disclosure by condition and productivity level (multiplier *e*). It reveals that, under the voluntary disclosure condition, the rate of disclosure at high productivity ($e = 5$) and low productivity ($e = 3$) are 83.6% and 71.2%. Thus, under the voluntary disclosure condition, managers do not exercise disclosure when the firm's productivity is low ($e = 3$). This result is consistent with that of Kothari, Shu, and Wysocki [2009], who empirically show that managers delay the release of bad news to investors. Further, they conclude that managers' tendency to withhold bad news can stem from a standard agency problem wherein managers' disclosure preferences are not aligned with those of shareholders.[16] In addition, Panel A shows that when intentional disclosures are compared with each other, the disclosure rate under the demanded condition (88.0%) is higher than that for the voluntary condition (77.4%). Thus, the execution of disclosure options differs by demanded and voluntary conditions. In the former, investors request information disclosures more proactively because they cannot directly observe if the firm's

[16] Baginski et al. [2018] empirically evidence that, as a result of career concerns, managers delay the disclosure of bad news.

productivity is high or low. Conversely, under the voluntary condition, managers do not exercise disclosure, particularly when the firm's productivity is low.

Panel B of Table 2 indicates that, under all three conditions, the levels of investment when the disclosure option is exercised are higher than those when it is not. Panel B also shows that the investment levels are the highest (5.96) under the demanded condition. Panel C of Table 2 highlights an identical tendency that, under all three conditions, the levels of ROI are higher when the disclosure option is exercised than when it is not. In addition, Panel C shows that the levels of ROI are the highest (1.08) under the demanded condition. Contrary to the sub-game perfect equilibrium prediction of zero investment and zero returns, the levels of investment and returns under all three experimental conditions are greater than zero. This is consistent with the results of previous studies that experimentally examine behavior using trust games (Berg et al. [1995], Johnson and Mislin [2011]).

Results for H1: Pure Effect of Information Disclosure

In the following analyses to test H1, H2, and H3, we treat each subject as an independent observation, computing averages for each subject. We first analyze the pure effect of information disclosure under all three conditions. Table 3 presents the parametric and nonparametric tests for H1.

[Insert Table 3 about here]

The Mann–Whitney U values in Panel A (Table 3) reveal that, under all three conditions, there are significant differences in the investment levels between the cases of disclosure and non-disclosure. This result provides support for H1. Similar results hold for the ROI levels (Panel B of Table 3).

Results for H2: Strategic Effect of Managers' Voluntary Disclosure

We analyze the strategic effect of managers' voluntary disclosure and compare the voluntary disclosure condition with the random disclosure condition. Table 4 presents the parametric and nonparametric tests for H2.

[Insert Table 4 about here]

Table 4 shows that, in all cases, both the levels of investment and ROI are higher under the voluntary condition than the random condition. In the case of H2a, the statistically significant difference is confirmed in the following case: when the disclosure option is exercised and productivity is low (e = 3), the mean investment level is higher under the voluntary condition (4.16) than the random condition (2.83) (t = 2.28, p = 0.026; U = 1,046, p = 0.032). This result partially supports H2a. As for H2b, the statistically significant difference is confirmed in the following case:

when the disclosure option is exercised and productivity is high (e = 5), the mean ROI level is higher under the voluntary condition (1.17) than the random condition (0.95) (t = 2.17, p = 0.033; U = 1,017.5, p = 0.035). This result partially supports H2b.

In sum, our results partially support H2a and H2b, that is, the strategic effect of managers' voluntary disclosure. The findings indicate that the manager's disclosure intention affects the gift exchange relationship. In other words, the investor views the manager's disclosure decision a kind "gift" and reciprocates accordingly.

Results for H3: Strategic Effect of Investors' Disclosure Request

Here, we examine the strategic effect of investors' disclosure request and compare the demanded disclosure condition with the random disclosure condition. Table 5 presents the parametric and nonparametric tests for H3.

[Insert Table 5 about here]

For H3a, Table 5 shows that the mean investment level when the disclosure option is exercised is higher under the demanded condition (6.14) than the random condition (4.17) (t = 3.70, p = 0.000; U = 1,173, p = 0.001). This result supports H3a. As for H3b, Table 5 shows that the mean ROI level when the manager discloses information is higher under the demanded condition (1.27) than the random condition (0.82) (t = 6.26, p = 0.000; U = 1,398, p = 0.000).

Thus, our results support H3a and H3b, that is, the strategic effect of investors' disclosure request. Further, the findings indicate that investors' intention to request a disclosure affects the gift exchange relationship. The manager views such a request as a personal concern for him/herself and reciprocates accordingly.

As described above, we analyze H1, H2, and H3, where we treat each subject as an independent observation, computing averages for each subject. As a result, we obtain results that support all hypotheses. However, given the short-term setting of our study, a more robust analysis that controls for the effects of both periods and individuals is warranted. In particular, our experiment comprises 20 decision-making periods, and thus, it is necessary to account for changes in the variables throughout all the periods. Further, an analysis of returns behavior must control for not only the effects of both periods and individuals but also the impact of the choices of disclosure and investment. This is because repayment is likely a function of both treatments (multiplier and disclosure rule) and subjects' responses to those treatments (choice of disclosure and choice of investment). We analyze this in the next section.

VII. DISCUSSION: ADDITIONAL ANALYSIS

Comparison of Three Conditions by Period

In this section, we expand the viewpoint presented in this study and compare all three conditions. Figure 3 presents the mean levels for investment and ROI for each condition by period.

[Insert Figure 3 about here]

Figure 3 shows that, despite the influence of differences in productivity (*e*) throughout the chart, the first and second halves of the round do not differ for all conditions. In other words, the learning effect has a limited influence and our experimental setting to control for the reputation effect functions successfully.

In addition, Figure 3 shows that, throughout all the rounds, the levels of investment and ROI under the voluntary and demanded conditions, where managers and investors intentionally exercise their disclosure, were higher than those under the random condition, where a computer unintentionally opts for disclosure. In particular, the levels of investment and ROI are the highest under the demanded condition.

Analysis using Linear Mixed-Effects Models

In this subsection, we use the linear mixed-effects (LME) models to control for the influence of periods and individuals (Bolker, Brooks, Clark, Geange, Poulsen, Stevens, and White [2009]) because our experiment is designed to induce repeated measures. The LME model allows for flexible specifications for the effect of a disclosure rule in terms of the observed fixed effects and for those of individuals in terms of a random effect.

Suppose r_{it} is a response variable for individual *i* in period *t*, for example, senders' investment or receivers' ROI and $\boldsymbol{x_{it}}$ is the vector of variables for subject *i* in period *t*, such as an experimental condition dummy, profitability (*e*), a period, or disclosure dummy for fixed effects $\boldsymbol{\beta}$. Then, we estimate the response variable r_{it} of individual *i* in period *t* as

$$r_{it} = \boldsymbol{\beta} \cdot \boldsymbol{x_{it}} + u_i + \varepsilon_{it},$$

where u_i is the individual-specific random effects across individuals and ε_{it} is an unobservable error term across individuals and periods.[17] We assume independent and normally distributed random terms denoted by *u* and ε.

[Insert Table 6 about here]

First, we analyze investors' investment behaviors using the LME models. Table 6 reports the estimation results for several models in which investment level is the dependent variable and the experimental conditions dummy and other variables such as profitability and period are independent variables. Model 1 estimates the average effect of experimental conditions on investment level relative to the baseline condition (random) and shows that while the voluntary

[17] We run a regression using Stata 14.0 with the command *mixed*.

dummy is not statistically significant, the demanded dummy is statistically significant at the 1% level. However, if we incorporate the interaction terms for disclose dummy and experimental conditions (Model 2), the interaction term for voluntary dummy becomes positive and statistically significant. This indicates that the effect of experimental conditions on investment level differs between the disclosed and non-disclosed cases. We run similar regressions using the disclosed (Model 3) and non-disclosed (Model 4) samples. For the disclosed sample, we observe large average effects by both the demanded and voluntary conditions on investment level relative to the baseline condition. However, such effects are not observable in the non-disclosed sample. This finding strongly supports H2a and H3a.

[Insert Table 7 about here]

Next, we examine the effects of disclosure decisions and the intention behind it on managers' returns behavior. Table 7 presents the estimation results for LME models, where ROI is the dependent variable. The experimental condition dummies and the disclosure decision are the independent variables in Model 1, and the interaction terms for these are added in Model 2. In both models, the disclose and demanded dummies are positive and statistically significant at the 1% level, although the coefficients related to the voluntary dummy are not. In other words, while the demanded condition positively affects managers' returns behavior, the voluntary dummy does not. However, as in the case for senders' behavior, returns behavior may differ between the disclosed and non-disclosed case. We examine this in the subsequent discussion.

[Insert Table 8 about here]

Table 8 reports the estimation results for the LME model, where ROI is the dependent variable and the sample is restricted to disclosed data. In addition to the experimental condition dummies, we incorporate investment (Model 1) as well as the interaction term for investment and the experimental condition dummies (Model 2) as independent variables. We find a positive and significant effect by the demanded dummy on ROI on both the intercept and slope of investment, which is consistent with the observations in Table 7. However, we also observe differences between voluntary and random with respect to the investment slope in Model 2, which is in contrast with the findings in Table 7. Managers who voluntarily disclose information reciprocate to investments stronger than those who randomly do so. In Models 3 and 4, we conduct a similar analysis using e * investment instead of investment and obtain the same result. This indicates that ROI level is statistically higher under the voluntary condition with intentional voluntary disclosure than under the random condition after controlling for the effects of investments and firm productivity. This result strongly supports H2b.

