The Impact of Empowering Investors on Trust and Trustworthiness

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Abstract

This paper uses a controlled laboratory environment and a two-person investment game in a multi-period setting to examine the impact of empowering investors with the right to veto the investee's profit distribution on trust and trustworthiness. Two forms of vetoes are tested: the first is costly for the investor to implement and the second is costless. One of the key findings is that the empowerment of investors through both costless and costly vetoes significantly increases trust by over 30% in both cases. To control for a treatment sequence effect, we conducted the experiment in a reverse order. We observe a comparable loss in trust when the power to veto is removed. Further analysis of veto decisions indicates that empowering investors increases both trust and trustworthiness without an undue abuse of the power to veto and that the veto decisions are mainly driven by unfair responses, consistent with the notion that most vetoes are cast by investors whose trust has been betrayed.

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1. Introduction

Trust is an important driver of investment decisions, especially in bargaining environments such as those related to investments in early stage business ventures and loosely connected business alliances, where contracts are generally between small numbers of agents and are inherently incomplete and difficult to monitor and enforce (Chan et al., 1997; Rosenkopf and Almeida, 2003). Prior literature documents that several behavioral factors including risk preferences, social preferences and reputation influence behavior related to trust (Anderhub et al., 2002; Bohnet and Huck, 2004; Bohnet et al., 2008; Fehr, 2009; Kanagaretnam et al., 2009). More recently, betrayal aversion is identified as a major inhibitor of trusting behavior (Bohnet et al., 2008; Fehr, 2009). In particular, there seems to be a special aversion towards being exploited by untrustworthy partners that prevents fully trusting behavior.

Given the above, an important question that should be addressed in the literature is: are there mechanisms which can be used to enhance the level of trust by assuring that the potential power of the parties to a business transaction is balanced so that there is recourse for betrayal of trust? Answering this question is particularly important in situations where business contracts are incomplete and one of the parties has complete control over the decision on the distribution of profits. This control over the distribution of profits introduces the need for assuring a high level of trustworthiness (or reciprocity) on the part of the parties distributing the returns to the investment, for this is likely necessary to induce trust.

The current study proposes and empirically examines the impact of a veto as an explicit mechanism for empowering an investor in a simple repeated investment game. Two forms of the veto are tested. One veto treatment is costly for the investor to implement and the second is relatively costless. We conjecture that introducing the veto mechanisms are likely to enhance the balance of power between the parties of an investment activity, and hence increase their level of cooperation (i.e., increase the level of trust and trustworthiness). With the costly veto, the investor may reject the profit distribution of the investee resulting in both investor and investee receiving a payoff of zero. With the costless veto, rejection results in the investee realizing a payoff of zero, but the investor will retain the initial investment.[1] The vetoes permit the investor to reject the investee's decision and deny the investee any income in the round in which the investee's response is vetoed. The introduction of the veto into a repeated game environment can be seen as a mechanism designed to restore what Kramer (2009) described as the presumptive trust that was tempered (lost) through negative experience or giving the investor recourse for betrayal of trust.[2]

Our laboratory environment closely relates to the organizational forms of alliances and joint ventures described by Chan et al. (1997).[3] In particular, our

[1] Note that the costless veto is not necessarily without cost, as an investor may reject an amount that may be greater than what was invested, but less than what the investor believes is appropriate. In this case there is a cost to the veto, but it is less costly than the costly veto treatment.

[2] This is comparable to permitting contributors in a public good game to punish non-contributors as a means to promote cooperation (Fehr and Gächter, 2000) and to permitting employers to punish workers who do not honor effort commitments (Fehr et al., 1997).

[3] Strategic alliances bring together otherwise independent firms to share resources in product design, production, marketing, and/or distribution so as to generate synergy. Such alliances are becoming prevalent as competitive pressures force firms to adopt flexible and more focused organizational structures (Chan et al., 1997). Mutual cooperation in alliances is not automatic because, in the absence of trust, individual firms may be guided by their self-interest both before and after joining an alliance.

experiment resembles a business context of a simple two-partner alliance with a dominant partner (who is the investee in our experiment and decides on the profit-sharing rule). The other partner's contribution to the alliance is similar to the investment game's investor (who provides resources to the dominant partner). The synergy from an alliance relationship is captured by the tripling of the investment in our experimental design.[4]

In this study, we focus on the effects of three treatments on a measure of trust and a measure of reciprocity derived from an investment game originally introduced in Berg et al. (1995).[5] Treatment 1 is a repeated game, during which the participants' roles as investors or investees do not change and the individuals with whom the participants were paired do not change. Treatment 2 is a repeated game with a costly veto and treatment 3 is a repeated game with a costless veto. While trying to account for possible learning effects by reversing the order of our treatments, we are also able to study the loss of trust and reciprocity when the power to veto is withdrawn.

A key finding of this study is that empowerment through an embedded veto option significantly increases trust. Empowerment of investors as implemented (by both the costly and the costless veto) contributes to a substantial increase in trust (over 30% in each case). More specifically, trust (as measured by the level of investment) increased from 71.2% for repeated games to 94.7% for repeated games with costless veto. Interestingly, we observe a comparable pattern when the power to veto is withdrawn, i.e.,

[4] Throughout the text we use the term investor for the sender. Similarly, we use the term investee for the receiver.

[5] In this two-person game, an investor sends some amount of a resource endowment to an investee. The investment is grossed up, to capture the return to the investment in the investee's hands, and then the investee sends resources back to the investor. The proportion of the endowment that is sent can be interpreted as a measure of the investor's trust. The proportion of the grossed-up investment that is returned can be interpreted as a measure of the investee's reciprocity, trustworthiness or fairness. We later define trustworthiness and fairness within the context of the reciprocity measure.

there is a substantial drop in trust, providing some insights into factors driving lost trust. The consistent trust results for the empowerment of investors and for the withdrawal of the investor's power to veto, indicates that the empowerment findings are not a result of participant learning the game, but a result of incentives inherent in empowerment. Additionally, once a veto is introduced, it is the interaction of the beliefs of the investor regarding the character of the investee with this ability to veto that will ultimately determine the action the investor will take in the punishment stage of the game.

Our results for reciprocity are mixed. Average reciprocity is significantly greater when empowerment is costly than when the veto is absent. However, there is no difference in the level of reciprocity between the costless veto and the costly veto.

