You Owe Me*

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Abstract

In many cultures and industries gift giving is a common practice to influence behavior, often at the expense of a third party. Examples include business gifts given by suppliers to procurement managers, by pharmaceutical companies to physicians or by lobbyists to politicians. In an experimental study we isolate the reciprocal effect of small gifts that are given unconditionally in one-shot interactions and have no informational content. We show that gift giving strongly affects the recipient's decisions in favor of the gift giver even if this comes at the expense of a third party. Subjects are well aware that the gift is given to influence their behavior but reciprocate nevertheless. We also show that withholding the gift triggers a strong negative response. The effects of gift giving are mitigated (but do not disappear) if the decision maker takes the decision on his own behalf or if he is offered a financial incentive scheme that aligns his interests with the interests of her client. The experimental results are inconsistent with the most prominent models of social preferences. We propose an extension of existing theories to capture the observed behavior by endogenizing the "reference group" to whom social preferences are applied.

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1 Introduction

Gift exchange is a prominent example for the importance of social preferences. Following Akerlof's (1982) seminal paper on gift exchange in labor markets, a large experimental literature has shown that gift exchange is an important mechanism to sustain cooperation both in the laboratory and in the field (see, e.g., Fehr, Kirchsteiger and Riedl, 1993; Gneezy and List, 2006; Falk, 2007). We also have a well-developed body of social-preference theories that are capable of explaining the observed behavior, such as intention-based reciprocity (Rabin, 1993) or inequity aversion (Fehr and Schmidt, 1999). Much less attention has been devoted to gift giving that tries to influence behavior to the detriment of a third party, e.g., business gifts to procurement managers, gifts from pharmaceutical companies to doctors, or from lobbyists to politicians.

In this paper, we design a gift-giving experiment with negative externalities for a third party. We first show that existing theories of social-preferences fail to predict a positive response to the gift. We then show experimentally that gift-giving strongly affects the recipient's decisions in favor of the gift giver and at the expense of a third party. Furthermore, withholding a (possible) gift has a strong negative effect, compared to a setting without the possibility of gift giving. We also find that experimental subjects are well aware that the gift is given with the intention to influence their behavior at the expense of a third party. Nevertheless they reciprocate. We propose an extension of existing theories to capture these effects, by endogenizing the "reference group" to whom social preferences are applied.

Gift giving with negative externalities is common in many cultures and industries. Given the large sums of money involved, it is hard to argue that it has no effect. Consider the wide-spread use of business gifts. In a typical scenario, the procurement manager of a firm receives gifts from a supplier, who hopes to get favorable treatment relative to other suppliers, even if his competitors offer better or cheaper products. B2B gifts range from small "tokens of appreciation" such as pens or coffee mugs to precious bottles of wine and tickets to cultural or sports events. An extreme example is the pharmaceutical industry that has been estimated to spend USD 8,000-15,000 per year on each physician in the US for marketing, including industry sponsored dinners and generous honoraria.[1] Another well-known example is lobbyists inviting politicians and regulators to luxurious dinners and conferences at attractive locations, or making donations and campaign contributions. Note that in all of these examples the person who receives the gift has to take a decision on behalf of a "client": the shareholders

[1] Blumenthal (2004, p. 1885).

of the procurement manager, the insurance company paying for the drugs prescribed by the physician, and the citizens affected by the decisions of the politician.

Such practices have raised concerns – and stirred a regulatory debate – about their influence on the recipients (Katz et al 2003, Blumenthal 2004, Susman 2008). The practice of gift giving has been blamed as a major contributor to weak corporate governance, to the dramatic rise of health care costs, and to wasteful pork barrel politics.[2] Standard economic theory can explain the effectiveness of these gifts in the case of a repeated relationships or if gifts have an informational content. For example, a physician may prescribe more drugs of a pharmaceutical company after attending a conference sponsored by that company, in order to induce more sponsored conferences in the future or because of scientific information about the drugs provided at the conference. However, in addition to the large-scale giving by the pharmaceutical industry and by lobbyists, there are also many small-scale gifts that amount to little compared to the income of the recipient and that do not have any obvious informational content.