In sum, even if we use the LME models to control for the influence of periods and individuals, we obtain the same results as those from the analysis presented in the previous section.

This indicates that our results are robust. In particular, our experimental results show that intentional disclosure fosters trust and reciprocity between managers and investors even in short-term transactions where reputations cannot be established. Further, when comparing intention disclosure with each other, the levels of investment and returns are higher under the demanded disclosure condition than the voluntary condition. This result suggests that *the gift exchange relationship between investors' disclosure request and managers' returns* is the most important factor in enhancing mutual trust. Therefore, investors' affective trust (Lewis and Weigert [1985], McAllister [1995]) in the manager is key in the manager–investor relationship.

Analysis on Efficiency and Fairness of Distribution

In this subsection, we analyze the efficiency and fairness of distribution under the three conditions. Figure 4 depicts the average profit per period by condition.

[Insert Figure 4 about here]

Figure 4 demonstrates that receivers' profits are greater than those of the sender and under all conditions, the total profits are higher when the disclosure option is exercised, which can be considered a logical consequence of disclosure promoting investments under all conditions. As for the distribution of total profits increasing by disclosure, we find a difference in each condition. In particular, under the intentional disclosure conditions (voluntary and demanded conditions), the profits of a player with the disclosure option significantly differ between the cases of information disclosure and non-disclosure. Table 9 presents the statistical analysis.

[Insert Table 9 about here]

Table 9 shows that, under the voluntary condition, where the receiver has the disclosure option, the receiver's mean profit level in the disclosure case (15.28) is significantly higher than that in the non-disclosure case (7.02) at the 1% level (parametric and nonparametric tests). On the other hand, for senders who do not have a disclosure option under the voluntary condition, only the parametric test shows significant differences in profit levels between the disclosure (10.76) and non-disclosure (9.67) cases at the 5% level.

In addition, Table 9 shows that, under the demanded condition, where the sender has the disclosure option, the sender's mean profit level is significantly higher in the disclosure case (12.53) than in the non-disclosure case (8.66) at the 1% level (parametric and nonparametric tests). As for receivers, who do not have a disclosure option under the demanded condition, the parametric and nonparametric tests show no significant difference in the profit levels between the disclosure (16.38) and non-disclosure (14.50) cases.

To conduct a more in-depth analysis, we create a scatterplot for each condition. Figure 5 presents the scatterplot for efficiency and fairness.

[Insert Figure 5 about here]

Figure 5 shows that information disclosure improves efficiency, denoted on the horizontal axis. On the other hand, the distribution of fairness on the vertical axis differs greatly between the information disclosure and non-disclosure cases, particularly under the intentional disclosure conditions (voluntary and demanded conditions). Therefore, further statistical analyses are required on the relationship between information disclosure and fairness. Table 10 presents the statistical analyses.

[Insert Table 10 about here]

Panel A of Table 10 shows that, under all conditions, the mean efficiency levels are significantly higher in the disclosure case than in the non-disclosure case at the 1% level (under the voluntary and demanded conditions) and the 10% level (under the random condition).

In addition, Panel B of Table 10 indicates that fairness increases when an information disclosure is made. Further, it shows differences in the effects of an information disclosure on fairness between intentional (voluntary and demanded conditions) and unintentional (random condition) disclosure conditions. The null hypothesis is not rejected in the disclosure case under the voluntary and demanded conditions, although it is rejected in the disclosure case under the random condition at the 5% level (two-tailed, one-sample t-test). Thus, under the intentional disclosure conditions, information disclosure increases fairness.

In the context of efficiency and fairness, our experimental results show that information disclosure promotes investments and enhances efficiency. Moreover, they indicate that intentional information disclosure particularly promotes fairness between investors and managers. Therefore, intentional disclosure can be deemed a mechanism to improve efficiency and fairness.

Demanded vs. Voluntary Condition

In this subsection, we further analyze the results for the demanded condition. Our experimental results show that both investment amount and ROI levels are the highest under the demanded condition. Why is their performance high under the demanded condition? We consider the following hypothesis to address this question: We hypothesize that *disclosure requests under the demanded condition promotes fair responses by managers.* We assume that investors' information requests function not only as a 'gift' in the hypothesis for gift exchanges between disclosure requests and returns, but also as a priming for managers to promote fair behavior.

In this regard, previous studies show that communication promotes empathy (e.g. Andreoni and Rao [2011], Kandul [2016], Yamamori et al. [2008]). Andreoni and Rao [2011]

employed a dictator game experiment to study the effects of communication on resulting allocations. They found that when the recipient spoke, giving increased, indicating that asking is powerful. They concluded that communication, especially the power of asking, greatly influences feelings of empathy and pro-social behavior. Yamamori et al. [2008] studied a dictator game with a "voice" option in which recipients were allowed to communicate numerical "minimal offer requests" to dictators, and examined the effects of communication in the absence of coordination aspects and personal identification. Their experimental results reveal that a recipient's voice can significantly affect the allocation of pie: if the minimum offer that a recipient is willing to receive is less than or equal to half the total amount, the dictators tend to increase their offers as the minimum offer rises. If we consider these results in our settings, we expect managers to believe that they should act more equitably given the investors' request for information disclosure.

Moreover, this effect may have a positive influence on not only managers' returns but also investment amount through investors' expectations of managers' fair behavior. Since such an effect cannot be assumed under the other conditions, both investment amount and ROI level are the highest under the demanded condition.

[Insert Table 11 about here]

To verify this, we focus on the frequency of managers' equitable distribution. Table 11 presents the frequency and the statistical tests. Panel A shows that the rate of frequency for managers' equitable distribution is statistically the highest at the 1% level under the demanded condition (X-squared = 19.61, p-value = 0.000). Panel B indicates that a manager tends to repay more than or equal to half the firm's income (*eM*), particularly when the disclosure option is exercised under the demanded condition. The three-sample test for the equality of proportions highlight the statistical difference among the three conditions (X-squared = 20.66, p-value = 0.000).

[Insert Table 12 about here]

To check the robustness of our findings on mangers' fair behavior under the demanded condition, we run a regression analysis that controls for an individual's repetitive responses and the varying investment levels across the experimental conditions. We conduct a multi-level, mixed effects logistic regression, extending the LME model to binary responses. Table 12 presents the estimation results. We set the voluntary condition as the baseline condition and incorporate investment level and its interaction term with the experimental condition as independent variables. This is because the traditional logic of trust and reciprocity in a trust game implies that the fair reply increases with a rise in investment level. Model 1 shows that, as investment level increases, the probability of fair returns is higher under the demanded condition than the voluntary condition.

The same result holds when we use a slightly different definition of managers' fair reply (Model 2).

As described above, our experimental results on the demanded condition, that is, the frequency of managers' equitable distribution, is the highest and it is concentrated when the disclosure option is exercised, suggesting that investors' disclosure requests under the demanded condition positively affects the promotion of the fairness norm among managers. This tendency is supported by the regression analysis. This effect is one of the explanations for the high performance under the demanded condition.

VIII. CONCLUSIONS

In this study, we examine the effects of information disclosure on mutual trust and reciprocity in the context of short-term transactions. We focus on the entity choosing to disclose information and the intention behind the decision. Several studies have mainly demonstrated the usefulness of voluntary disclosure in a long-term relationship (e.g., Lunawat [2013a, 2013b]). We examine whether the same result holds during short-term transactions, which is a more realistic and severe environment. In addition, we account for a disclosure system that reflects investors' intensions.

We hypothesize that in the context of the "gift exchange" paradigm, the intension behind disclosure plays the role of a "gift" in the trust game. The literature on gift exchange is relevant here because the settings seem to share numerous similarities (Akerlof [1982], Berg et al. [1995], Fehr et al. [1993]).

Our experiment highlights that information disclosure promotes investments under all three conditions. This is because information disclosure reduces investment uncertainty and investments are promoted by eliminating information asymmetry. Thus, similar to the findings of previous studies using a trust game to explore long-term transactions, we find that information disclosure enhances trust between a manager and an investor even in the short-term transaction.

In addition, we observe that the disclosure effect differs by disclosure intention, as expected. The levels of investment and returns are higher in an intentional disclosure case (voluntary and demanded conditions) than in an unintentional disclosure case (random condition), suggesting that intentional disclosure fosters mutual trust between investors and managers during short-term transactions. This is because an intentional voluntary disclosure and intentional disclosure request are recognized as a kind "gift" and the levels of investment and returns increase in line with the "gift." Further, when comparing types of intentional disclosure, the levels of investment and returns are higher under the demanded disclosure condition than the voluntary condition. This is because investors' information requests function not only as a "gift" under the hypothesis of a gift exchange between disclosure request and returns, but also as a priming to promote fair behavior among managers (e.g., Andreoni and Rao [2011], Yamamori et al. [2008]).

Despite its contributions, this study is naturally subject to several limitations. Some of these limitations are inherent to the use of a controlled laboratory experiment with student participants and relate to the generalizability of our findings to real-world disclosure settings. For

example, to manipulate the effects of intentions underpinning disclosures, we used a modified trust game in which a computer, a manager, or an investor can exercise the disclosure option. The cautious approach is recommended when extrapolating laboratory results to real-world situations since our experimental settings are highly controlled.