In additional analysis, we explore the determinants and the patterns of vetoes cast in our experiment. Although the participants in this experiment had 378 opportunities to cast a veto following the response of an investee, interestingly vetoes were cast only 44 times (less than 12% of possible vetoes). This indicates that empowering investors increases both trust and reciprocity without an undue abuse of the power to veto (without overly destroying social surplus). In the analysis of the determinants of the veto, not surprisingly, the estimated probability of casting a veto is significantly greater under the costless veto than under the costly veto. Additionally, the investor's trust and the interaction of the investor's trust and the investee's reciprocity are highly significant. The risk attitude of the investor is also significant. The significant interaction between trust and reciprocity displayed by the regression results indicates that when reciprocity is low, individuals who display more trust are more likely to cast a veto than are individuals who are less trusting. Analysis of individual responses to when or why participants

choose to cast a veto sheds more light on "untrustworthy" responses that trigger the vetoes. The punitive sentiments are largely driven by unfair responses, consistent with the notion that vetoes are triggered only when trust is betrayed.

An important implication of our results is that empowerment of investors in contexts such as simple business alliances will increase investment levels. The data also support the notion that empowerment is important in enhancing trust in an environment where trust may be low or investors are inhibited by betrayal aversion and that the implications of regulatory actions, such as the Sarbanes-Oxley Act of 2002, which stipulate enhanced enforcement by creating countervailing power, will have a positive impact on the level of investment.

2. Literature Review and Research Expectations

Trust is defined as the act of an investor placing "resources at the disposal of another party (the investee) without any legal commitment from the latter"… but "with an expectation that the act will pay off in terms of the investor's goals" (Fehr, 2009, p. 238). Thus placing trust in the investee puts the investor at risk. Reciprocity is an echo of trust by the party that was trusted. The significance of this two-way interaction on business transactions has been tested extensively in the experimental economics literature in a one-shot game relationship. More recently, some studies (see, Anderhub et al., 2002; Bohnet and Huck, 2004; Cochard et al., 2004; Kanagaretnam et al., 2010) have tested this interaction in a multi-period environment as an indirect means of empowering investors and inducing higher levels of cooperation by investees so as to enhance the total output of a business relationship. Falk et al. (1999) have shown comparable results within the

context of a gift exchange environment in which repeated interaction increases worker effort.

2.1. Empowerment and Trust

In the two-person investment game, trust is constrained by the uncertainty involved in investing a positive amount that may or may not be reciprocated by the investee. In particular, trust is an action taken by a party to an economic transaction with the anticipation that the other party of the transaction will not behave opportunistically, i.e., will not exploit the vulnerability that the party has created for himself or herself by taking the action with an uncertain outcome (James, 2002; Bohnet et al., 2008). This is especially so in a one-shot investment relationship where there is no opportunity for the investor to retaliate or for the entrepreneur to build reputational capital. In this environment, the individual investors place trust in the entrepreneurs to manage the new ventures in the collective interest of all parties, and expect that managers will behave in a cooperative and non-exploitative ways (Cook and Cooper, 2003). However, in the absence of an effective monitoring mechanism in these incomplete contractual relationships, investors may hesitate to fully invest in these projects due to the fear of being betrayed by the entrepreneur. This study conjectures that in these environments empowering investors with the right to punish opportunistic entrepreneurs is likely to reduce the betrayal aversion behavior and hence increase the levels of trust (investment) and trustworthiness (return to investment).

One way of introducing empowerment into this environment is to move from a one-shot game to a repeated game. In a repeated interaction environment, investors can retaliate by reducing their future investments in response to a low level of reciprocity. In

this case, one's reputation may be an effective a priori control on ex-ante opportunism. We expect that in a repeated multi-period investment game, subjects may attempt to create incentives that induce the other party to cooperate. Sending credible signals to their counterparts is likely to influence them to adopt strategies that enhance cooperation and lead to Pareto-superior outcomes (see Kreps et al., 1982; Fudenberg and Levine, 1992; Eckel and Wilson, 2003). This reputation building mechanism (the repeated interaction), is expected to encourage the investor to trust more (Engel-Warnick and Slonim, 2004) in order to influence the investee to acknowledge the increased trust with greater returns (increased reciprocity).

A more direct and more effective way of empowering investors is to permit them the opportunity to exhibit their objection to what is returned to them in the investment game by vetoing the response and voiding the contract. This veto could be costly to only the investee (costless veto) or to both the investee and the investor (costly veto).[6] In related research, Andreoni (2005) examines the policy of satisfaction guarantee (ability to return a product) on the trust exhibited by the buyers and the trustworthiness of sellers. He finds that offering a satisfaction guarantee always increases the trustworthiness of sellers, but increases the trust of the buyers only when it is externally enforced. Trust increases only in the situation where it is legally enforced suggesting that the offer of satisfaction guarantee does not automatically increase the trust of the buyers. More recently, Rigdon (2009) examines the impact of rewards and punishments on trust in a one-shot investment game. She finds that only the high punishment environment has a

[6] Costly vetoes are possible in the presence of inequity aversion. According to Fehr and Schmidt (1999) inequity aversion means that people resist inequitable outcomes; i.e., they are willing to give up some material payoff to move in the direction of more equitable outcomes.

significant increase in investment relative to the one-shot investment game. Even then the mean investment only increases from 5.45 to 7.37 out of possible maximum of 10. Our study differs from Andreoni (2005) and Rigdon (2009) in two important ways. First, our environment (allowing for veto by investors) offers the investors the unconditional power to punish, thus giving them recourse in presence of untrustworthy responses – this should in theory alleviate any concerns of betrayal and encourage the maximum level of trust. Second, we explicitly control for some of the other behavioral factors including risk preferences and value orientation and reputation in repeated games to isolate the impact of empowerment on trust and reciprocity.

Our empowerment treatment is also comparable to permitting contributors in a public good game to punish non-contributors as a means to promote cooperation or permitting firms to punish workers who do not reciprocate incentive wages with high effort. Results reported by researchers such as Fehr and Gächter (2000) and Fehr et al. (1997) have demonstrated that punishment in public goods environments and gift exchange environments have been successful in promoting cooperation. Also, prior research on the ultimatum game has shown that responders do not maximize monetary payoffs by accepting every offer; they typically reject unfair offers (see Camerer 2003, Chapter 2).[7]

The public goods and gift exchange environments differ subtly from the investment game. In the public good environment all of the participants make simultaneous initial contributions as first movers and make simultaneous punishment moves as second movers. In the gift exchange game, the second mover controls the size

[7] These effects occur even when there will be no future interactions with the partner suggesting that fairness is important to the responders.

of the surplus and the first mover controls punishment of the second mover. In the investment game the first mover controls the size of the surplus and the punishment of the second mover (who controls the distribution of the surplus).[8] The gift exchange and investment games are sequential-decision games. The public good game is a simultaneous-decision game. Comparing two-person games, in the public good game there is more strategic uncertainty than in the gift exchange and investment games. In the gift exchange and investment games the first mover knows that the second mover will have full information about the first mover's wage offer or investment decision before the second mover has an opportunity to make a decision. This permits the first mover to act on his or her beliefs regarding the second mover. This will permit the second mover to respond knowing that the first mover's decision was predicated on some belief about the second mover.