In this paper, we use a controlled laboratory study to demonstrate that there is an additional effect of the gift *per se* that can be quite powerful. The laboratory setting allows us to exclude future interaction, informational content, or any (other) monetary incentives as explanations for such a response. In the experiment we observe that the gift is given with the intention to affect the decision of the recipient at the expense of a third party. The recipients are fully aware of this intention but reciprocate nevertheless. We show that existing theories, including theories of social preferences, are inconsistent with the recipient's response to the gift. In fact, the parameters of the experiment have been chosen such that most theories, including altruism, inequality aversion, maximin preferences, and various theories of reciprocity cannot explain why the recipient favors the gift giver at the expense of a third person.

In our experiment, a decision maker has to buy one of two possible products on behalf of a client. The products are simple 50/50 lotteries, and the two possible payoffs are natural numbers between 3 and 20. The decision maker is instructed to choose the product that is best for her client and is paid a fixed wage independent of her choice. Before she takes the decision she may receive a small gift from one of the two producers. The gift is given unconditionally and before the producers learn the payoffs of their products so that the gift

[2] There are many policy initiatives addressing these problems ranging from voluntary codes of conduct that have been adopted by many companies and industry groups (see e.g. Murphy 1995 on corporate ethics statements of large U.S. corporations and Grande 2009 on self-regulation in the pharmaceutical industry) to regulatory reforms and laws limiting the possibilities for gift giving and requiring disclosure, such as the Lobbying Disclouse Act of 1995 and the Honest Leadership and Open Government Act or 2007 in the US (see e.g. Susman 2008).

cannot contain any information about the quality of the product. The setting is anonymous and players are re-matched after each round. Hence, the gift does not provide any monetary incentives to favor the gift giver. Nevertheless, the gift strongly affects behavior. Even if the product of the gift giver is first order stochastically dominated by the alternative product (and much less valuable in expected terms), almost 50 percent of the decision makers choose the product of the gift giver, as compared to less than 10 percent in a Baseline Treatment in which there is no possibility of gift giving. The Baseline Treatment also reveals that the decision makers had no problem to figure out what the best product for the client is and that the distortion of behavior must be due to the gift.

In addition we find that *not* giving the gift has a strong effect, too. If a producer could have given a gift but chose not to do so, decision makers often punish him by refusing to buy his product even if it is the better product for the client. In this case not giving the gift reduces the likelihood that the better product is chosen from more than 90 percent in a setting without gifts to less than 60 percent if a gift could have been given but the potential gift giver chose not to do so.

Our experimental design allows us to test whether decision makers are aware how strongly the gift affects their behavior. This question is much debated in practice and of obvious policy relevance.[3] In the context of gifts by the pharmaceutical company, for example, a questionnaire study by Steinman et al (2001) found that only 39 percent of medical residents believe that these gifts affect their prescription behavior, but 84 percent believe that other physicians have been influenced. In our experiment we have an objective measure for the influence of the gift. Furthermore, we asked our decision makers at the end of the experiment to estimate how often their decisions coincided with the preferred product of the client. We used a quadratic scoring rule to give strong financial incentives to decision makers to come up with their best, unbiased estimate. Comparing the answers in the Gift Treatment and in the Baseline Treatment, we find that decision makers underestimate their ability to predict the preferences of their clients but overestimate their ability to resist the influence of the gift. Furthermore, as in Steinman et al (2001), decision makers believe that other decision makers are more strongly affected by the gift than they are.

Finally we conducted two control experiments in order to evaluate how large the distortion of behavior due to gift giving is and how it can be mitigated. In the No Externality Treatment we look at a situation where the decision maker is buying the product for himself (there is no client). If it was the case that in this situation the decision maker reciprocates to

[3] See Dana and Loewenstein (2003).

the gift to the same extent as she does if she acts for a client, then it could be argued that gift giving is less harmful. After all, in this case the client would have decided similarly as the decision maker had he received the gift himself. Thus, gift giving would not reduce efficiency but only redistribute income. However, we show in the No Externality Treatment that this is not the case. While the effect of the gift is still there (and highly significant), it is much smaller than in the Gift Treatment, in particular when the difference between the two competing products is large.

