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Risk taking by agents: The role of ex-ante and ex-post accountability

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We study the role of accountability in situations where an agent makes risky decisions for a principal. We observe that in the absence of accountability, agents choose less risk averse investments for the principal than investors who invest for their own account. Accountability mitigates the observed decrease in risk aversion. Differences are observed between situations where agents are accountable for their decision (“ex-ante”) and where they are accountable for the outcome (“ex-post”).

Highlights:

- Agents make less risk averse decisions than investors
- Accountability eliminates this reduction in risk aversion
- Different effects of outcome-based and decision-based accountability

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1. Introduction

Risky decisions are often made by agents in situations where a straightforward incentivization of their choices is not possible. President Obama has to decide whether to attack the compound that intelligence identified as the potential hiding place of Osama Bin Laden in Pakistan. His decision renders risky consequences for the American People.¹ The Dutch finance Minister has to decide whether to buy ABN Amro bank from the falling Fortis group in the middle of the financial crisis. His decision has risky financial consequences for the Dutch taxpayer.² In both examples, the decision maker is acting as an agent, and has no clear financial incentives connected to the risky outcomes following from the decision. However, in both cases the agent is in a larger sense accountable for his decisions.

A few experimental studies have tested how risk attitudes in agency situations differ from those where people make decision for themselves. The results of these studies are mixed. Chakravarty et al. (2010) and Polman (2012, Study 3) use binary lottery choice experiments and find reduced risk aversion. Eriksen and Kvaloy (2010) and Füllbrunn and Luhan (2014) employ the Gneezy and Potters (1997) investment task (also used in the current study, see Section 2) with agents making investments for one principal or six principals, respectively. Both studies report increased risk aversion. Reynolds et al. (2009) use a lottery task and also observe more risk aversion when people make decisions for others.³ We also test for such pure agency effects in the absence of incentives. We then add two conditions in which the principal can hold the agent accountable. We distinguish two types of accountability. First, the agent may be evaluated on the basis of his decision, with uncertainty not yet resolved and the principal thus not yet knowing the outcome. Second, the agent may be evaluated after the uncertainty is resolved and outcomes turned out either favorable or unfavorable. Both types of accountability are empirically relevant, and may have very different effects on behavior.⁴ Typically, decisions are evaluated differently when the outcome is known as opposed to when the outcome is not known. Even if the outcome has no informational value for the quality of the decision, people take it into account and for example rate decision makers as more competent if the outcome of a random draw is positive (Baron and Hershey 1988).

¹ See Bergen (2012).

² See De Volkskrant (2012), or <http://www.bloomberg.com/news/2012-04-11/dutch-state-erred-in-abn-amro-ing-rescues-committee-finds.html>

³ All these studies use real monetary incentives for the own/principals' payoffs.

⁴ A different type of accountability is studied by Pahlke et al. (2012) who let agents justify their choices in the presence of the principal. In particular, the principal could interrogate the agent in person after the experiment regarding the reasons behind her choices. Although no monetary consequences are involved, this manipulation is closer to the situation where agents are evaluated before the resolution of uncertainty because the decision process is emphasized by this manipulation, rather than the outcomes.

Agents may anticipate this effect and make different decisions when they know they are held accountable based on the outcome as opposed to when they know they are held accountable based on their decision only. In the current study we test the effects of these two types of accountability in an experimental risky investment tasks with agency.

2. Experimental Design

We employ the Gneezy and Potters (1997) investment task. In this task, the investor (or an agent) has to decide how to invest an endowment of 100 points into a risky and a safe asset. Each point invested in the safe asset has a return of 0%. Each point invested in the risky asset has a return of 250% with probability 1/3, and a return of -100% with probability 2/3. The risky investment has a positive expected return of 16.7%.

We run 4 treatments in a between-subjects design. In treatment OWN, subjects invest their 100 points for their own account. Additionally, participants receive a fixed payment of 100 points.⁵ In treatment OTHER, an agent invests the 100 points of another, passive person (principal). The principal owns the full investment (in safe and risky asset), but cannot influence or reward the decision of the agent. Additionally, both players have a fixed payment of 100 units. The agent has no other financial incentives. In treatment REWARD BEFORE, the agent makes an investment decision which is then communicated to the principal. The principal can reward the agent on the basis of his investment (i.e., number of units invested in safe and risky), but has no information about the outcome of the risky asset yet. Both agents have a fixed payment of 100 points, and the principal can use this endowment to reward the agent with any amount between 0 and 100 points. Any points not paid to the agent remain in the account of the principal. After the reward is paid, the uncertainty of the risky asset is resolved. Finally, in treatment REWARD AFTER, the principal is informed about the investment and the outcome before he can reward the agent using the additional endowment of 100 points. Note that as in REWARD BEFORE, the reward is constrained to the interval [0,100], irrespective of the actual outcome of the investment.