In simultaneous games one can expect that some of the punishments are due to coordination failures in beliefs, but this is less likely in the sequential games. A consequence of this is that in the punishment stage of the investment game it is not credible that a low return by a second mover was unintentional and due to too pessimistic

[8] The basic structure of the experimental setting is a variant of the investment game developed by Berg et al. (1995) in which the investor makes a decision to accept the investee's allocation or to punish the investee for the announced allocation. Within the context of a game that is repeated but which does not have a known or probabilistic end, the one-shot game solution that the investor should invest nothing will not necessarily obtain. Early papers studying the one-shot game (such as Berg et al., 1995; Croson and Buchan, 1999; Ortmann et al., 2000) have shown that the actual behavior is quite different from the predicted behavior. The investors send on average a significant positive sum to the investee, thus exhibiting some "trust" in the investee. The investee reciprocates this trust by sending some money back. By sending money back to the investor, the investee exhibits positive "reciprocity". Results using repeated play in investment games show increased levels of trust. Permitting punishment as described above in the investment game may lead to increased trust that is comparable to the increased public good provision and increased effort realized when punishment is permitted in these environments.

beliefs about the other player's contribution. This may affect the inclination for punishment relative to that in the public good game.[9]

With the ability to punish, investors should feel a greater willingness to trust the investee to return an acceptable amount of the grossed-up investment. The opportunity for investors to retaliate or punish possible self-regarding behavior on the part of investees may constrain them from betraying investors' trust and exploiting investors. Therefore trust exhibited by empowered investors in the veto treatments is expected to be greater than trust under a repeated-game environment. As the cost of punishing falls, investors should feel an even greater willingness to expect the investee to return a greater amount of the grossed-up investment. Consequently, we expect the following:

> ***Conjecture 1***: the costly veto power will likely increase the level of investors' trust relative to the trust exhibited in the repeated interaction setting without veto power.
>
> ***Conjecture 2***: the costless veto will result in higher level of trust than that exhibited under the costly veto.

2.2. Empowerment and Reciprocity

The veto grants investors an opportunity to retaliate or punish possible self-regarding behavior by the investees to betray trust placed on them by investors'. The fear of retaliation by investors may increase the propensity to reciprocate by the investees, i.e., with the investor acquiring an ability to punish, investees may be more likely to return a greater portion of the grossed-up investment. Therefore, the level of reciprocity under a costly veto may be greater than the level of reciprocity under repeated games. As the cost of punishment falls, the investee may expect the investor will be even more likely to veto an unacceptable return. Therefore, the level of reciprocity under a costless veto may be

[9] We thank an anonymous reviewer for pointing out this consequence.

greater than the level of reciprocity under costly veto. Consequently, we expect the following:

Conjecture 3: the level of reciprocity will be at its highest level under a costless veto.

Conjecture 4: the level of reciprocity will be greater when the veto is costly than when no veto is permitted.

2.3. Exercising the Veto

The investment game has two stages. First the investor sends some resources to the investee. Second, the investee returns some of the augmented investment to the investor. Adding a veto to the investment game adds a third stage to the game. The second and third stages are somewhat comparable to an ultimatum game, where the investee proposes a split of the augmented investment and the investor decides whether to accept or reject the split. These two stages differ from the ultimatum game in the way that the amount to split is determined. In this environment, the amount to be split is determined by a decision of the individual who must accept or reject the split. Within the context of a one-shot game, this three-stage game has the same Nash equilibrium payoffs as the two-stage investment game.[10] Played repeatedly, trust in the first stage may be rewarded with increased reciprocity in the second stage. This, in turn, may be rewarded with acceptance in the third stage.

Generally, within the context of the conventional ultimatum game, rejection frequencies are high when less than 30% of the investor's endowment is offered to the investee (Camerer 2003, Chapter 2). Within the context of the investment game, we expect the grossed-up investment to be comparable to the investor's endowment in the

[10] We thank an anonymous reviewer for pointing out that it is the Nash equilibrium payoffs rather than the Nash equilibrium that will be the same in the two games for there are many strategy combinations that will constitute Nash equilibrium and the strategy sets differ for the two games.

ultimatum game. We expect rejections to be highest when reciprocity is less than 0.33, which is the reciprocity measure for which the amount returned is equal to the amount invested. This is a level of reciprocity for which the investee appropriates the entire surplus created by the investor, which could make the investor feel betrayed. It is also possible that investors may view an equal sharing of the social surplus to be a fair return and they might veto reciprocity values below 0.67, which, within this context, are unfair. Within the context of a repeated investment game, a veto may induce increased reciprocity in the subsequent rounds much as punishment in public goods games and gift exchanges lead to increased contributions and effort (Fehr and Gächter, 2000, Fehr et al., 1997). Consequently, we expect the following:

Conjecture 5: the likelihood of a rejection will increase as reciprocity falls.[11]

Conjecture 6: reciprocity increases in decision-rounds following the casting of a veto.

3. Experimental Protocol and Design

A total of 86 subjects were recruited from undergraduate business classes at a medium-sized university. During the recruitment phase, students were told that the experiment involves simple decision-making, and that the details would be given to them during the session. In addition, they were told that they were required to participate in two separate sessions. Each session would be conducted on a different day and each session would last no more than two and one-half hours. They were also informed that during the course of the sessions they would earn money that would be paid to them in cash at the conclusion of each session.

[11] Reciprocity in excess of 0.67 is unlikely to be vetoed and reciprocity less than 0.33 is most likely to be vetoed.

In the first session, we elicited subjects' social value orientations and risk attitudes. This allows us to isolate intrinsic individual characteristics rather than assume that our subjects are risk-neutral, non-cooperative profit maximizers.[12] These measures are collected for inclusion in the analysis of vetoes. The more risk-seeking the investor, the more likely the investor may cast a veto in an attempt to change the behavior of the investee in a following decision period and the greater the social value orientation of the investor (the more pro-social the investor) the less likely the investor may be to reduce the social surplus by casting a veto.

The second session consisted of either twenty decision rounds or sixteen decision rounds of an investment game similar to that used by Berg et al. (1995) in which investors and investees are endowed with 100 Francs at the start of each round. Investors make an investment of an amount of their choosing from zero to 100 Francs. This investment is grossed up to three times the initial investment and the investee receives this grossed-up amount.[13]

The participants play four *treatments*. The first treatment is a one-shot investment game. The second treatment is a repeated investment game. The third treatment is a repeated investment game in which an investor can veto the investee's response and impose a payoff of zero Francs on both investor and investee (the costly veto). The fourth treatment is a repeated investment game in which an investor can veto

[12] A detailed description of the risk attitude measure and the social value orientation measure used in this study closely follows Kanagaretnam et al. (2009). Instructions used to elicit risk preferences and value orientations are available from the authors upon request.