An obvious idea to mitigate the effect of gift giving is to better align the incentives of the client and the decision maker by using financial incentives. In the Incentive Treatment the client can offer ten percent of his profits to the decision maker. With profit sharing the effect of the gift is slightly stronger than in the No Externality Treatment, but the difference is not statistically significant. However, clients choose profit sharing in only 30 percent of all cases. If they do not offer profit sharing (but could have done so), the effect of the gift is even stronger than in Gift Treatment. Even if the product of the gift giver is much worse than the product of his competitor decision makers choose it in almost 70 percent of all cases!

How can the observed behavior be explained? The questionnaire evidence suggests that a gift triggers an obligation to repay the gift that exists independently of the intentions of the gift giver and the distributional consequences.[4] It seems that the gift creates a special bond between the gift giver and the recipient of the gift. There is a large anthropological literature documenting that gifts create obligations.[5] Sociologists argue that many forms of social exchange are based on a universal social norm that gifts have to be reciprocated. However most of the economics literature on social preferences assumes that these preferences are exogenously given and unaffected by the actions of other people. In this paper, we propose to extend existing models of outcome-based social preferences by endogenizing the reference group. The weight that the welfare of individual i gets in the utility function of person j depends on the actions taken by i that affect j. This simple model captures the intuition that a favorable act such as giving a gift strengthens the bond between the gift giver and the decision maker. We show that it is consistent with the observations in our experiments, including the

[4] This is consistent with Strassmair (2009) who also found that reciprocal behaviour is not affected by intentions. She considers a variant of the trust game in which the trustee can reciprocate only with some exogenously given probability. If this probability is high the trustor may expect a return for his initial gift, so his intention may be "selfish". If this probability is small the trustor cannot expect to get much in return, so his intention when giving the gift must be more "kind". However, the behavior of trustees is unaffected by the perceived kindness of the trustor.

[5] This is also expressed in many languages. For example, in English a synonym for "thank you" is "much obliged", in French "Je vous suis bien obligé", in German "Ich bin Ihnen zu Dank verpflichtet".

fact that decision makers punish the potential gift giver for not giving the gift and the client for not offering profit sharing.

In addition to the papers mentioned above (and the anthropological and sociological literature discussed in Section 7), our paper is related to three branches of the economics literature. First there is a large empirical literature on the effects of business gifts. Much of this literature focuses on the pharmaceutical industry. In a meta-study based on 29 empirical articles, Wazana (2000) concludes that gifts are "associated with increased prescription rates of the sponsor's medication" (p. 373). Campbell et al. (2007) conducted a survey of 3,167 physicians in six specialties and document the types of gifts given by the pharmaceutical industry and the nature of physician-industry interaction. Morgan et al. (2006) conducted a survey on physicians' opinions on whether it is ethical to accept gifts of the pharmaceutical industry and whether these gifts affect prescription behavior. The general conclusion from this literature is that business gifts are widespread and that they are effective. However, the empirical literature cannot disentangle the causal factors that explain why gifts work.

Second, there is a large experimental literature on gift exchange games, starting from Fehr, Kirchsteiger and Riedl (1993). Almost all of this literature considers the case where the gift exchange affects only the giver and the receiver of the gift, so there are no externalities. This literature has established that reciprocity is an important motive facilitating gift exchange. However, the theoretical explanations offered to explain reciprocity (e.g. altruism, inequality aversion, maximin preferences, type- and intention-based reciprocity) cannot explain reciprocal behavior in our experiment with externalities. A notable exception of a gift exchange game with externalities is Abbink et al (2002) and Abbink (2004) who consider an experimental "bribery game". In this experiment one player can bribe another player to take an action that is beneficial to him but has negative external effects on the "public" (i.e., all other participants in the experiment). With some probability the bribe is detected, in which case both parties are severely punished. Abbink et al. show that repeated interaction can sustain a bribery relationship and that the penalty threat significantly reduces corruption.[6] While Abbink and his coauthors are concerned about illegal "bribes" in a repeated relationship and how their enforcement is affected by repetition and the threat of punishment, we are interested in the effects of gifts that are legally and socially accepted in the absence of any repeated interaction or other monetary incentives.

[6] In Abbink et al. (2002) the "firm" and the "public official" play a repeated game over 30 periods. In Abbink (2004) "job rotation" is introduced, i.e. each firm is randomly matched to one of three public officials in each period. This weakens but does not eliminate repeated games effects.