The above described investment task is statically repeated 5 times with fixed agent-principal pairs. After each round the payoffs for each player are transferred to his experiment account and cannot be used anymore in the experiment. Each round a new endowment and investment fund is provided. The decision situation thus remains identical over time. 244

⁵ This payment becomes relevant in the accountability conditions and is paid in all treatments to maintain symmetry of payoffs across conditions.

subjects participated in 15 experimental sessions, 100 as principals and 100 agents, and 44 in treatment OWN. Subjects were randomly allocated to the roles of principal and agent, and did not know who their matched player was. Decisions were made anonymously. No communication between the principal and the agent was possible in any of the treatments. Agents could only anticipate which investment choice would make the principal content, and what the reaction would be in terms of rewards.⁶

3. Results

Investment shares are shown in Figure 1. In the first round, investing for another person induced less risk averse investments compared to investments made by subjects for their own account. However, both accountability conditions lead to a reduction of the risky investment share in comparison to OTHER, making these conditions similar to the OWN condition.⁷ Investment behavior changes over time. After five rounds of investments with feedback and rewards, risky investment shares are similar in conditions OWN, OTHER and REWARD AFTER. In contrast, in REWARD BEFORE, a low level of the risky share is maintained over time, leading to lower investment shares than the other three treatments.

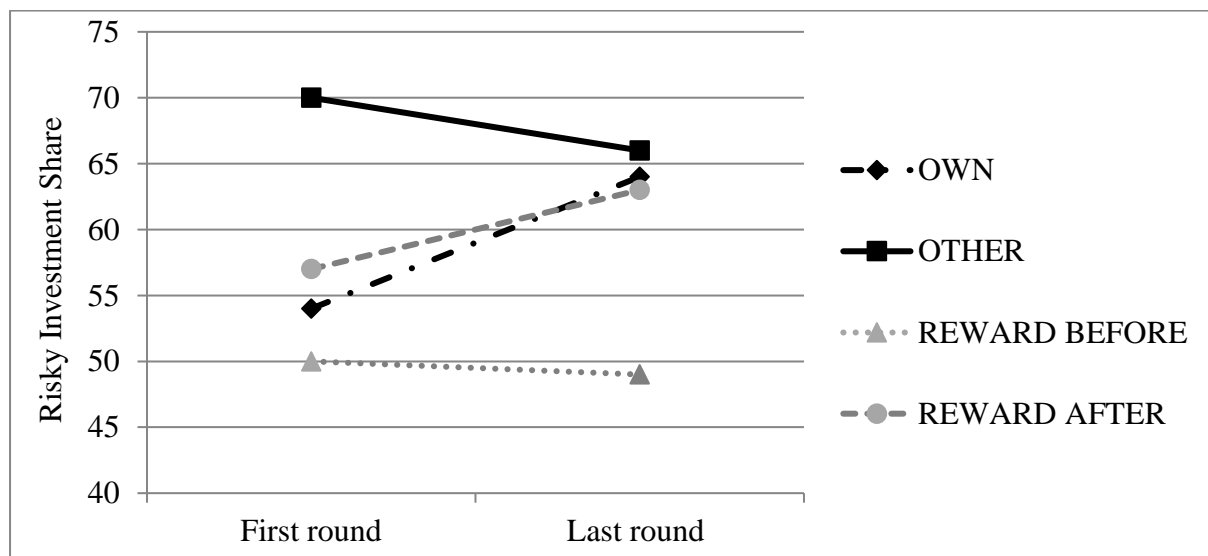


Fig. 1. Investments

⁶ Each point earned in the experiment was worth €0.1. After reading the instructions, subjects were asked a set of comprehension questions. Only after all subjects in a session had correctly answered these questions, the experimental tasks began. Subjects in treatments OTHER, REWARD BEFORE, and REWARD AFTER could earn an additional 100 points in a belief elicitation task. We do not discuss this task in the current paper.

⁷ In the framework of an expected utility model with power utility, the average investment shares in the first round imply CRRA coefficients of .14 (OWN), .10 (OTHER), .15 (REWARD BEFORE), and .13 (REWARD AFTER). The respective expected returns are 8.99% (OWN), 11.66% (OTHER), 8.33% (REWARD BEFORE), and 9.49% (REWARD AFTER).