[13] Francs were converted into Canadian dollars at the rate 100 Francs equals 1 Canadian dollar. The average payout for the sessions in which subjects participated in the value orientation game and the risk attitude lotteries was $24. The average payout for the sessions in which subjects participated in the investment game was $34.

the investee's response and the investor retains the initial endowment of 100 Francs as payoff while the investee gets a payoff of zero Francs (the costless veto).[14] Sixty participants experienced the four treatments. Twenty-six experienced the first three treatments.[15]

Some participants experienced the treatments in the order described above (the *forward sequence*). Others experienced the one-shot game first, and the remaining treatments in the reverse order to that presented above (the *backward sequence*). In the *forward sequence*, 60 participants play the repeated game without a veto and the repeated game with a costly veto and 34 participants play these two repeated-game treatments as well as the repeated game with a costless veto. In the *backward sequence*, 26 participants play all of the repeated-game treatments.

Participants are told that the first game they play is a one-shot game. At the end of that game, they are re-matched with different participants and they play the same game again, but in different roles. Investors in the first round are investees in the second round.[16] In subsequent rounds, participants do not know how long they will remain in a particular role or what will be the next treatment. In the *forward sequence*, half of the participants play four rounds of the repeated investment game without a veto option as an investor (investee) and then play four more rounds of the same game, as an investee (investor), re-matched with a different person. This same pattern is repeated for two sets of three rounds of the repeated game with a costly veto and two sets of two rounds of the

[14] Figure 1 describes the sequence of decisions.

[15] Data was lost from the last treatment for one session with 26 participants because of a computer malfunction.

[16] Subjects are used in both roles to increase the number of observations. Regression analysis is used to identify order effects introduced by this. The order effect also accounts for bias introduced by playing the game a second time in a different role.

repeated game with a costless veto. In the *backward sequence*, participants follow the one-shot game with two rounds of the repeated game with a costless veto, three rounds of the repeated game with a costly veto and finally, four rounds of the repeated game without a veto. The participants are not told how many rounds they will play each game. The same reversal of roles is used in the *backward sequence* as in the *forward sequence* so that each individual experiences each treatment as both an investor and an investee.

The order in which a participant plays a role is a variable in our analysis. *Order* identifies the order in a session in which a participant took the role of an investor. Every participant recruited for the experiment had the opportunity to participate as an investor and an investee. When roles were changed, participant pairings were reassigned. Individuals were never re-matched during a session and this was made clear to participants in the instructions. The variable *order* takes the value of unity when a participant played the investor role before playing the investee role. The value was zero otherwise. The order in which participants play the investor and the investee roles is the same across treatments.

The trust index used in this analysis for each participant in each treatment is the mean of the trust indices (percentage of endowment invested) for an individual over the rounds of the treatment. Each participant's reciprocity index for each treatment in the analysis is the mean of the reciprocity indices (percentage of grossed-up investment that is returned to the investor) for an individual over the rounds of the treatment.

The data are analyzed by running OLS regressions for each of the outcomes (trust and reciprocity). We accommodate the within-subjects design that uses repeated observations for each individual across each game treatment by clustering on the

individual. Robust standard errors are computed. The independent variables are the categorical variables *treatment* (3 levels: repeated games without veto, with costly veto and with costless veto), *sequence* (2 levels: forward and backward), *order* (2 levels: the participant plays investor first or plays investee first) and all of their interactions.[17]

4. Results

4.1. Trust

As stated earlier, trust is measured as the ratio of the amount invested to the endowment of resources in the investor's control. As there is no requirement that the investee return anything to the investor, trust must be large if the investor is to keep nothing back for himself or herself as insurance against no return to his or her investment. We consider an unrestricted model that includes game treatments, Sequence, Order and their interactions. Data are clustered by subject and robust standard errors are estimated.

A test of the joint significance of Order and all of the terms including Order permits us to maintain the null hypothesis that there is no order effect ($F(6, 85) = 0.99$, $p = 0.438$). Table 1 presents the results of a regression for the restricted model of trust that includes game treatments, sequence and their interactions with observations pooled across Order. Table 2 presents mean measures of trust by game treatment for the forward sequence and backward sequence sessions with data pooled across Order. Figure 2 summarizes the Table 2 data.

The regression results in Table 1 permit us to test the significance of the differences in trust between the repeated games with veto options. In the forward sequence, trust under the costless veto is significantly greater than trust under the costly

[17] Note that the one-shot game is not analyzed here. A comparison of the one-shot game and the repeated game without veto is presented in Kanagaretnam et al. (2010).

veto ($t = 3.93$, $p = 0.000$). In the backward sequence, the difference is also statistically significant ($F(1, 85) = 4.41$, $p = 0.020$). When trust under either of the empowerment treatments is compared with the repeated games without a veto option, the level of trust exhibited in the absence of empowerment is statistically lower than when some sort of empowerment is available, independent of the sequence in which the games are played (t-test, F-tests, $p < 0.005$ for all four cases). The consistency between the backward sequence sessions and the forward sequence sessions provide support for a claim that the greater trust observed in the empowerment treatments in the forward sequence sessions is not a result of participant learning (following participation in a repeated game without empowerment), but a result of the incentives inherent in the treatment. In particular, there is no statistical difference between the average trust exhibited under the costless veto in the forward and backward sequences ($F(1, 85) = 0.51$, $p = 0.478$) and no statistical difference between the average trust exhibited under the repeated game without veto in the forward and backward sequences ($F(1, 85) = 0.12$, $p = 0.728$).[18]

The changes in trust that we observe across the three game treatments of the forward (backward) sequence sessions show an increase of more than 30% in trust as participants move from the repeated game without veto power (costless veto) to the repeated game with a costless veto (without a veto power). The results based on the Table 1 regression support *Conjecture 1* and *Conjecture 2*.

[18] This result is consistent with the findings of Fehr and Gächter (2000, p 990) who also document that there is an immediate increase in contributions in public goods experiments with the introduction of punishment opportunities and an immediate drop in contributions with the removal of punishment opportunities.

4.2. Reciprocity

Reciprocity is measured as the ratio of the amount returned to the investor by the investee to the tripled investment made by the investor. Without any recourse available to the investor, within the context of a one-shot game, there is no reason to expect the investee to return anything to the investor. Moving from a one-shot to a repeated game without re-matching across rounds induces increased trust and reciprocity (see Bohnet and Huck, 2004; Cochard et al., 2004; Kanagaretnam et al., 2010). We consider an unrestricted model for reciprocity that includes game treatments, Sequence, Order and their interactions.

A test of the joint significance of Order and all of the terms including Order permits us to maintain the null hypothesis that there is no order effect ($F(6, 85) = 0.48$, $p = 0.822$). Table 3 presents the results of a regression for the restricted model of reciprocity which includes game treatments, Table 2 presents mean measures of reciprocity by game treatment for the forward sequence and backward sequence sessions with data pooled across Order. Figure 2 summarizes the Table 2 data.