A third related strand of the literature are field studies and experiments on the effects of gifts when third parties are involved. For example, Falk (2007) collaborated with a charitable organization and sent out different solicitation letters to 10,000 potential donors. One third of the letters contained no gift, one third contained a small gift, and one third a large gift. He finds that the small gift increases the frequency of donations by 17 percent and the large gift by 75 percent. Manacorda, Miguel and Vigorito (2009) estimate the impact of a large anti-poverty program in Uruguay on political support for the government that implemented it. Those households that benefited from the program are 11 to 13 percentage points more likely to favor the current government than those who did not benefit. These studies suggest that reciprocity effects are not restricted to the lab but extend to the field.

The rest of the paper is organized as follows: Section 2 describes the experimental design and the different treatments. Section 3 considers the most prominent recent economic theories of social preferences and shows that all of them predict that the decision maker should not favor the gift giver. Section 4 presents our main results. It compares the behavior of the decision makers in the Gift Treatment to their behavior in the Baseline and the No Externality Treatment. Furthermore, it analyzes whether decision makers are aware of how gifts affect their behavior, and it reports the questionnaire evidence on motives and beliefs. Section 5 considers the No Externality and the Incentive Treatment. Section 6 looks at the behavior of producers across all treatments and asks what affects their decision on whether or not to give the gift. Section 7 discusses how to explain the observed behavior and offers a new model of outcome-based social preferences with an endogenous reference group. Section 8 concludes.

2 Experimental Design and Procedures

There are two producers A and B each of whom wants to sell his product to a client. The client has to buy either product A or product B. He cannot make the choice himself but has to rely on an expert to make this decision on his behalf. We call the expert the decision maker (DM). The client pays DM a fixed wage for her services. If the decision maker chooses product A (product B, respectively), producer A (B) receives a (quasi-)rent $\Delta > 0$, while the other producer gets 0.[7] Before DM takes her decision one of the producers can pass on a small monetary gift to the decision maker. The gift is unconditional, there is no possibility to refuse the gift if it is passed, and subjects are anonymously re-matched after each round (imperfect

[7] The existence of a rent implies that there is imperfect competition between A and B at the time when they sell their product.

strangers design). The client is aware of the possibility that a gift may be given, but he does not know whether a gift was actually passed on, nor does he observe whether the decision maker chooses the product of the (potential) gift giver or the other product.

This set-up captures some key elements of situations where a client has to rely on an expert to make a decision on his behalf, and where the decision affects a third party that has an interest in influencing the decision maker. We focus on the case where the gift is small (such as a pen, a coffee mug, a bottle of wine, or an invitation for lunch), is given unconditionally, and where the parties interact only once. Such small gifts are common in many cultures and industries and, differently from bribes, are often legally and socially accepted.

In the experiment we implemented this set-up as follows. Each session has 24 subjects: 6 decision makers, 6 clients, 6 producers A, and 6 producers B. There are 20 periods. In each period the decision maker is anonymously matched with a new client and new producers A and B. At the beginning of each period one of the two producers is selected at random as the potential gift giver.[8] This producer receives one additional token from the experimenter that he can either keep or pass on to the decision maker in which case it doubles and DM receives two tokens. To simplify the exposition it will be convenient to relabel the producers and their products. In the following we speak of producer X (offering product X) if a producer is the potential gift giver in a given period and of Producer Y (offering product Y) if he is not the potential gift giver.

The products X and Y are 50/50 lotteries that differ in each period.[9] For example product X could be a lottery that yields a net profit of either 5 or 11 for the client, while product Y is a lottery that yields either 3 or 17. All lotteries are simple. They involve two outcomes that occur with equal probability, and all outcomes are natural numbers between 3 and 20. It is straightforward to compare them by expected value, by variance, or by first order stochastic dominance. We can classify the 20 periods (or decision problems) into four categories:

- In four periods the lotteries offered by producer X have an expected value that was six points smaller than the expected value of product Y (i.e. X is about 35 percent less valuable than Y) . Furthermore, in these periods product Y first order stochastically dominates product X, so every rational decision maker (no matter how risk averse or risk loving) prefers Y to X.

