How disclosure enhances thinking about future generations:
A preregistered experiment on the real effects of sustainable reporting

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Abstract

As the global environment undergoes significant transformations, the landscape of sustainable reporting information disclosure, once at the discretion of companies, is experiencing a notable shift towards mandatory disclosure. This study employed a modified trust game featuring a disclosure option to compare conditions of voluntary and random disclosure. Its objective was to determine which condition fosters future-oriented perspectives among managers and investors, utilizing a pre-registered experiment involving 142 participants. The results of the experiment unveiled an unexpected outcome: managers operating under voluntary conditions tended to employ a strategy that enticed investors into bad exchanges by intentionally disclosing low sustainable investments. Conversely, managers under random disclosure conditions demonstrated a greater inclination towards adopting high sustainable investments and cultivating good exchange relationships with investors. Our research sheds new light on the positive dimensions of mandatory sustainable disclosure, which have remained unclear until now.

Keywords: disclosure, real effect, trust game, future orientation, sustainable reporting

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1. Introduction

The global environment is undergoing drastic changes, forcing a review of securities markets and corporate activities, which are particularly affected. For example, sustainable investment centered on ESG (Environment, Social, Governance) and sustainable management aimed at achieving the sustainability of corporate SDGs (Sustainable Development Goals) activities are required. Regarding corporate information disclosure, the G7 has requested the disclosure of climate change risk information based on the 'Task Force on Climate-related Financial Disclosures (TCFD)', and the information disclosure of sustainable reporting that has been left to the discretion of companies is significantly changing to mandatory disclosure. In the research field as well, along with the reconstruction of capitalism, the way of new information disclosure is being discussed, and further deepening of research is being demanded.

Much of the research on sustainable disclosure premised on the securities market is empirical research using archival data, investigating the correlation between corporate size, industry, governance form and disclosure, and the impact of information disclosure on stock prices (Barth et al. 2017; Christensen et al. 2021). In the field of management control, the impact of tools such as the Sustainability Balanced Scorecard on employee productivity and motivation has been investigated (Hansen et al. 2016). However, to achieve a sustainable society, research should be needed from the perspective of how mandatory corporate sustainability reporting draws out the future orientation of managers and investors. However, such perspective research has not yet been conducted.

This study employed a modified trust game with a disclosure option to compare voluntary disclosure and random disclosure conditions, and tested which condition brings out the future orientation of managers and investors in a pre-registered economic experiment (N = 142). In the game, first, the manager (receiver) chooses one of the management investments, either environmentally considerate (high sustainable investment) or environmentally destructive low sustainable investment). This choice determines the multiplier *e*. Second, it is decided whether the management investment chosen by the manager will be disclosed. Under voluntary disclosure conditions, the manager decides this, while under mandatory disclosure conditions, the computer randomly decides this. Third, the investor (sender) decides the amount of investment in the manager from 0 to 100. Finally, the profits determined by the investment amount and multiplier *e* are split equally between both parties. In addition, future-oriented priming was applied to all of the participants, referencing future design research (Saijo 2020).

We extend the gift exchange hypothesis from previous research (Berg et al. 1995) and propose the good exchange and bad exchange hypotheses through disclosure. Specifically, under voluntary disclosure conditions, we assume that the disclosure itself becomes a gift, establishing a good exchange. Specifically, managers choose high CSR investment and voluntarily disclose it,

investors perceive it as a gift, and in response to the gift, they invest more (good exchange hypothesis). On the other hand, under random disclosure conditions, there is no room for such reciprocity to be established, so they are simply expected to make economically rational choices (bad exchange hypothesis).

The results of the experiment revealed three key findings. First, managers under voluntary conditions chose low CSR investment more often than managers under random conditions. In particular, managers under voluntary conditions adopted a strategy to lure investors into a bad exchange by choosing and voluntarily disclosing low CSR investment, compared to managers under random conditions. This is an unintended consequence. Second, investors invested more when disclosed, under both conditions. Third, when there is disclosure and the sample is limited to those with high future orientation, investors invested more in high CSR investment. In summary, under random disclosure conditions, managers are more likely to adopt high CSR investment and it is easier to build a good exchange relationship with investors.

Based on our experiment, there is a certain rationality in the institutional reform to shift to the current mandatory disclosure. Therefore, our research sheds light on the positive aspects of mandatory sustainable disclosure that have not been clarified until now.