These results are confirmed in a multivariate analysis (Table 1), and remain robust if gender is included as an explanatory variable (males are significantly less risk averse). F-tests show that the coefficient of OWN is statistically indistinguishable from those of REWARD AFTER and REWARD BEFORE in the first round ($p=.58$ and $p=.72$). In the fifth round, the coefficient of OWN is indistinguishable from REWARD AFTER ($p=.94$), but significantly larger than the coefficient of REWARD BEFORE ($p=.04$). The increased standard errors in columns III and IV in comparison to columns I and II show that behavior in later rounds is influenced by various uncontrolled factors, including the reward behavior of the principals, and the random outcomes of the risky assets. Columns V and VI of Table 1 show that in a panel model using all 5 rounds, only condition REWARD BEFORE is different from condition OTHER.

Table 1: Tobit Regressions for treatment effects

	I	II	III	IV	V	VI
	Risky Investment Round 1	Risky Investment Round 1	Risky Investment Round 5	Risky Investment Round 5	Risky Investment All rounds	Risky Investment All rounds
OWN	-25.337 (9.94)**	-19.490 (9.26)**	-3.439 (14.39)	1.191 (14.24)	-17.184 (10.301)*	-10.876 (9.53)
REWARD AFTER	-19.972 (10.57)*	-18.379 (9.80)*	-4.576 (15.44)	-3.741 (15.15)	-17.381 (10.98)	-16.011 (10.09)
REWARD BEFORE	-28.794 (10.44)***	-23.928 (9.70)**	-31.739 (15.12)**	-28.518 (14.84)*	-29.094 (14.42)***	-24.024 (10.01)**
Male		31.162 (6.67)***		26.477 (10.33)**		34.357 (6.90)**
Subjects	144	144	144	144	144	144
# Obs.	144	144	144	144	720	720

Notes: Tobit model in columns I-IV, random effects tobit model in columns V and VI; treatment OTHER is the excluded category; marginal effects reported; standard errors in parenthesis; */**/** denotes 10%/5%/1% significance level

4. Discussion

Consistent with findings by Chakravarty et al. (2010) and Polman (2012, Study 3) we observe lower risk aversion when people make risky investments with other people's money. In contrast, although our task was closer to those in Eriksen and Kvaloy (2010) and Füllbrunn

and Luhan (2014), we do not replicate their finding of increased risk aversion in the agency situation.⁸ Making people accountable in our experiment reduces risk tolerance to the level that subjects are willing to take for their own account. While this holds true for both ex-ante and ex-post accountability, there are also important differences between the two types of accountability. The dynamics of the ex-post accountability in REWARD AFTER are similar to that of the OWN treatment, while the ex-ante accountability seems to be different, leading to more careful and constant investment strategies.

Our finding that accountability brings behavior closer in line with the principal's interests (as indicated by behavior in OWN) is consistent with findings by Lefebvre and Vieider (2013). These authors show that incentive structures like limited liability lead to lower risk aversion than would be optimal from the point of view of the principal, which is consequently mitigated by an accountability manipulation. Here the reduction in risk aversion is not driven by high-powered incentives, but the accountability effect is similar. Eriksen and Kvaloy (2010) suggest that one of the reasons why agents' investments differ from what principals would decide for themselves is the empathy gap (Loewenstein 1996): people make inaccurate inferences about others' risk preferences and base their decisions on that. Accountability may then reduce the empathy gap, bringing behavior in line with principals' preferences.

Comparison of the current results with the study by Pahlke et al. (2012) shows that accountability effects can depend on subtle details of the accountability manipulation. Pahlke et al. let agents explain their decisions to the principal in person at the end of the experiment. They observed less risk aversion in this accountability condition compared to a condition where agents make decisions without the need to justify them, as in our condition OWN. This result is only observed for mixed lotteries where both gain and loss are possible, but not for pure gain or pure loss prospects. Their finding thus differs from our finding of increased risk aversion in REWARD treatments compared to OWN investments (although both gains and losses are possible in our task). These findings suggest that accountability has different effects when people need to explain their choices (and loss aversion may be difficult to justify, bringing behavior closer to a normative benchmark or risk neutrality), than when a reward-based type of accountability reduces empathy gaps (bringing behavior closer to the principal's preferences).

⁸ We can only speculate why the results differ. In Eriksen and Kvaloy (2010) the agents were informed that "The investor is your client, and your task is to manage his/her money." This instruction may have caused more risk averse investments than our instructions which used more neutral phrasing "Your task is to make an investment for another participant."

Our study only looked at average behavior. Anderson et al. (2013) considered convex incentive structures similar to Lefebvre and Vieider (2013), and showed that risk taking in an agency situation is moderated by pro-social preferences and traits.⁹ An interesting question for future research thus concerns the role of heterogeneity in the agents' reaction to accountability. This may also help to get a better understanding of the mixed effects for the basic agency condition in the literature.

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⁹ Dijk et al. (2014) also report that social comparison effects strongly influence agent investment behavior.

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