The regression results in Table 3 permit us to test the significance of the differences in reciprocity between the repeated games with veto options. In the forward sequence, reciprocity under the costless veto is not significantly different from reciprocity under the costly veto ($t = 0.80$, $p = 0.573$), where our expectation was that it would be greater. In the backward sequence, the difference between reciprocity with the costless veto and the costly veto is statistically significant ($F(1, 85) = 3.02$, $p = 0.043$). From Figure 2, it is clear that average reciprocity falls when the game treatment changes from

the costless veto to the costly veto. *Conjecture 4* is supported by the data for the backward sequence, but not for the forward sequence.[19]

Average reciprocity is significantly greater when empowerment is costly than when the veto is not permitted. For the forward sequence $F(1, 85) = 5.37$ and $p = 0.012$, while for the backward sequence $F(1, 85) = 2.94$ and $p = 0.045$. *Conjecture 3* is hence supported by the data.

Further, similar to results on trust, the difference between the average reciprocity exhibited under the costless veto in the forward sequences and backward sequences (0.635 versus 0.700) and the difference between the average reciprocity exhibited under the repeated games without veto in the forward and backwards sequences (0.593 versus 0.562) are not significant at the conventional 5% level ($F(1, 85) = 2.57$, $p = 0.089$ for the costless veto and $p = 0.560$ for the repeated game without a veto).[20]

The changes in reciprocity that we observe across the three game treatments of the forward sequence sessions show an increase of about 7% in reciprocity as participants move from the repeated game without veto power to the repeated game with a costless veto. A larger proportion of difference in reciprocity between the costless veto and no veto environments is observed when participants experience the costless veto before the repeated game without veto. The empowerment of investors as implemented in this

[19] This difference between the reactions of investors when moving from the costly veto environment to the costless veto relative to moving from the costless veto to the costly veto may be attributed to a difference in the saliency of losses and gains. This may be an example of the "loss aversion" discussed by Kahneman and Tversky (1979) and subsequent researchers. Potential losses evoke a greater response than potential gains of the same magnitude.

[20] Note that all of the tests that compare different treatments within a sequence are one-tail tests. The tests that compare the same treatments across sequences are two-tail tests.

environment contributes to a significant increase in investment and ultimately a significant increase in reciprocity.

4.3. Veto Incidences

The 86 participants in this experiment had 378 opportunities, in their role as an investor, to cast a veto following the response by an investee. Vetoes were cast 44 times. Thirty individuals cast vetoes, 19 of them cast a veto only once. Nine cast two vetoes, one person cast three and one person cast four vetoes. We run a probit regression whose dependent variable is the probability that a veto is cast to analyze these data.[21]

A restricted model containing the variables costless veto, trust, risk attitude and the interaction of trust and reciprocity is estimated and reported in Table 4.[22] This model is used to estimate probabilities of casting a veto given different measures of reciprocity from the investee and trust displayed by the investor. These estimates are presented in Figure 3 for the costly veto and costless veto treatments.[23]

Given the level of trust, the estimated probability of casting a veto is significantly greater under the costless veto than under the costly veto (Table 4, $p = 0.005$). Under the costly veto, the investor can reject an investee's offer to share the grossed-up investment and both the investor and investee will receive nothing for that decision round. When vetoes are costly, they are cast in only 24 of the 258 opportunities (9 percent of the time).

[21] The repeated observations in the costly and costless veto treatments and the within subjects design with regard to the two treatments are accounted for in the regression by creating a variable that is the interaction of subject and treatment. We then cluster on this variable and estimate robust standard errors.

[22] In an unrestricted model, neither sequence, order nor value orientation account for a significant proportion of the variation in the decision to cast a veto.

[23] The relationships displayed in Figure 3 would be shifted up (down) as the individual becomes more risk seeking (averse) indicating that greater risk seeking results in a greater likelihood of casting a veto, all other things constant. For these estimates, the average sample risk attitude measure of 14.5 is used (the range of the risk attitude measure runs from highly risk averse, with a risk attitude measure of 0, to highly risk seeking, with a risk attitude measure of 24).

When vetoes are costless, they are cast nearly twice as often (20 of 120 opportunities or 17 percent of the time). Costly vetoes show little decline over time while costless vetoes decline from 23 percent to 10 percent of opportunities from the first to second round.

The significant interaction between trust and reciprocity displayed by the regression results is clearly shown in Figure 3. When reciprocity is high, individuals who display more trust are less likely to cast a veto than less trusting individuals. However, when reciprocity is low, more trusting individuals are more likely to cast a veto than less trusting individuals. The more trusting individuals are more likely to reward high levels of reciprocity than less trusting individuals and more likely to punish low levels of reciprocity than are less trusting individuals. The data summarized in Figure 3 support *Conjecture 5* that as reciprocity rises, the probability that a veto will be cast falls.

4.4. Individual Responses

The probit results do not provide insights about when or why individuals choose to cast a veto. Because there are only 30 individuals who cast vetoes, it is not difficult to look at the decisions made by each of these individuals and attempt to make some inferences from their choices. Before reporting on this review, consider the following categorization of reciprocity responses. If the reciprocity measure exceeds one-third of the grossed up investment, the investor will receive back more than what was sent to the investee. Call this a *trustworthy* response. If one-third or less of the grossed-up investment is returned, the response is *untrustworthy*. Although a response may be viewed as trustworthy, it may not be viewed as fair. Fairness is subjective, but for our purposes of categorizing responses, we will consider two possibilities. If at least one half of the grossed-up investment is returned to the investor the response may be fair.

Returning two-thirds of the grossed up investment guarantees that the investor and the investee have an equal share of the total social surplus (each receives the same payoff from that round's interaction). This may be a reasonable upper bound on the fair responses. A reciprocity measure exceeding two-thirds could be described as *supra-fair*, for the investor enjoys a greater share of the social surplus.

Figure 4 presents distributions of the reciprocity types by game treatment for all responses made by investees during this experiment. It is clear that there are more (less) fair (untrustworthy) responses under the veto treatments than under the no-veto treatment. Empowering investors induced about a 25% increase in fair responses by investees (from 76% of all responses with no veto to 92% of all responses for the veto treatments).

Typically, the decision to cast a veto is made following an investee's decision to respond in a less trustworthy way than the investor anticipated. Twenty-four of the 44 vetoes were cast during rounds 2 and 3 of the costly veto treatment and round 2 of the costless veto treatment. For 18 of those 24 vetoes, the investee's trustworthiness fell from the previous round. This seems to have precipitated the veto. Fair responses were rejected only 6% of the time (11 of 181 opportunities) under the costly veto, but 14% of the time (12 of 86 opportunities) under the costless veto. Supra fair responses were never rejected under the costly veto (out of 50 opportunities) and only 3 times under the costless veto (out of 28 opportunities).[24] When responses were not fair, 52% were rejected under the costly veto (13 of 25 opportunities) and 83% were rejected under the costless veto (5 of 6 opportunities). Two-thirds of untrustworthy responses were rejected (8 of 12 opportunities).