Second, this study did not consider the content of accounting information. That is, the effects of disclosure intention may vary by the nature of disclosed content such as CSR information (Martin and Moser [2016], Moser and Martin [2012]). We leave the in-depth analysis of this issue to future studies.

The third and final limitation of this study is the quality of information. The quality of disclosed information has remained constant in this experiment. However, if we allow managers to change the disclosure quality, particularly under the voluntary disclosure condition, higher quality may be disclosed. To ensure the robustness of this research, it is necessary to conduct experiments that allow for the selection of quality.[18]

[18] In connection with this point, experimental research that takes into account the level of readability of qualitative information can also be considered in the future. As related studies, Asay, Elliott and Rennekamp [2017], Asay and Hales [2018], and Asay, Libby, and Rennekamp [2018] may be useful.

APPENDIX.

INSTRUCTIONS USED FOR THE EXPERIMENT[19]

1. Roles

The following decision-making problem requires two roles: the Sender and the Receiver. Your role in this game will be randomly determined by the computer at the start of the game and will remain unchanged until the end of the game.

2. Rules for decision-making

At the start of the game, pairs consisting of a Sender and a Receiver are formed. Decisions are made by each pair. The timeline of the game is as follows.

The timeline

Stage 1: *Receiver's (sender's [demanded condition]/ a computer's [random condition]) decision*
Stage 2: Sender's decision
Stage 3: Receiver's decision

Stage 1: *Receiver's (Sender's [demanded condition]/ a computer's [random condition]))* decision *The Receiver (Sender/ Computer) decides whether to disclose the information (request the disclosure of information[demanded])* on the parameter *e* to the *Sender (Receiver)*. When the information is disclosed, the Sender learns the value of *e* in that round. If the information is not disclosed, the Sender will not know the value of *e*.

Stage 2: Sender's decision

The Sender is given 10 points. The Sender decides how many of those points to send to the Receiver.

Stage 3: Receiver's decision

The points sent by the Sender to the Receiver are multiplied by *e* by the computer. The Receiver decides how many of the points received should be returned to the Sender. The points are calculated in the following way:

Points earned by the Sender

= [points remaining on hand] + [points received from the Receiver]

Points earned by the Receiver

= [points received from the Sender] × *e* – [points returned to the Sender]

3. Matching

[19] The underlined text in italics varies depending on the conditions (the demanded or random conditions appear within parentheses).

The sequence of decision-making described above is repeated 20 times. Pairs of Senders and Receivers are determined randomly in each round by the computer. Thus, the decision-making process is not conducted repeatedly between the same participants.

4. Parameter *e*

Parameter *e* takes the value 3 or 5, which is determined randomly in each round by the computer. The value of *e* is known only to the Receiver. However, in instances where the information is disclosed, the Sender finds out the value of *e*.

REFERENCES

AKERLOF, G. A. 'Labor Contracts as Partial Gift Exchange.' *Quarterly Journal of Economics* 97 (1982): 543–569.

ANDREONI, J., and J. M. RAO. 'The power of asking: How communication affects selfishness, empathy, and altruism.' *Journal of Public Economics* 95 (2011): 513–520.

ASAY, H. S., W. B. ELLIOTT, and K. RENNEKAMP. 'Disclosure Readability and the Sensitivity of Investors' Valuation Judgments to Outside Information.' *The Accounting Review* 92 (2017): 1–25.

ASAY, H. S. and J. HALES. 'Disclaiming the Future: Investigating the Impact of Cautionary Disclaimers on Investor Judgments Before and After Experiencing Economic Loss.' *The Accounting Review* 93 (2018): 81–99.

ASAY, H. S., R. LIBBY, and K. RENNEKAMP. 'Firm performance, reporting goals, and language choices in narrative disclosures.' *Journal of Accounting and Economics* 65 (2018): 380–398.

BAGINSKI, S. P., J. L. CAMPHELL, L. A. HINSON, and D. S. KOO. 'Do career concerns affect the delay of bad news disclosure?' *The Accounting Review* 93 (2) (2018): 61–95.

BARRON, O. E., and H. QU. 'Information Asymmetry and the Ex-Ante Impact of Public Disclosure Quality on Price Efficiency and the Cost of Capital: Evidence from a Laboratory Market.' *The Accounting Review* 89 (2014): 1269–1297.

BASU, S., J. DICKHAUT, G. HECHT, K. TOWRY, and G. WAYMIRE. 'Recordkeeping Alters Economic History by Promoting Reciprocity.' *Proceedings of the National Academy of Sciences USA* 106 (2009): 1009–1014.

BEAULIEU, P. 'Voluntary Income Reporting.' *Accounting Horizons* 28 (2014): 277–295.

BERG, J., J. DICKHAUT, and K. McCABE. 'Trust, Reciprocity and Social History.' *Games and Economic Behavior* 10 (1995): 122–142.

BICCHIERI, C. *The Grammar of Society: The Nature and Dynamics of Social Norms.* New York, NY: Cambridge University Press, 2006.

BLOOMFIELD, R., M. W. NELSON., and E. SOLTES. 'Gathering Data for Archival, Field, Survey, and Experimental Accounting Research.' *Journal of Accounting Research* 54(2) (2016): 341–395.

BOHNET, I. 'Trust in Experiments.' In *Behavioral and Experimental Economics*, edited by S. N. DURLAUF and L. E. BLUME, 253–257. New York, NY: Palgrave Macmillan, 2010.

BOLKER, B.M., M. E. BROOK, C. J. CLARK., S. W. GEANGE., J. R. POULSEN., M. H. H. STEVENS, J-S. S. WHITE. 'Generalized linear mixed models: a practical guide for ecology and evolution.' *Trends in Ecology & Evolution* 24 (2009): 127–135.

BROWN, J., J. EVANS, and D. MOSER. 'Agency Theory and Participative Budgeting Experiments.' *Journal of Management Accounting Research* 21 (2009): 317–345.

BUSHEE, B. J., M. J. JUNG, and G. S. MILLER. 'Do Investors Benefit from Selective Access to Management?' *Journal of Financial Reporting* 2 (2017): 31–61.

BUSHMAN, R., and A. SMITH. ‘Financial Accounting Information and Corporate Governance.’ *Journal of Accounting and Economics* 32 (2001): 237–333.

CAMERER, C. F. *Behavioral Game Theory*. Princeton, NJ: Princeton University Press, 2003.

CARDINAELS, E., and H. YIN. ‘Think Twice before Going for Incentives: Social Norms and the Principal’s Decision on Compensation Contracts.’ *Journal of Accounting Research* 53 (2015): 985–1015.

COLETTI, A. L., K. L. SEDATOLE, and K. L. TOWRY. ‘The Effect of Control Systems on Trust and Cooperation in Collaborative Environments.’ *The Accounting Review* 80 (2005): 477–500.

COLLINS, N. L., and MILLER, L. C. ‘Self-disclosure and liking: A meta-analytic review.’ *Psychological Bulletin 116*(3) (1994): 457–475.

COZBY, P. C. ‘Self-disclosure: A literature review.’ *Psychological Bulletin* 79(2) (1973): 73–91.

CROSON, R. T. A. ‘Information in ultimatum games.’ *Journal of Economic Behavior and Organization* 30 (1996): 192–211.

COX, J. ‘How to Identify Trust and Reciprocity.’ *Games and Economic Behavior* 46 (2004): 260–281.

DAVIDSON, B. I., and D. E. STEVENS. ‘Can a Code of Ethics Improve Manager Behavior and Investor Confidence? An Experimental Study.’ *The Accounting Review* 88 (2013): 51–74.

DICKHAUT, J. ‘The Brain as the Original Accounting Institution.’ *The Accounting Review* 84 (2009): 1703–1712.

DICKHAUT, J., M. LEDYARD, A. MUKHERJI, and H. SAPRA. ‘Information Management and Valuation: An Experimental Investigation. *Games and Economic Behavior* 44 (2003): 26–53.

DICKHAUT, J., W. J. LIVINGSTON, and D. WATSON. ‘On the Use of Surrogates in Behavioral Experimentation. *The Accounting Review* 47 (1972): 455–470.

DOUTHIT, J. D., and D. E. STEVENS. ‘The Robustness of Honesty Effects on Budget Proposals When the Superior Has Rejection Authority.’ *The Accounting Review* 90 (2015): 467–493.

DYE, R. A. ‘Some Recent Advances in the Theory of Financial Reporting and Disclosures.’ *Accounting Horizons* 31(3) (2017): 39–54.

EINHORN, E. ‘The Nature of the Interaction Between Mandatory and Voluntary Disclosures.’ *Journal of Accounting Research* 43 (2005): 593–621.

ELLIOTT, W. B., J. L. HOBSON, and K. E. JACKSON. ‘Disaggregating Management Forecasts to Reduce Investors’ Susceptibility to Earnings Fixation.’ *The Accounting Review* 86 (2011): 185–208.

FANNING, K., C. P. AGOGLIA, and M. D. PIERCEY. ‘Unintended Consequences of Lowering Disclosure Thresholds.’ *The Accounting Review* 90 (2015): 301–320.

FEHR, E., O. HART, and C. ZEHNDER. ‘Contracts as Reference Points: Experimental Evidence.’ *American Economic Review* 101 (2011): 493–525.

FEHR, E., G. KIRCHSTEIGER, and A. RIEDL. ‘Does Fairness Prevent Market Clearing? An Experimental Investigation.’ *Quarterly Journal of Economics* 108 (1993): 437–459.