[8] We did not allow for the possibility that both producers can make a gift simultaneously, in which case the two gifts might simply neutralize each other.
[9] A table with all 20 lotteries is provided in Appendix B.

- In six periods the lotteries offered by producer X had a disadvantage in terms of expected value of two points. In these cases the lotteries could not be compared by FOSD.
- In six periods the lotteries X and Y had the same expected value (but differed in variance).
- In four periods product X had an two point advantage over product Y, so the product of producer X was actually better than the product of producer Y (in terms of expected value).

The use of lotteries as products allows us to explore two types of scenarios – situations in which one product clearly dominates the other product (X is FOSD by Y) and situations in which at least some measures of comparison differ, giving the decision maker some leeway in picking one or the other as the "better" product.

The potential gift giver must decide whether to pass on the gift before he learns what the products X and Y are in this period. Thus, the gift cannot be interpreted as a signal of product quality. The producer who sells his product gets a payoff of 16, the other producer gets 0. The producers do not learn which product the decision maker chooses. They are informed about their total payoff only after all 20 periods have been played. Thus there is no learning about the effectiveness of gifts, and producers' future behavior cannot be affected by giving or withholding the gift.

The decision maker is paid a fixed wage of 20 tokens per period "for taking a decision that is in the best interest of the client." The decision maker learns who the potential gift giver is and whether the gift was passed on. Then she sees the two lotteries and chooses one for her client. The decision maker's payoff is unaffected by the product she chooses, and she does not learn how the lotteries resolve.

The client does not know who the potential gift giver is and whether the gift was passed on. He observes the two products and is asked which of them he would have chosen if, hypothetically, he could have made the decision himself. He does not observe which product is actually chosen by the decision maker, nor does he observe the outcome of the lottery. At the end of the experiment he is informed only about the sum of his payoffs in all 20 periods.

The rules of the experiment and the information structure are common knowledge among all subjects. In particular, the instructions that are read aloud at the beginning of each session state explicitly that "(t)he client cannot observe the decision of the decision maker. At

the end of period 20 the client learns only the sum of all payoffs received during the experiment."

After 20 periods, subjects are asked to answer a questionnaire. In the first part, decision makers are asked to estimate how often their own decision and the decision of the other decision makers coincided with the preferred product of the clients. Similarly, clients and producers are asked to estimate how often the decision makers chose the product that the clients would have preferred. The answers to these questions are incentivized with a quadratic scoring rule. In the second part, we ask subjects about their motives for their own decisions and their beliefs about the motives of the other subjects. This will be discussed in more detail in Section 4.4.

In order to better understand how the gift affects the choices of the decision makers we compare the results of this *Gift Treatment* to three other treatments. In all of these treatments the same lotteries ("products") were used in the same sequence as in the Gift Treatment:

- *Baseline Treatment*: As a baseline for comparison we want to know how decision makers behave in a world without gifts. In the Baseline Treatment producers cannot send a gift to the decision maker and gifts are never mentioned. This treatment shows whether decision makers choose the products preferred by their clients if nobody tries to influence them. Comparing the Baseline Treatment to the Gift Treatment allows us to test both for the effect of gift giving and for the effect of not giving a gift (despite having the option) relative to a world without gifts.
- *No Externality Treatment:* In this treatment, there is no client and no fixed wage for the decision maker. DM buys the product for herself and is full residual claimant of the payoffs of the lottery she chooses. This treatment allows us to test to what extent the effect of the gift in the Gift Treatment is due to the fact that DM acts on behalf of a third party and does not have to bear the consequences of her decisions.
- *Incentive Treatment:* The client can choose whether to give DM 10 percent of his profit in addition to the fixed and exogenously given wage of 20. This treatment allows us to test whether offering financial incentives that align the interests of the client and the decision maker alleviates the effect of the gift.

We conducted 11 sessions with 24 participants in each session at MELESSA[10] of the University of Munich in 2010 and 2011. Subjects were undergraduate students of various

[10] MELESSA is the Munich Experimental Laboratory for the Economic and Social Sciences. All experiments were computerized with the software z-Tree (Fischbacher 2007). The recruitment was done with the software ORSEE (Greiner 2004).

disciplines from the University of Munich and the Technical University of Munich. Upon arrival at the lab subjects were randomly and anonymously assigned to the different roles. Sessions lasted about one hour. On average, subjects earned about €15 ($21), which includes a show-up fee of €4 ($5.60).