[24] Two of the three vetoes were cast by the same individual. This individual even chose to reject a response that returned more than 90% of the grossed-up investment.

Vetoes were cast 32 times during rounds 1 and 2 of the costly veto treatment and round 1 of the costless treatment veto. These were all rounds that provided an opportunity for the investee to respond to a rejection by increasing reciprocity. The veto was successful in increasing reciprocity 28 of these 32 times. Twice there was no change in reciprocity and twice reciprocity fell (by 14% and by 3%). Of the 28 positive responses, all were fair responses and 6 (21%) were supra fair. The data support *Conjecture 6*.

Generally, empowering the investors by giving them the opportunity to sanction investees by rejecting the investees' responses leads to increased trust and increased reciprocity. Vetoes are cast infrequently, and these are cast more often when they are less costly and when responses may be viewed as unfair.

5. Conclusion

The contribution of this paper lies in its demonstration, in a controlled environment, of how empowerment in an investment game can affect trust and trustworthiness and increase the returns to the participants in the investment activity. In particular, our study examines how the empowerment of investors to retaliate against investees who do not reciprocate as they expect can increase the levels of trust and reciprocity in an economic exchange. Prior literature has put forward the notion that betrayal aversion is one of the key factors that inhibits trusting behavior in an investment setting (Bohnet et al., 2008; Fehr, 2009). Our results provide empirical evidence consistent with this reasoning, i.e., there is substantial increase in trust with the empowerment of investors even after controlling for other behavioral factors including risk preferences and value orientation and reputation building in repeated games. The

empowerment treatments in investment games give investors recourse for possible betrayal by investees resulting in trust levels of over 90% in our costless veto settings.

In further analysis, we identified some of the determinants and the patterns of vetoes cast in our treatments. Although the participants in this experiment had 378 opportunities to cast vetoes following the response of an investee, vetoes were cast only 44 times (less than 12% of possible vetoes). This indicates that empowering investors increases both trust and reciprocity without an undue abuse of the veto power. The estimated probability of casting a veto is significantly greater under the costless veto than under the costly veto. Additionally, the trust of the investor and the interaction of the investor's trust and the investee's reciprocity are highly significant. The risk attitude of the investor is also significant. Analysis of individual responses to when or why individuals choose to cast a veto sheds more light on "untrustworthy" responses that trigger the vetoes. The punitive sentiments are largely driven by unfair responses, consistent with the notion that most vetoes are cast by investors whose trust has been betrayed.

Our results provide some insights on the effect of empowering investors in the context of a simple two-partner alliance. The results support the notion that empowering investors is important in eliciting trust and reciprocity in loosely connected organizational forms. The results regarding the role of punishment for increasing the social surplus are comparable to those shown to exist for product guarantees, punishment and rewards in contract settings, voluntary provision of public goods and for inducing increased work effort. However, relative to other studies on punishments in investment settings (Andreoni, 2005; Rigdon, 2009), our environment gives investors a greater power to

punish (with or without a cost to themselves), thus giving them recourse for untrustworthy responses resulting in very high levels of trust.

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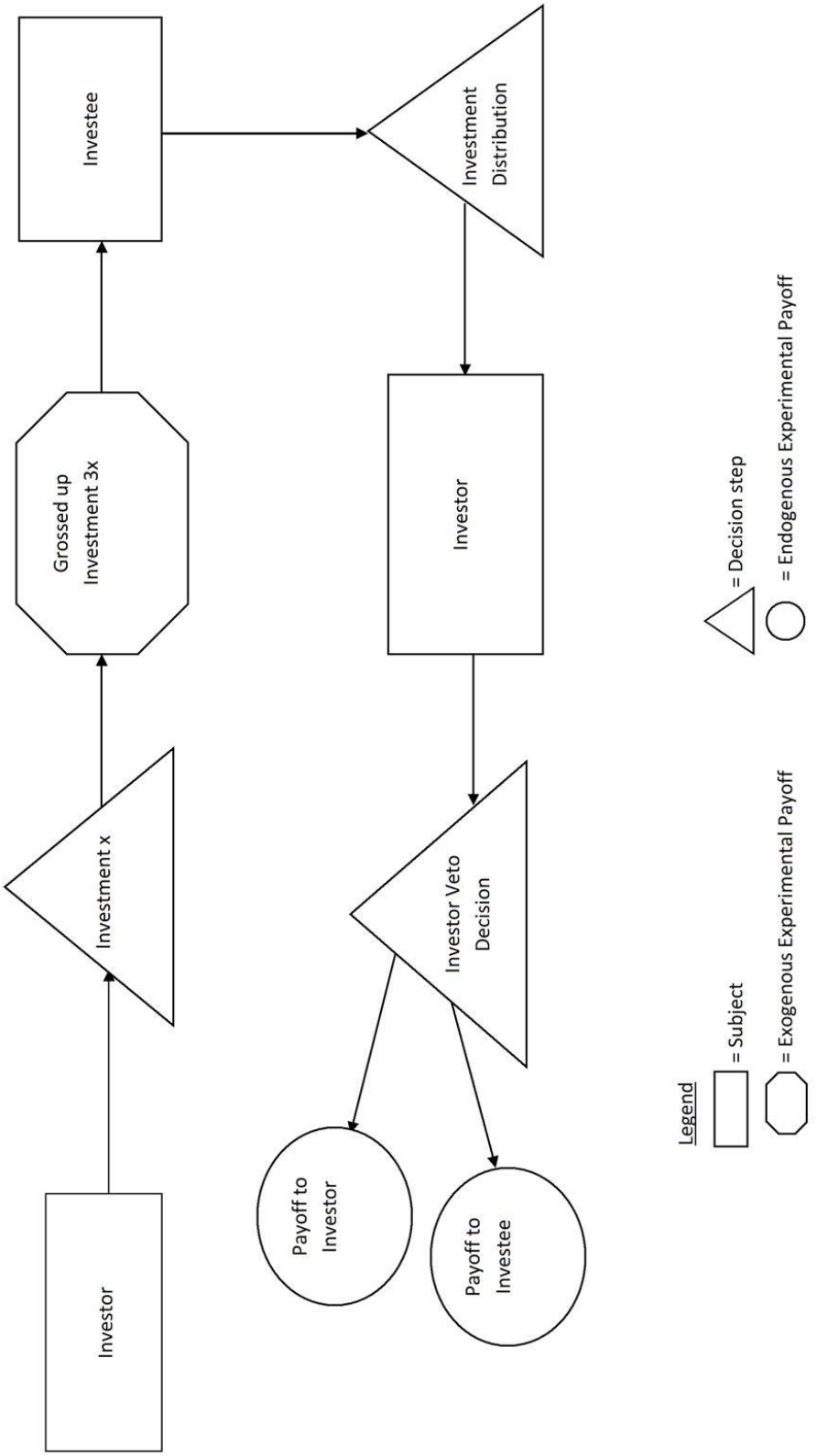