FEHR, E., and K. M. SCHMIDT. ‘A Theory of Fairness, Competition, and Cooperation.’ *Quarterly Journal of Economics* 114 (1999): 817–868.

FISCHBACHER, U. ‘Z-tree: Zurich Toolbox for Ready-Made Economic Experiments.’ *Experimental Economics* 10 (2007):171–178.

GEIGER, M., and J. L. SMITH. ‘The Effect of Institutional and Cultural Factors on the Perceptions of Earnings Management.’ *Journal of International Accounting Research* 9 (2010): 21–43.

GIGLER, F., C. KANODIA, H. SAPRA, and R. VENUGOPALAN. ‘How Frequent Financial Reporting Can Cause Managerial Short-Termism: An Analysis of the Costs and Benefits of Increasing Reporting Frequency.’ *Journal of Accounting Research* 52 (2014): 357–387.

GRAHAM, J. R., C. R. HARVEY, and S. RAJGOPAL. ‘The Economic Implications of Corporate Financial Reporting.’ *Journal of Accounting and Economics* 40 (2005): 3–37.

GREENBERG, J. ‘The College Sophomore as Guinea Pig: Setting the Record Straight.’ *Academy of Management Review* 12 (1987): 157–159.

GUTH, W., W. S. HUCK, and P. OCKENFELS. ‘Two-level ultimatum bargaining with incomplete information: An experimental study.’ *Economic Journal* 106 (1996): 593–604.

HALES, J., X. J. KUANG, and S. VENKATARAMAN. ‘Who Believes the Hype? An Experimental Examination of How Language Affects Investor Judgments.’ *Journal of Accounting Research* 49 (2011): 223–255.

HAN, J., and H.-T. TAN. ‘Investors’ Reactions to Management Earnings Guidance: The Joint Effect of Investment Position, News Valence, and Guidance Form.’ *Journal of Accounting Research* 48 (2010): 81–104.

HEALY, P. M., and K. G. PALEPU. ‘Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature.’ *Journal of Accounting and Economics* 31 (2001): 405–440.

HEFLIN, F., W. J. KROSS, and I. SUK. ‘Asymmetric Effects of Regulation FD on Management Earnings Forecasts.’ *The Accounting Review* 91(1) (2016): 119-152.

HIRST, D. E., L. KOONCE, and J. MILLER. ‘The Joint Effect of Management’s Prior Forecast Accuracy and the Form of Its Financial Forecasts on Investor Judgment.’ *Journal of Accounting Research* 37 (1999): 101–124.

HIRST, D. E., L. KOONCE, and S. VENKATARAMAN. ‘Management Earnings Forecasts: A Review and Framework.’ *Accounting Horizons* 22 (2008): 315–338.

JAMAL, K., M. MAIER, and S. SUNDER. ‘Enforced Standards Versus Evolution by General Acceptance: A Comparative Study of e-Commerce Privacy Disclosure and Practice in the United States and the United Kingdom.’ *Journal of Accounting Research* 43 (2005): 73–96.

JOHNSON, N. D., and A. A. MISLIN. ‘Trust Games: A Meta-Analysis.’ *Journal of Economic Psychology* 32 (2011): 865–889.

JOURARD, S. M. ‘Self-disclosure and other-cathexis.’ *The Journal of Abnormal and Social Psychology* 59(3) (1959): 428–431.

KAGEL, J. H., C. KIM, and D. MOSER. ‘Fairness in ultimatum games with asymmetric information and asymmetric payoffs.’ *Games and Economic Behavior* 13 (1996): 100–110.

KANDUL, S. ‘Ex-post blindness as excuse? The effect of information disclosure on giving.’ *Journal of Economic Psychology* 52 (2016): 91–101.

KATO, K., D. J. SKINNER, and M. KUNIMURA. ‘Management Forecasts in Japan: An Empirical Study of Forecasts that Are Effectively Mandated.’ *The Accounting Review*: 84 (2009): 1575-1606.

KING, R. R. ‘Reputation Formation for Reliable Reporting: An Experimental Investigation.’ *The Accounting Review* 71 (1996): 375–396.

KOCH, A. K. and H. T. NORMANN. ‘Giving in Dictator Games: Regard for Others or Regard by Others?’ *Southern Economic Journal*. 75(1) (2008): 223–231.

KOTHARI, S. P., S. SHU, and P. D. WYSOCKI. ‘Do Managers Withhold Bad News?’ *Journal of Accounting Research* 47 (2009): 241–276.

KUANG, X., and D. V. MOSER. ‘Reciprocity and the Effectiveness of Optimal Agency Contracts.’ *The Accounting Review* 84 (2009): 1671–1694.

LEWIS, J. D., and A. WEIGERT. ‘Trust as a social reality.’ *Social Forces 63*(4) (1985): 967–985.

LI, X., and H. I. YANG. ‘Mandatory Financial Reporting and Voluntary Disclosure: The Effect of Mandatory IFRS Adoption on Management Forecasts.’ *The Accounting Review* 91 (2016): 933–953.

LIBBY, R., R. BLOOMFIELD, and M. W. NELSON. ‘Experimental research in financial accounting.’ *Accounting, Organizations and Society* 27 (8) (2002): 775–810.

LUFT, J., and M. D. SHIELDS. ‘Psychology Models of Management Accounting.’ *Foundations and Trends(R) in Accounting* 4 (2009): 199–345.

LUNAWAT, R. ‘The Role of Information in Building Reputation in an Investment/Trust Game.’ *European Accounting Review* 22 (2013a): 513–532.

LUNAWAT, R. ‘An Experimental Investigation of Reputation Effects of Disclosure in an Investment/Trust game.’ *Journal of Economic Behavior & Organization* 94 (2013b): 130–144.

MAAS, V. S., and M. V. RINSUM. ‘How Control System Design Influences Performance Misreporting.’ *Journal of Accounting Research* 51 (2013): 1159–1186.

MARTIN, P. R., and D. V. MOSER. ‘Managers’ Green Investment Disclosures and Investors’ Reaction.’ *Journal of Accounting and Economics* 61 (2016): 239–254.

McALLISTER, D. J. ‘Affect and cognition‐based trust as foundations for interpersonal cooperation in organizations.’ *Academy of Management Journal* 38 (1) (1995): 24–59.

MITZKEWITZ, M., and R. NAGEL. ‘Experimental results on ultimatum games with incomplete information.’ *International Journal of Game Theory* 22 (1993): 171–198.

MOSER, D. V., and P. R. MARTIN. ‘A Broader Perspective on Corporate Social Responsibility Research in Accounting.’ *The Accounting Review* 87 (2012): 797–806.

NAKAYACHI, K., and M. WATABE. ‘Restoring Trustworthiness after Adverse Events: The Signaling Effects of Voluntary “Hostage Posting” on Trust.’ *Organizational Behavior and Human Decision Processes* 97 (2005): 1–17.

NELSON, M. W., and K. K. RUPAR. ‘Numerical Formats within Risk Disclosures and the Moderating Effect of Investors’ Concerns about Management Discretion.’ *The Accounting Review* 90 (2015): 1149–1168.

PILLUTLA, M. M., and J. K. MURNIGHAN. ‘Being fair or appearing fair: Strategic behavior in ultimatum bargaining.’ *Academy of Management Journal* 38 (1995): 1408–1426.

RABIN, M. ‘Incorporating fairness into game theory and economics.’ *American Economic Review* 83 (5) (1993): 1281–1302.

RAPOPORT, A., and J. A. SUNDALI. ‘Ultimatums in two-person bargaining with one-sided uncertainty: Offer games.’ *International Journal of Game Theory* 25 (1996): 475–494.

REMUS, W. ‘Graduate Students as Surrogates for Managers in Experiments on Business Decision Making.’ *Journal of Business Research* 14 (1986): 19–25.

SHLEIFER, A., and R. VISHNY. ‘A Survey of Corporate Governance.’ *The Journal of Finance* 52 (1997): 737–783.

SLOVIC, P. ‘Perceived Risk, Trust, and Democracy.’ *Risk Analysis* 13 (1993): 675–682.

SPENCE, M. ‘Job Market Signaling.’ *The Quarterly Journal of Economics* 87 (1973): 355–374.

SPRECHER, S., TREGER, S., WONDRA, J. D., HILAIRE, N., and WALLPE, K. ‘Taking turns: Reciprocal self-disclosure promotes liking in initial interactions.’ *Journal of Experimental Social Psychology 49*(5) (2013): 860–866.

STIGLITZ, J. E. *Rewriting the Rules of the American Economy. An Agenda for Growth and Shared Prosperity* W. Norton & Company, 2015.

STRAUB, P. G., and J. K. MURNIGHAN. ‘An experimental investigation of ultimatum games: Information, fairness, expectations, and lowest acceptable offers.’ *Journal of Economic Behavior and Organization* 27 (1995): 345–364.

SUNDER, S. ‘Corporate Disclosure: A Symposium.’ *Accounting Horizons* 26 (2012): 353–355.

TAYLER, W. B., and R. J. BLOOMFIELD. ‘Norms, Conformity, and Controls.’ *Journal of Accounting Research* 49 (2011): 753–790.

THAYER, J. ‘Determinants of Investors’ Information Search: Credibility and Confirmation.’ *The Accounting Review* 86 (2011): 1–22.

YAMAMORI, T., K. KATO, T. KAWAGOE, and A. MATSUI ‘Voice matters in a dictator game.’ *Experimental Economics* 11(4) (2008): 336–343.