3 Behavioral Predictions

To guide our empirical analysis, we present a simple theoretical framework, which allows us to derive the predictions of existing theories of social preferences and reciprocity.

Suppose that the decision maker receives a gift from producer X. Is she then going to favor the gift giver or will she choose the product that is in the best interest of her client? The payoff of the decision maker is fixed and unaffected by her decision, including the payoff from the gift (since it is given prior to the decision). The traditional model of rational and self-interested behavior predicts that the decision maker is indifferent which decision to take, independently of whether the gift is given or not. Thus, if we want to explain why the gift systematically affects her decision we have to look for alternative models of human behavior.

In recent years several theories of such other-regarding behavior have been proposed. These theories model how a decision maker could be influenced by regards for the payoffs, the types or the intentions of the other players she interacts with.[11] In the context of our experiment the different theories come up with very different predictions. Outcome-based theories predict unambiguously that the decision maker should not be influenced by receiving the gift and should maximize the expected utility of her client. Type-based and intention-based theories have multiple equilibria that point in opposite directions. However, these theories make predictions about frequencies and about the players' beliefs that apply to all equilibria and that can be tested. The rest of this section makes these claims precise.

We assume that the decision maker is risk neutral and evaluates products *A* and *B* by their expected values.[12] We say that the decision maker "favors" producer *i* if she chooses product *i* no matter how it compares to product *j*, $\mathrm{i,j} \in \{\mathrm{X,Y}\}$, $i \neq j$. We say that DM favors the client if she chooses the product with the highest expected value for the client or, if both products have the same expected value, the product with the smaller variance. We assume that if the decision maker is indifferent between products she will buy the product that favors the

[11] See Fehr and Schmidt (2006) and Sobel (2005) for surveys of the literature on "social preferences".

[12] Most existing social-preference theories do not explicitly consider choices between lotteries. Since the experimental stakes are fairly small risk aversion should not affect decision making (see Rabin, 2000) and, at a first approximation, risk neutrality is not restrictive. Note also that in our experiment the decision maker never observes the outcome of the lotteries.

client.[13] Thus, in the standard, self-interest model the decision maker always chooses the product that favors the client.

Suppose first that the decision maker has outcome-based social preferences $U^{DM}\left(m^{DM}, m^{X}, m^{Y}, m^{C}\right)$, where m^{i} is the expected monetary payoff of player $i \in \{DM, X, Y, C\}$ and U^{DM} is invariant to permutations of $\left(m^{X}, m^{Y}, m^{C}\right)$. We consider the three forms of outcome-based social preferences that have received most interest in the literature: (i) Altruism in the specific form of Utilitarianism (e.g. Andreoni and Miller, 2002) assumes that the utility of the decision maker increases with the sum of the material payoffs of the other players, (ii) Maximin Preferences (e.g. Charness and Rabin, 2002) assume that DM's utility increases with the payoff of the worst-off in the group, and (iii) Inequality Aversion (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) assumes that DM dislikes to be worse off and (to a lesser degree) to be better off than the other players. Note that utilitarianism and maximin preferences are special cases of generalized altruism. Generalized altruism assumes that the utility function of a player weakly increases with the payoffs of all other players. In the set-up of our experiment, most results hold for any form of generalized altruism.[14]

> **Proposition 1 [Outcome-Based Social Preferences]:** Suppose that the decision maker is motivated by (i) altruism (utilitarianism), (ii) maximin preferences, or (iii) inequality aversion. Then we have:
>
> (a) In the *Baseline Treatment*, where no gift can be passed on, the decision maker always chooses the product that favors the client.
>
> (b) In the *Gift Treatment*, if producer X did pass on the gift, the decision maker chooses the product that favors the client.
>
> (c) In the *Gift Treatment*, if producer X did not pass on the gift, the decision maker favors the client if she is altruistic (utilitarian) or inequality averse, but favors producer Y if she has maximin preferences.

Proof: See Appendix A.