Figure 1. Sequence of steps in the Investment game (One-shot and Repeated)

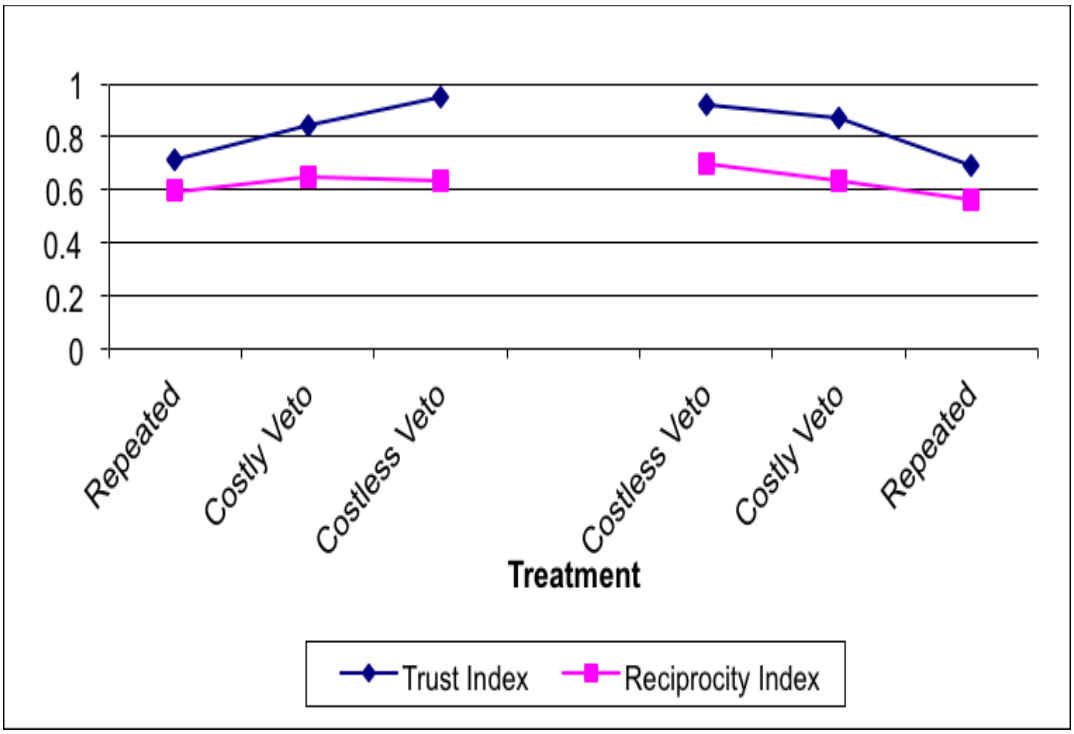

Figure 2. Trust and Reciprocity by Game Type and Sequence

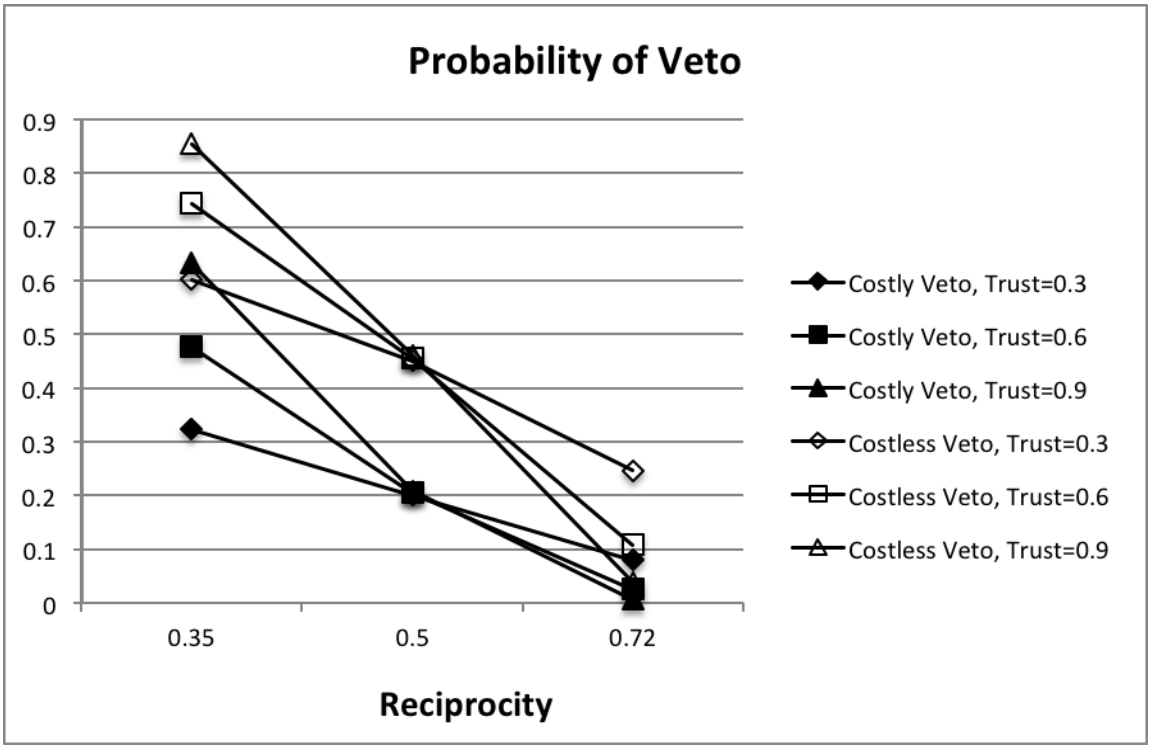

Figure 3. Estimated Probability of an Investor Casting a Veto Given Investor's Trust and Investee's Reciprocity and the Veto is Costly or Costless