2. Method

2-1. Task

This study modifies the traditional trust game by focusing on the multiplier *e*. We introduce information asymmetry and the disclosure regime in the traditional trust game. Furthermore, I incorporate the manager's (receiver's) choice of business investment and linked it with the multiplier *e*. Specifically, the manager chooses one from one environmentally considerate management investment (High CSR investment, $e = 2$) and two environmentally destructive management investments (Low and certainty CSR, $e = 3$. Low and uncertainty CSR, $e = 1$ or 5). As for the labeling of whether it is environmentally considerate or not, I assigned "CSR scores" to each investment, referring to Hoang and Phang (2023). These labels are only notations on the vignette that do not affect the payoff structure of the game.[1] Figure 1 shows the timeline.

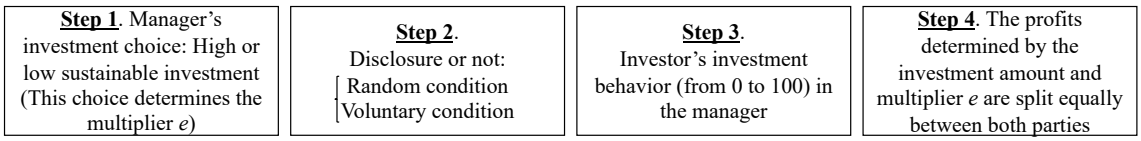


Figure 1. Timeline of the game

[1] In detail, I set CSR scores as follows: CSR score of High CSR investment = 96, that of Low and certainty CSR investment = 28, and that of Low and uncertainty CSR investment = 26.

2-2. Experimental design and procedures

I used a 2 × 1 between-participants design: I manipulated the type of disclosure (the random disclosure condition, in which a computer randomly determines whether to disclose, and the voluntary disclosure condition, in which the receiver make a decision whether to disclose).

The experimental protocol was approved with unanimity by the Institutional Review Board of the research Institute for Technology, Enterprise and Competitiveness of Doshisha University (Review No. 2022-7), and all experimental conditions were conducted in accordance with relevant regulations and guidelines, which met the requirements of the Declaration of Helsinki. Informed consent was obtained from all participants in the experiments. After approval by the Institutional Review Board, we pre-registered the experiment in *AsPredicted* (https://aspredicted.org/, Pre-registered No.118647). All experiments were performed in accordance with relevant named guidelines and regulations. We performed a power analysis beforehand and calculated the sample size.

I conducted experiments in December 2022 and January 2023. All conditions were programmed using o-Tree software (Chen et al. 2016), and participants were recruited from the campus through the Sona system. In total, 142 participants joined our experiment. Participants were business student at a large university's students and 21.02 years old on average (SD = 1.45, The max and min ages were 28 and 18 years, respectively). 48.59 percent of them were female.

The experiment consisted of one practice round and ten actual rounds. Before the game started, future-oriented priming was applied to all of the participants with referencing future design research (Saijo 2020). This is to make participants feel more realistic about the high and low CSR investment settings in the experiment.[2]

The payment for the experiment was based on the points earned in two randomly selected rounds out of the ten rounds. Due to the adoption of performance-based pay using points earned in the game, participants' behavior was sufficiently incentivized. Each session lasted approximately 60 minutes on average, and the average payment to participants was JPN 3687.8.

I confirmed participants' understanding of the experiment through post-questionnaire. The result indicated that it was sufficiently high (mean levels = 6.22 points out of 7 points).