[13] This assumption is imposed frequently in principal-agent models in which the contracting game has multiple equilibria. It is confirmed by the results of the Baseline Treatment.

[14] Generalized altruism is sufficient to establish parts (a) and (b) of Proposition 1. In part (c) it matters whether DM cares more about the worst off in the group (i.e. the producer who does not make a sale) than about all other players.

The proof is not difficult and it is instructive to briefly go through the main arguments. In the Baseline Treatment the two producers are perfectly symmetric: one of them gets a payoff of 16 and the other one a payoff of 0. By choosing one or the other the decision maker cannot affect the payoff distribution of producers. She can only affect the expected payoff of the client. Moreover, we designed the experiment such that the payoff of the decision maker (either 20 or 22, depending on whether she receives a gift) is always (weakly) higher than the realized payoff of any other player in any state of the world. Thus, all three outcome based theories of social preferences predict that the decision maker favors the client. The same argument holds in the Gift Treatment when producer X passed on the gift. Again, DM cannot change the payoff distribution of producers, so she favors the client. Finally, if in the Gift Treatment X did not pass on the gift, then the payoff distribution of producers X and Y is (17,0) if DM chooses X and (1,16) if she chooses Y. For an altruistic (utilitarian) or inequality averse DM this does not matter; she still maximizes the client's expected payoff. But, if DM has maximin preferences, she maximizes the payoff of the worst off in the group and favors producer Y.[15]

Note that Proposition 1 implies that DM never favors X, no matter whether a gift is given or not. If she is utilitarian or inequality averse, DM always favors the client, so producer X will not pass on the gift. If DM has maximin preferences, she favors Y if the gift is not passed on. To prevent that Y is favored producer X passes on the gift, but this does not induce DM to favor X.

Consider now models of type-dependent preferences such as Levine (1998) and Gul and Pesendorfer (2010). Assume for simplicity that there are two types of players, a "kind" and a "selfish" type. A kind type cares positively about the payoffs of the other players if they are also kind, but he does not care about the payoff of a selfish player. A selfish type cares only about his own payoff. The type of a player is private information. It is common knowledge that for each player $i \in \{X, Y, C, DM\}$ the probability of being a kind type is given by $\mu^X = \mu^Y = \mu^C = \mu^{DM} = \mu$, with $0 < \mu < 1$. Let μ_i^j denote the (updated) belief of player i about the type of player j, $i, j \in \{X, Y, C, DM\}$, $i \neq j$. Then the expected utility of a kind player is given by

[15] If DM has maximin preferences that also account for the sum of all payoffs as in the formulation in Charness and Rabin (2002), she favors Y if she puts sufficiently high with on the payoff of the worst off; else she favors the client.

$$U^i(k) = m^i + \sum_{j \neq i} \mu_i^j \cdot \alpha \cdot m^j$$

where $\alpha > 0$ is the (common) degree to which a kind player *i* cares about the payoff of a kind player j.[16] The utility function of a selfish player simply is $U^i(s) = m^i$.

> **Propostion 2a:** Suppose that the decision maker has type-dependent preferences as described above. Any Perfect Bayesian Equilibrium in which the selfish type keeps the gift with positive probability requires that the difference between the probability that product X is chosen when the gift is given and the probability that X is chosen when the gift is not given is less than or equal 1/16.

The proof of this proposition is straightforward. Let p^{gg} denote the probability that DM chooses product X if the gift was given and p^{gng} the probability that DM chooses X if the gift was not given. A selfish producer X keeps the gift only if

$$1 + p^{gng} \cdot 16 \geq p^{gg} \cdot 16 \quad \Leftrightarrow \quad p^{gg} - p^{gng} \leq \frac{1}{16}$$

Thus, any equilibrium in which the selfish type keeps the gift with positive probability must have $p^{gg} - p^{gng} \leq 1/16$.

Proposition 2a implies that if $p^{gg} - p^{gng} > 1/16$ in the experiment then producer X cannot signal that he is the kind type by giving the gift because the selfish type will mimic him. (Below, we will show that, in our experiment, $p^{gg} - p^{gng} = 0.47 >> 1/16$.) In Appendix A we characterize the set of pooling and separating equilibria of this signaling game in Proposition 2b. For all these equilibria Proposition 2a must hold.