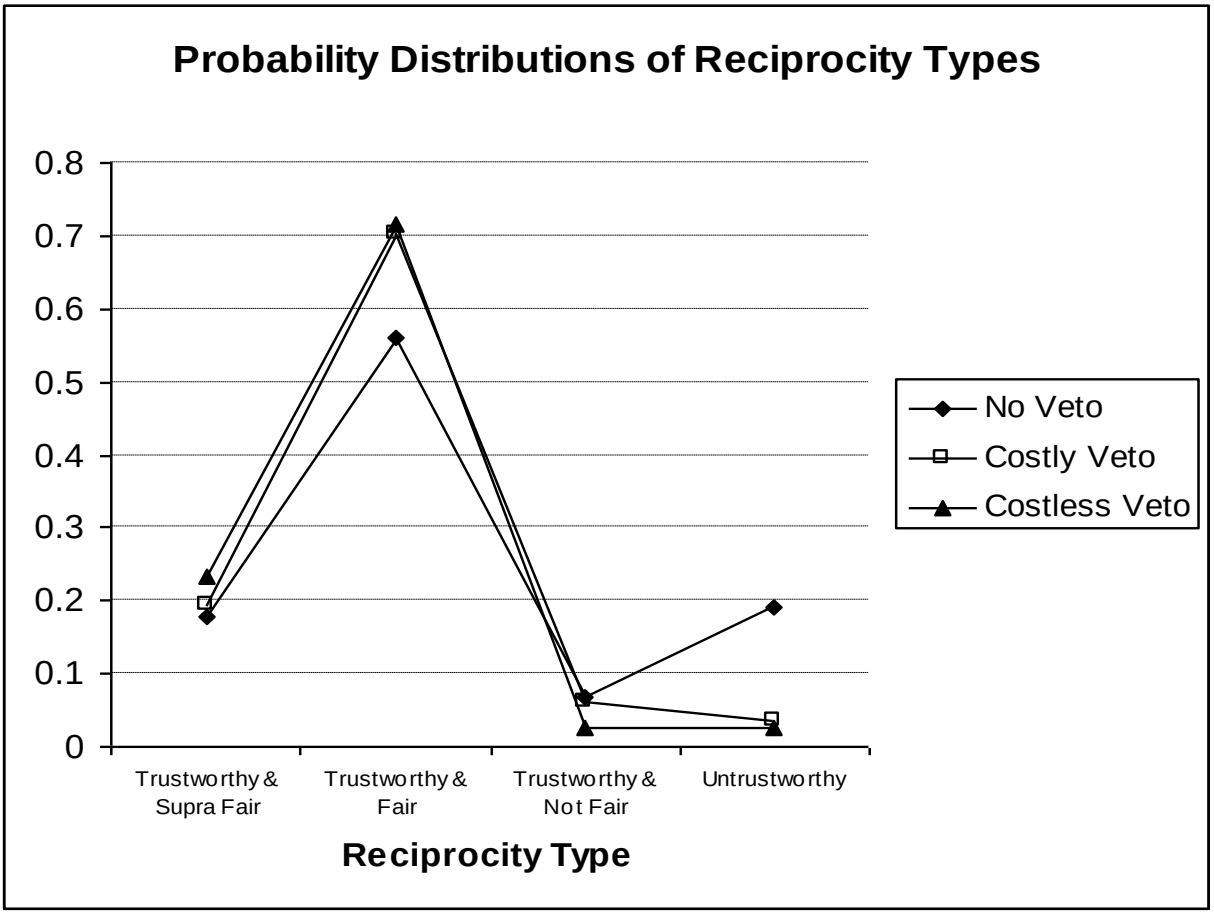

Figure 4. Distributions of Reciprocity Types Pooled across Sequence and Order

Table 1.Regression for Mean Trust Data by Treatments, Sequence and all Interactions

Variables	Coefficient	Robust Standard Error	p-value
Repeated Game (rg)	- 0.131	0.021	0.000
Costly Veto (V1)	dropped		
Costless Veto (v2)	0.104	0.027	0.000
Sequence (S)	- 0.024	0.069	0.728
rgS	dropped		
v1S	0.048	0.067	0.473
v2S	- 0.007	0.067	0.918
constant	0.843	0.025	0.000

Number of clusters (ID) = 86
Number of observations = 232
F(5, 85) = 14.86
Prob> F = 0.000
R-squared = 0.1540
Root mean square error = 0.22258

Note: rgS, v1S and v2S are the interactions between the Repeated Game, Costly Veto, Costless Veto treatments and Sequence.

Table 2. Summary of Average Trust and Reciprocity by Sequence and by Game

	Total Forward		Total Backward	
	Trust	Reciprocity	Trust	Reciprocity
Game	Mean (St. Dev.) [Obs]	Mean (St. Dev.) [Obs]	Mean (St. Dev.) [Obs]	Mean (St. Dev.) [Obs]
Repeated	0.712 (0.247) [60]	0.593 (0.180) [52]	0.688 (0.312) [26]	0.562 (0.231) [26]
Costly Veto	0.843 (0.191) [60]	0.649 (0.092) [60]	0.867 (0.252) [26]	0.633 (0.139) [26]
CostlessVeto	0.947 (0.128) [34]	0.635 (0.094) [34]	0.916 (0.191) [26]	0.700 (0.175) [26]

Note: There were 52 rather than 60 observations for the reciprocity measure in the forward repeated game because eight investors sent nothing to the investees with whom they were paired.

Table 3.Regression for Mean Reciprocity Data by Treatments, Sequence and all Interactions

Variables	Coefficient	Robust Standard Error	p-value
Repeated Game (rg)	- 0.042	0.031	0.178
Costly Veto (v1)	0.014	0.018	0.427
Costless Veto (v2)	dropped		
Sequence (S)	- 0.030	0.052	0.560
rgS	dropped		
v1S	0.014	0.048	0.771
v2S	0.095	0.057	0.100
constant	0.635	0.016	0.000

Number of clusters (ID) = 86
Number of observations = 224
F(5, 85) = 2.99
Prob> F = 0.0155
R-squared = 0.0637
Root mean square error = 0.15182

Note: rgS, v1S and v2S are the interactions between the Repeated Game, Costly Veto, Costless Veto treatments and Sequence.

Table 4. Restricted Probit Regression for Casting a Veto

Variables	Coefficient	Robust Standard Error	p-value
Costless Veto	0.736	0.262	0.005
Trust	4.281	0.803	0.000
Risk	0.033	0.019	0.042
TReciprocity	- 8.898	1.184	0.000
Constant	- 1.131	0.461	0.014

Number of clusters (IDF) = 146
Number of observations = 378
Wald chi2 (4) = 57.86
Prob> chi2 = 0.0000
Pseudo R-squared = 0.3392
Log pseudolikelihood = -89.8509

Note: Costless Veto is 1 if the veto is costless, 0 if costly. Trust is the measure of the investor's trust, Reciprocity is the measure of the investee's reciprocity, Risk is a measure of the risk attitude of the investor (takes on values from 0 to 24 with higher values indicating greater risk-seeking) and TReciprocity is the interaction of Trust and Reciprocity. The p-values for the significant tests that the coefficients of the costless veto and of risk are positive are for one-tail tests.