Table 1. Frequency of the manager's investment by condition

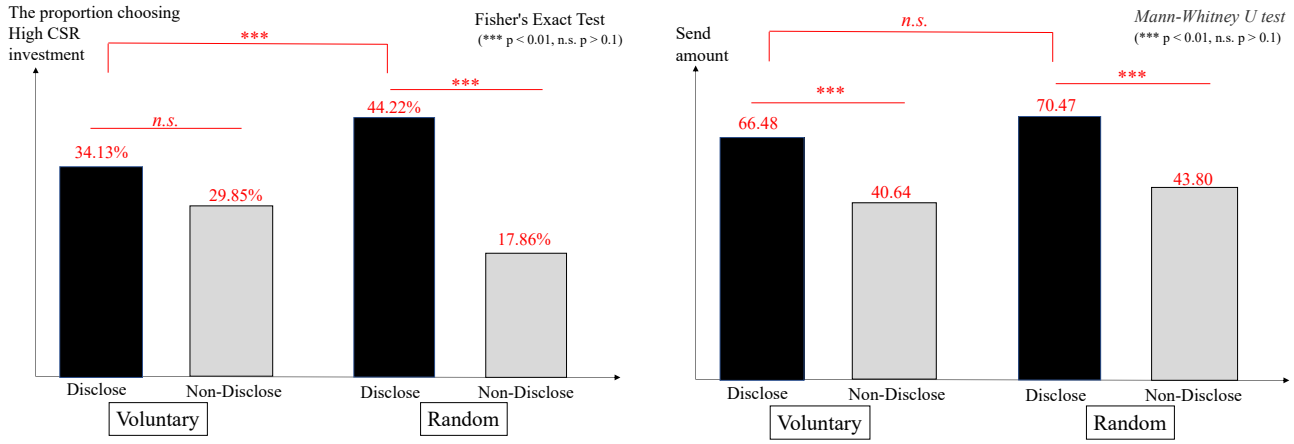
	Voluntary			Random		
	Total	Disclosure	No-Disclosure	Total	Disclosure	No-Disclosure
High CSR	33.33%	34.13%	29.85%	40.00%	44.22%	17.86%
	(120/360)	(100/293)	(20/67)	(140/350)	(130/294)	(10/56)
Low CSR1	49.17%	52.56%	34.33%	42.00%	42.52%	39.29%
(Certainty)	(177/360)	(154/293)	(23/67)	(147/350)	(125/294)	(22/56)
Low CSR2	17.50%	13.31%	35.82%	18.00%	13.27%	42.86%
(Uncertainty)	(63/360)	(39/293)	(24/67)	(63/350)	(39/294)	(24/56)

[2] In the post-questionnaire, when measuring participants' future-oriented score, the average score was 4.65 (SD. = 1.37) out of 7 points (Random condition: 4.60, voluntary condition: 4.70). As they were statistically significantly higher than the midpoint of the scale at 4, it can be concluded that priming to become a virtual future-oriented person was effective in both conditions.

3. Results

3.1. Main results about managers' behavior

First, table 1 shows the manager's behavior. The proportion of managers' choosing High CSR investment under the random condition (40.00%) was statistically higher than the proportion under the voluntary condition (33.33%) (Fisher's Exact Test, $p = 0.038$).



Panel A. The manager's behavior **Panel B. The investor's behavior**

Figure 2. Main results

Furthermore, panel A of figure 2 shows that, within the conditions, in the random condition, the proportion choosing High CSR investment when disclosure is present (44.22%) was statistically higher than the proportion when disclosure is not present (17.86%) (Fisher's Exact Test, $p = 0.000$). However, in the voluntary condition, there was no statistical significance between these proportions (34.13%, 29.85%. $p = 0.301$). This result is contrary to our predictions.

In summary, in the random condition, when disclosure is made, at least 44% of managers choose high CSR investment and aim to conduct a good exchange. However, in the voluntary condition, while making disclosures, the proportion choosing Low CSR investment amounts to as much as 65% in total. This suggests that, under the voluntary disclosure condition, managers adopted a strategy to use voluntary disclosure to rather lure investors into a bad

Table 2. The regression analysis for investors' investment behavior restricted to the disclosed sample

	(1)	(2)	(3)
VARIABLES	Sent_amount	Sent_amount	Sent_amount
VoluntaryDum	-7.477	-5.059	-3.280
	(-1.107)	(-0.578)	(-0.445)
High CSR invest	19.575***	22.714***	20.139**
	(2.755)	(2.795)	(2.632)
VoluntaryDum×High CSR		-6.069	-3.981
		(-0.431)	(-0.303)
RecPeriod	-5.922	-5.524	-6.358
	(-0.898)	(-0.805)	(-0.968)
Future oriented			-7.434**
			(-2.273)
Prosocial_Dum			17.818***
			(2.994)
Gender			-6.889
			(-1.099)
Risk			3.483
			(1.007)
Constant	60.897***	59.368***	52.890***
	(10.761)	(9.652)	(7.763)
Observations	354	354	354
R-squared	0.086	0.088	0.198

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

exchange.

3.2. Main results about investors' behavior

Second, panel B of figure 2 shows that, in both conditions, investors invested more when disclosure was made, which is consistent with previous research (Taguchi and Kamijo 2020). However, even if disclosure is made, the meaning greatly changes depending on whether the management strategy adopted by the manager is high or low CSR investment. Table 2 takes this into account and shows the results of regression analysis limited to samples with disclosure and further narrowed down to samples with a high future-oriented score[3]. The result shows that, when there is disclosure, investors with high future orientation invested more in high CSR investment.

In summary, under random disclosure conditions, managers were more likely to adopt high sustainable investment and investors invested more, indicating that it is easier to build a good exchange relationship between managers and investors.

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[3] Specifically, the sample is narrowed down to those with a future-oriented score of 4 (out of 7) or higher.