VERRECCHIA, R. E. ‘Discretionary Disclosure.’ *Journal of Accounting and Economics* 5 (1983): 179–194.

WARD, E. ‘Generalizability of Psychological Research from Undergraduates to Employed Adults.’ *The Journal of Social Psychology* 133 (1993): 513–519.

WYSOCKI, P. ‘New Institutional Accounting and IFRS.’ *Accounting and Business Research* 41 (2011): 309–328.

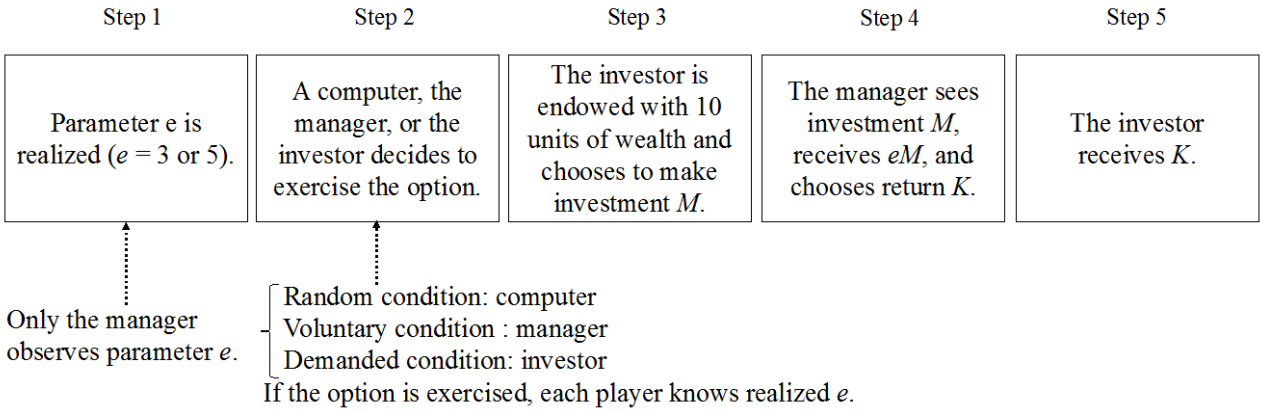


Figure 1. Game timeline

Note: This figure illustrates the timeline of the trust game with the disclosure option. In step 1, the state of nature determines the firm's productivity (multiplier e). It is equally possible for the realized value of productivity to be high (e = 5) or low (e = 3). Only the manager observes the realized value. In step 2, a computer (under the random condition), the manager (under the voluntary condition), or the investor (under the demanded condition) determines whether to exercise the disclosure option. Steps 3–5 are the same as those in the traditional trust game. After step 5, managers and investors are randomly re-matched and thereafter, steps 1–5 are repeated for a total of 20 rounds.

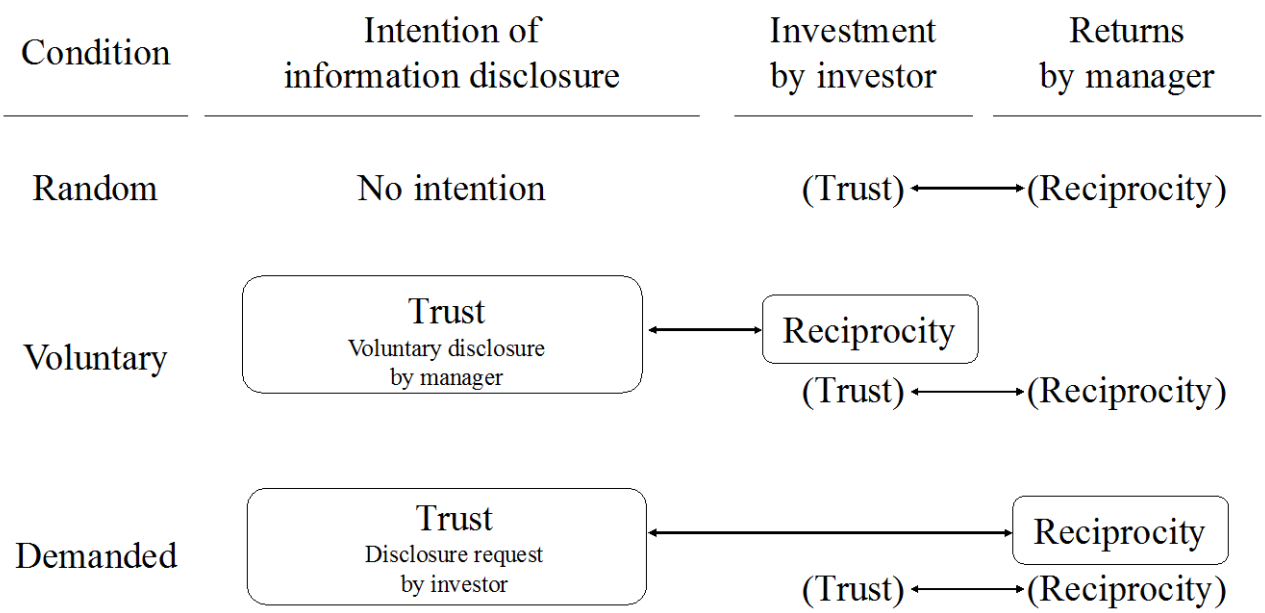
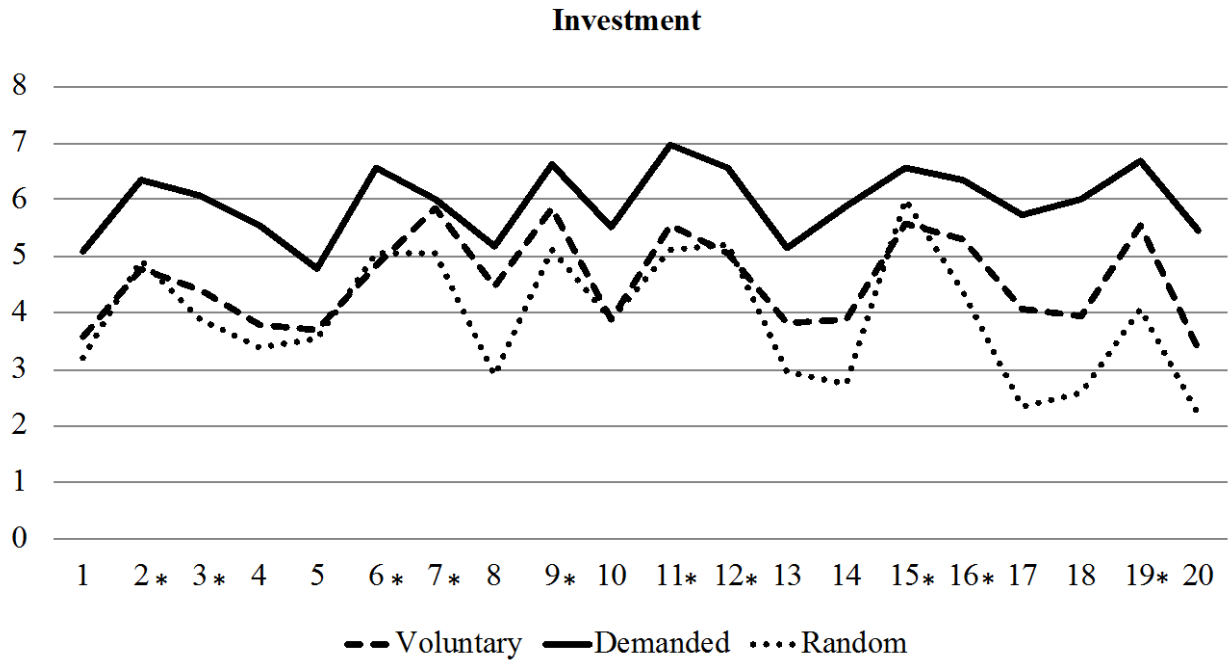


Figure 2. Gift exchange hypotheses

Note: This figure describes the gift exchange hypotheses presented in this section. For the random condition, the parentheses indicate the gift exchange relationship between investment and returns (normal gift exchange hypothesis). As for the voluntary condition, the boxes denote the gift exchange relationship between the manager's intentional voluntary disclosure and the investor's investment (hypothesis for gift exchange between voluntary disclosure and investment). In addition, the parentheses highlight the relationship of the correlation between the investment and the returns shown in the previous studies. Finally, for the demanded condition, the boxes show the gift exchange relationship between the investor's intentional disclosure request and the returns by the manager (hypothesis for gift exchange between disclosure request and returns). Further, the parentheses highlight the relationship of the correlation between the investment and the returns shown in the previous studies.

Panel A: Investment



Panel B: ROI

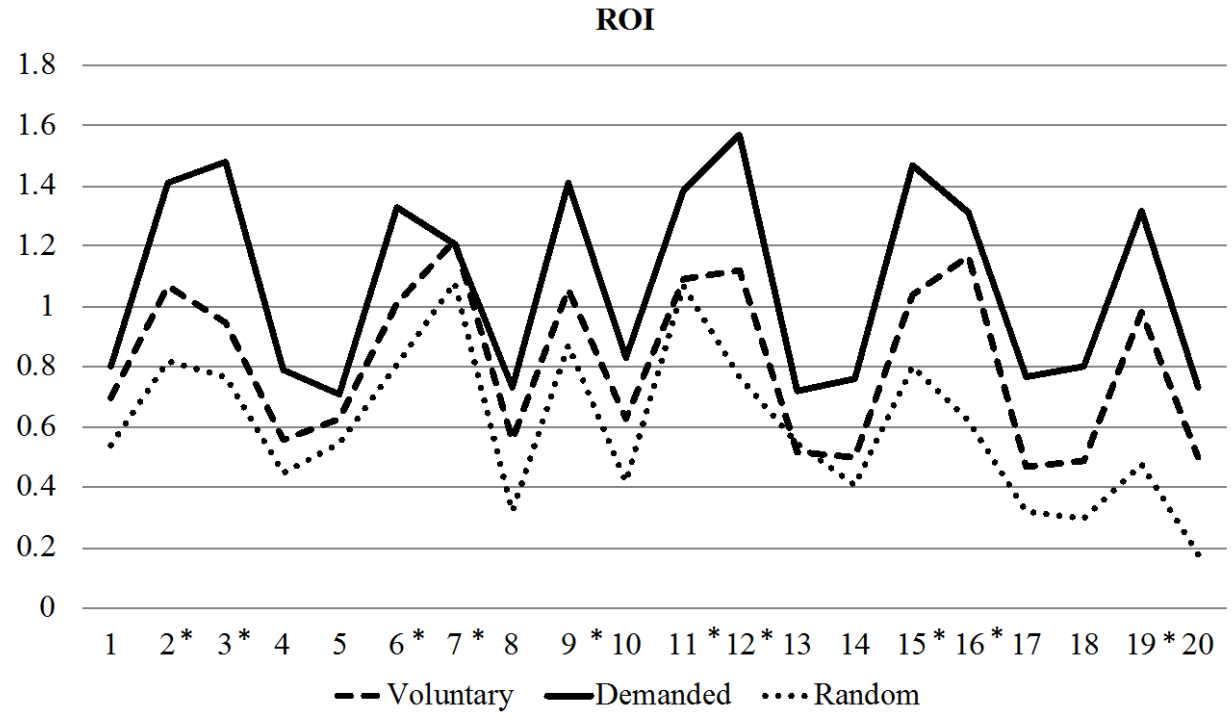


Figure 3. Mean levels of investment and ROI for each condition by period

Note: Panel A of Figure 3 shows the average investment levels for each condition by period. Panel B presents the average ROI levels for each condition by period. Each experimental session comprises 20 rounds. Productivity (multiplier *e*) in each period is low or high with a probability of 50%. Asterisks are appended to the upper right corner of the rounds in which productivity is high (*e* = 5).

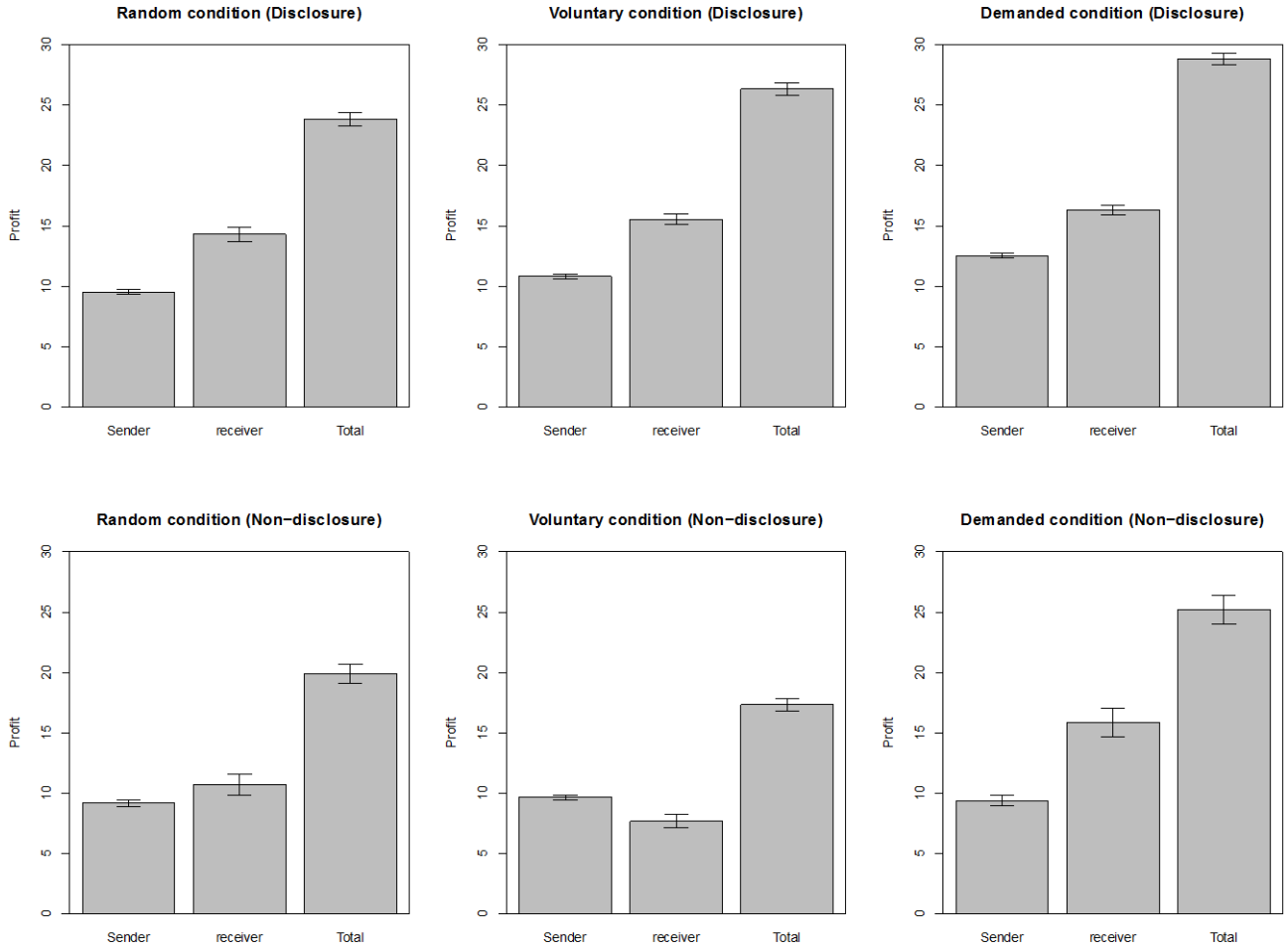


Figure 4. Average profit per period by condition

Note: The bar graph shows the average profit per period by condition. *Sender* denotes the average profit of senders per period and *Receiver* is the average profit of receivers per round. *Total* is the average profit of the sender–receiver pairs per round. The error bars indicate the standard errors of the profits. This figure is based on pooled data because total profits cannot be individually calculated.

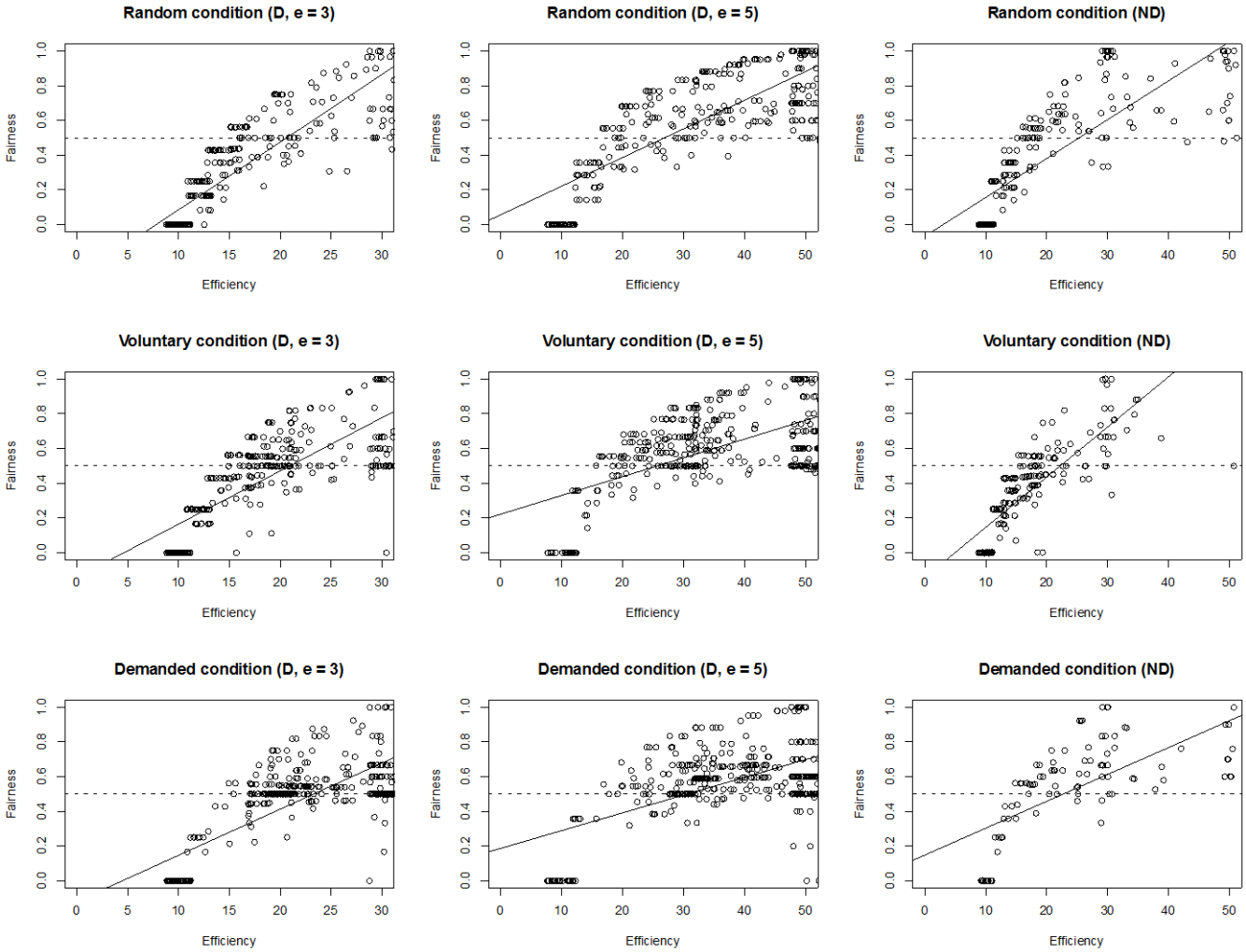


Figure 5. Scatterplot for efficiency and fairness by condition

Note: This figure is the scatterplot for the efficiency and fairness of distribution by condition. *D* and *ND* in the title of each scatterplot mean disclosure and non-disclosure. The horizontal axis denotes the index representing *efficiency*, which is calculated as follows: *Efficiency* = total profits per period. The index is said to be efficient when it approaches 30 (e = 3) or 50 (e = 5 and non-disclosure). The vertical axis shows the index representing *fairness*, which is calculated as follows: *Fairness* = [receiver's profits] / [total profits]. This index ranges between 0 and 1 and is said to be fair when it approaches 0.5. However, if the index approaches 1 (or 0), profits tend to be biased toward the receiver (or sender). The solid lines are regression lines.

C	Participants	S	R	Rounds	S-obs.	R-obs.
Random	78	39	39	20	780	780
Voluntary	84	42	42	20	840	840
Demanded	84	42	42	20	840	840
Total	246	123	123		2,460	2,460

Table 1. Experimental design

Note: This table presents the experimental design. The items in this table are as follows: condition (*C*), number of participants, senders (*S*), receivers (*R*), rounds, and total number of observations for senders (*S-obs.*) and receivers (*R-obs.*) in the experiment. In the *random* disclosure condition, a computer randomly decides whether to exercise the disclosure option. The random disclosure condition involves 78 participants forming 39 pairs across 20 rounds, thus providing 780 investor (receiver) observations. In the *voluntary* disclosure condition, the manager decides whether to exercise the disclosure option. This condition includes 84 participants forming 42 pairs across 20 rounds, thus resulting in 840 investor (receiver) observations. In the *demanded* disclosure condition, the investor decides whether to exercise the disclosure option. This condition involves 84 participants forming 42 pairs across 20 rounds, and consequently, 840 investor (receiver) observations.

Panel A: Rate of disclosure

		Random	Voluntary	Demanded
Total	Rate	72.2%	77.4%	88.0%
	Obs.	780	840	840
e = 3	Rate	73.1%	71.2%	88.1%
	Obs.	390	420	420
e = 5	Rate	71.3%	83.6%	87.9%
	Obs.	390	420	420

Panel B: Investments

			Random	Voluntary	Demanded
Total		Mean	3.93	4.54	5.96
		S.D.	3.70	3.35	3.33
		Obs.	780	840	840
Disclosure	e = 3	Mean	2.85	4.22	5.56
		S.D.	3.30	3.30	3.52
		Obs.	285	299	370
	e = 5	Mean	5.54	5.77	6.64
		S.D.	3.58	3.24	2.98

		Obs.	278	351	369
	Total	Mean	4.18	5.06	6.10
		S.D.	3.69	3.35	3.31
		Obs.	563	650	739
		Mean	3.27	2.77	4.93
Non-disclosure		S.D.	3.66	2.69	3.34
		Obs.	217	190	101

Panel C: Return on investment

			Random	Voluntary	Demanded
Total		Mean	0.61	0.81	1.08
		S.D.	0.79	0.81	0.82
		Obs.	780	840	840
Disclosure	e = 3	Mean	0.43	0.57	0.81
		S.D.	0.61	0.60	0.57
		Obs.	285	299	370
	e = 5	Mean	0.88	1.12	1.48
		S.D.	0.90	0.90	0.90
		Obs.	278	351	369
	Total	Mean	0.65	0.87	1.14
		S.D.	0.80	0.82	0.82
		Obs.	563	650	739
Non-disclosure		Mean	0.50	0.64	0.61
		S.D.	0.76	0.76	0.67
		Obs.	217	190	101

Table 2. Descriptive statistics per experimental condition

Note: This table presents the descriptive statistics for each experimental condition. The experiment follows a 3×1 factorial design. *The rate of disclosure* in Panel A is the rate at which the disclosure option is exercised by a computer (random condition), a manager (voluntary condition), or an investor (demanded condition). *Obs.* indicates the number of observations. *Investment* in Panel B is the level of the investment determined by the investors. *S.D.* is standard deviation. *Return* (*ROI*) in Panel C denotes return on investment, which is defined as the level of managers' returns (*K*) divided by the investor's investment (*M*). Basu et al. [2009], for example, use ROI as a proxy for managers' returns behavior.

Panel A: investment behavior test

			Tests of differences			
			t-test		Mann–Whitney U	
Condition	Disclose	Non-Disclose	t	p-value (two-tailed)	U	p-value (two-tailed)
Random	4.17	3.40	1.28	0.206	918.00	0.071
	[39]	[39]				
Voluntary	4.98	2.55	3.99	0.000	1,337.50	0.000
	[42]	[42]				
Demanded	6.13	4.52	2.79	0.007	893.50	0.006
	[42]	[42]				

Panel B: Returns behavior test

			Tests of differences			
			t-test		Mann–Whitney U	
Condition	Disclose	Non-Disclose	t	p-value (two-tailed)	U	p-value (two-tailed)
Random	0.66	0.52	1.29	0.200	933.50	0.084
	[39]	[39]				
Voluntary	0.88	0.55	3.12	0.003	1,105.50	0.003
	[42]	[42]				
Demanded	1.15	0.52	6.23	0.000	1,314.00	0.000
	[42]	[42]				

Table 3. Hypothesis test for H1

Note: This table presents the parametric and nonparametric tests for H1, where we treat each subject as an independent observation computing averages for each subject. Investment behavior in Panel A is measured as the average investment levels. The returns behavior in Panel B is measured as the average ROI levels, which is the level of managers' returns (*K*) divided by the investor's investment (*M*). The square brackets denote the number of observations.

				Tests of differences			
				t-test		Mann–Whitney U	
		Voluntary	Random	t	p-value (two-tailed)	U	p-value (two-tailed)
H2a: Investment	Disclose all	4.99	4.17	1.53	0.130	969.50	0.156
	e = 3	4.16	2.83	2.28	0.026	1,046.00	0.032
	e = 5	5.71	5.57	0.24	0.810	819.00	1.000
H2b: ROI	Disclose all	0.95	0.82	1.67	0.099	933.00	0.200
	e = 3	0.67	0.56	1.27	0.207	821.00	0.307
	e = 5	1.17	0.95	2.17	0.033	1,017.50	0.035

Table 4. Hypothesis test for H2

Note: This table presents the parametric and nonparametric tests for H2, wherein we treat each subject as an independent observation computing averages for each subject. The investment behavior for H2a is measured as the average investment levels. The returns behavior for H2b is measured as the average ROI level, which is the level of managers' returns (*K*) divided by the investor's investment (*M*).

				Tests of differences			
				t-test		Mann–Whitney U	
		Demanded	Random	t	p-value (two-tailed)	U	p-value (two-tailed)
H3a: Investment	Disclose all	6.14	4.17	3.70	0.000	1,173.00	0.001
	e = 3	5.59	2.83	4.64	0.000	1,230.00	0.000
	e = 5	6.70	5.57	1.95	0.055	993.00	0.100
H3b: ROI	Disclose all	1.27	0.82	6.26	0.000	1,398.00	0.000
	e = 3	0.98	0.56	5.32	0.000	1,232.00	0.000
	e = 5	1.58	0.95	5.90	0.000	1,342.00	0.000

Table 5. Hypothesis test for H3

Note: This table presents the parametric and nonparametric tests for H3, where we treat each subject as an independent observation computing averages for each subject. The investment behavior for H3a is measured as the average investment levels. The returns behavior for H3b is estimated as the average ROI levels, defined as the level of managers' returns (*K*) divided by the investor's investment (*M*).

Dependent variable	Investment			
Sample	Full	Full	Disclosed	Non-Disclosed
Variables	(1)	(2)	(3)	(4)
Base line: random				
Voluntary	0.536	−0.339	3.018***	−0.655
	(0.532)	(0.575)	(0.763)	(0.588)
Demanded	1.801***	1.266**	5.022***	0.950
	(0.533)	(0.612)	(0.747)	(0.659)
Disclose	1.464***	0.873***		
	(0.132)	(0.203)		
Voluntary * Disclose		1.171***		
		(0.293)		
Demanded * Disclose		0.714**		
		(0.363)		
e			1.373***	
			(0.0973)	
Voluntary * e			−0.572***	
			(0.133)	
Demanded * e			−0.769***	
			(0.129)	
Period	−0.00784	−0.0106	0.00771	−0.0402**
	(0.00871)	(0.00871)	(0.00916)	(0.0180)
Constant	2.954***	3.410***	−1.385**	3.820***
	(0.404)	(0.420)	(0.561)	(0.462)
Observations	2,460	2,460	1,952	508
Number of individuals	123	123	123	111
Individual random effect	Yes	Yes	Yes	Yes
Log likelihood	−5912	−5904	−4564	−1212

Standard errors are in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1

Table 6. LME models' results for investors' investment behaviors

Note: This table shows the LME results for investors' investment behaviors. Investment level is the dependent variable and the baseline condition is random. *Voluntary* and *Demanded* are dummy variables indicating the

experimental conditions. *Disclose* is a dummy that takes the value of 1 if *e* is disclosed and 0 otherwise. *Full*, *Disclose*, and *Non-Disclose*, respectively, mean that we use the sample of all, disclosed, and non-disclosed data.

Depending variable	ROI	
Sample	Full	Full
Variables	(1)	(2)
Baseline: Random		
Voluntary	0.0946	0.0158
	(0.110)	(0.131)
Demanded	0.376***	−0.0462
	(0.110)	(0.138)
Disclose	0.314***	0.145**
	(0.0394)	(0.0631)
Voluntary * Disclose		0.109
		(0.0905)
Demanded * Disclose		0.505***
		(0.0996)
Period	−0.00542**	−0.00535**
	(0.00256)	(0.00254)
Constant	0.642***	0.768***
	(0.0879)	(0.0956)
Observations	2,029	2,029
Number of individuals	123	123
Individual random effect	Yes	Yes
Log likelihood	−2154	−2140

Standard errors are in parentheses

*** p < 0.01, ** p < 0.05, * p < 0.1

Table 7. LME models' results for managers' returns behaviors

Note: This table presents the LME result for managers' returns behaviors. ROI is the dependent variable. Please refer to the note appended to Table 6 for a description of the independent variables.

Dependent variable	ROI			
Sample	Disclosed	Disclosed	Disclosed	Disclosed
Variables	(1)	(2)	(3)	(4)
Baseline: Random				
Voluntary	0.106	0.134	0.109	0.122
	(0.116)	(0.113)	(0.113)	(0.110)
Demanded	0.375***	0.362***	0.341***	0.314***
	(0.115)	(0.113)	(0.113)	(0.110)
Investment	0.0636***	0.0103		
	(0.00534)	(0.00872)		
Voluntary * Investment		0.0808***		
		(0.0123)		
Demanded * Investment		0.0835***		
		(0.0127)		
e * Investment			0.0194***	0.00597***
			(0.00135)	(0.00224)
e * Investment * Voluntary				0.0201***
				(0.00317)
e * Investment * Demanded				0.0214***
				(0.00327)
e	0.240***	0.244***		
	(0.0146)	(0.0143)		
Period	−0.00900***	−0.0101***	−0.0123***	−0.0135***
	(0.00251)	(0.00247)	(0.00271)	(0.00267)
Constant	−0.0242	−0.0526	0.999***	0.999***
	(0.108)	(0.106)	(0.0860)	(0.0841)
Observations	1,644	1,644	1,644	1,644
Number of individuals	123	123	123	123
Individual random effects	Yes	Yes	Yes	Yes
Log likelihood	−1539	−1510	−1660	−1632

Standard errors are in parentheses

*** p < 0.01, ** p < 0.05, * p < 0.1

Table 8. LME models' results for managers' returns behavior using subsamples limited to information disclosure

Note: This table presents the LME models' results for managers' returns behavior using a subsample limited to information disclosure. ROI level is the dependent variable and investment is mean centered. Please see the note appended to Table 6 for a description of the independent variables.

				Tests of differences			
				t-test		Mann–Whitney U	
Condition	Role	Disclose	Non-Disclose	t	p-value (two-tailed)	U	p-value (two-tailed)
Random	Sender	9.54	9.35	0.57	0.568	820.50	0.420
	Receiver	14.39	11.18	2.52	0.014	1,038.50	0.005
Voluntary	Sender	10.76	9.67	2.33	0.023	1,100.50	0.050
	Receiver	15.28	7.02	9.72	0.000	1,500.50	0.000
Demanded	Sender	12.53	8.66	6.93	0.000	1,151.00	0.000
	Receiver	16.38	14.50	1.52	0.135	903.50	0.312

Table 9. Difference in profits between information disclosure and non-disclosure cases per role by condition

Note: This table presents the parametric and nonparametric tests for differences in the profits between the information disclosure and non-disclosure cases per role by condition, wherein we treat each subject as an independent observation computing averages for each subject. *Sender* denotes senders' average profits and *Receiver* is receivers' average profit.

Panel A: Parametric and non-parametric tests of efficiency

			Tests of differences			
			t-test		Mann–Whitney U	
Condition	Disclose	Non-disclose	t	p-value (two-tailed)	U	p-value (two-tailed)
Random	23.82	20.44	1.73	0.089	967.50	0.020
Voluntary	26.14	17.56	5.63	0.000	1,450.50	0.000
Demanded	28.91	22.57	3.40	0.001	961.50	0.000

Panel B: Parametric test of fairness

Condition	Disclose		Non-disclose	
Random	0.45	**	0.38	***
Voluntary	0.50		0.34	***
Demanded	0.50		0.52	

Table 10. Statistical tests for efficiency and fairness by condition

Note: This table presents statistical tests for efficiency and fairness by condition, wherein we treat each subject as an independent observation computing averages for each subject. Panel A presents the parametric and nonparametric tests for the differences in the index representing *Efficiency*, which is calculated as follows: *Efficiency* = total profits per period. This index is said to be efficient when it approaches 50. Panel B shows the parametric test (one-sample, t-test) for the index representing *Fairness*, which is calculated as follows. *Fairness* = [receiver's profits] / [total profits]. This index ranges between 0 and 1 and is said to be fair when it approaches 0.5. If the index approaches 1 (or 0), however, profits tend to be biased toward the receiver (or sender). We conduct a two-tailed t-test using the null hypothesis that the true mean is equal to 0.5. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Panel A: Frequency of managers' equitable distribution by condition

Condition	Random	Voluntary	Demanded
Frequency rate	9.29% (54/581)	11.44% (82/717)	17.10% (125/731)
3-sample test for equality of proportions	X-squared = 19.61, p-value = 0.000	***	

Panel B: Breakdown of frequency by condition

Condition	Random	Voluntary	Demanded
Disclose	75.93% (41/54)	84.15% (69/82)	97.60% (122/125)
Non-disclose	24.07% (13/54)	15.85% (13/82)	2.40% (3/125)
3-sample test for equality of proportions	X-squared = 20.66, p-value = 0.000	***	

Table 11. Frequency of managers' equality distribution and its statistical tests

Note. This table discusses the frequency of managers' equitable distribution and its statistical tests. Both Panel A and Panel B are based on pooled data. We exclude the sample in which the investment amount is equal to 0. Panel A shows the frequency rate for managers' equitable distribution by condition. When a manager's repayment is greater than or equal to half the firm's income (*eM*), it is known as *managers' equitable distribution*. The rate is calculated as follows: rate = [frequency of managers' equitable distribution] / [number of total observations]. For the statistical test, we conduct a three-sample test for the equality of proportions. Panel B indicates the breakdown rate for the frequency of managers' equitable distribution by condition. *Disclose* and *Non-Disclose* mean disclosure and non-disclosure. The rate is calculated as follows: rate = [frequency of managers' equitable distribution when information is (or is not) disclosed] / [frequency of managers' equitable distribution]. Here as well, we use a three-sample test to statistically examine the equality of proportions. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

	Strict Definition	Weak Definition
DEPENDENT VARIABLE	Fair Reply Dummy 1	Fair Reply Dummy 2
VARIABLES	(1)	(2)
Base Line: Voluntary		
Demanded	-0.313	-0.442
	(0.497)	(0.438)
Random	0.0980	-0.114
	(0.477)	(0.437)
Investment	0.399***	0.186***
	(0.0573)	(0.0440)
Demanded * Investment	0.252***	0.294***
	(0.0928)	(0.0734)
Random * Investment	-0.338***	-0.341***
	(0.0755)	(0.0631)
Disclose	0.584**	0.361*
	(0.268)	(0.213)
e	-0.335***	-0.437***
	(0.0863)	(0.0756)
period	-0.00658	-0.00842
	(0.0150)	(0.0128)
Constant	-2.275***	-0.920*
	(0.558)	(0.474)
Observations	2,029	2,029
Number of groups	123	123
Individual random effect	Yes	Yes
Log likelihood	-565.9	-709.1

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12. Results of multi-level, mixed-effects logistic regressions for managers' fair reply

Note: This table shows the results of the multi-level, mixed logistic regression for managers' fair reply. The fair reply dummy is the dependent variable. When a manager's repayment is greater than or equal to $\lfloor eM/2 \rfloor$, it is known as *a weak definition of fair reply*, and when a manager's repayment is greater than or equal to $\lceil eM/2 \rceil$, it

is known as *a strict definition of fair reply*.[20] The baseline condition is voluntary. *Random* and *Demanded* are dummy variables indicating the experimental conditions. Investment is mean centered. Please see the note appended to Table 6 for a description of the other independent variables.

[20] $\lfloor x \rfloor$ is the maximum integer that is less than or equal to *x*. $\lceil x \rceil$ is the minimum integer that is greater than or equal to *x*.