Consider now models of intention-based reciprocity (Rabin 1993; Dufwenberg and Kirchsteiger 2004). These models use psychological game theory (Geanakoplos, Pearce, and Stacchetti 1988) to capture the idea that players care not only about the action of the other players but also about their intentions. Psychological games with intention-based reciprocity are consistent with many interesting phenomena, but they also tend to have multiple equilibria. For example, if there are two players that can be kind or hostile to each other, it is

---

[16] We could have also assumed that a kind player *i* cares about the payoff of a selfish player *j* to the degree $\underline{\alpha}$, while he cares about a kind player *j* to the degree $\overline{\alpha}$, with $\underline{\alpha} < \overline{\alpha}$ and $(1-\mu)\underline{\alpha} + \mu\overline{\alpha} > 0$. This complicates the exposition but does not change the qualitative results.

an equilibrium that both players are kind because they expect the other player to be kind as well; but it is also an equilibrium that both players are unkind because they expect the other player to be unkind.

To apply intention-based reciprocity to our experiment we simplify the strategy space of DM. We allow DM to choose only between action X, i.e. choosing product X, and action C, i.e. choosing the product that maximizes the utility of the client. Because the experiment has a sequential structure we use the notion of "Sequential Reciprocity Equilibrium" of Dufwenberg and Kirchsteiger (2004), but the same result obtains if we apply Rabin's (1993) notion of fairness equilibrium to the normal form of the sequential game.

> **Proposition 3a:** Suppose that DM and X are motivated by intention-based reciprocity. If producer X passes on the gift, DM must conclude that X's intention is kind.

Proof: See Appendix A.

Passing on the gift must always be considered a "kind" act because it increases DM's payoff, while keeping the gift is always "unkind" because it reduces DM's payoff. This is independent of the strategies or beliefs of the players. In the experiment we ask the producers about their intentions when giving the gift and we ask the decision makers about their beliefs what these intentions are. This allows us to test this prediction.

In Appendix A we characterize the set of Sequential Reciprocity Equilibrium outcomes in Proposition 3b. We show that there are equilibria in which producers give the gift and equilibria in which they do not. However, in any equilibrium Proposition 3a must hold.[17]

4 The Effects of Gift Giving

4.1 Baseline: Decision-Making on Behalf of a Client without Gift Giving

[17] A related approach is "guilt aversion" (Charness and Dufwenberg, 2006). According to this theory people want to live up to the expectations of others, and they feel guilt if they let other people down. However, in the experiment neither the producer nor the client learned which product was chosen by DM. They only observe their total payoff at the end of the game. Thus, it is difficult to argue that they feel disappointed by DM's decision that they do not observe. But even if the noisy signal that they observe after 20 periods gives rise to disappointment the theory does not offer a clear prediction in our experiment. If product X is not the product that is best for the client then the decision maker has to disappoint either the expectations of the gift giver or the expectations of the client. Thus, guilt is unavoidable.

Decision makers are instructed to choose the product that is in the best interest of their clients. Before we can study how this decision is affected by gift giving of interested third parties, we have to see what happens if there are no gifts. Which products did clients prefer, and how difficult is it for decision makers to predict these preferences? The Baseline Treatment compares the preferences of clients to the actual choices of decision makers in the absence of the possibility of gift giving. This will serve as a natural benchmark for all other treatments.

A natural hypothesis is that a client prefers the producer offering the lottery with the highest expected value. Figure 1 shows that this is indeed the case. If producer X offers the lottery with the highest expected value 94 percent of the clients prefer product X. If producer X offers a lottery with an expected value that is 2 points smaller than the expected value of lottery Y, then only 8 percent of the clients would have chosen X. If X has a disadvantage of six points no client preferred X to Y as predicted by First Order Stochastic Dominance. Decision makers behave very similarly. In fact, there is no statistically significant difference in their actual choices to the preferred choices of the clients.[18] The overwhelming majority chooses the lottery with the highest expected value. If the two lotteries have the same expected value, clients and decision makers choose producer X in 41.7 and 43.1 percent of all cases, respectively. However, in this case only about two thirds of the subjects go for the lottery with the smaller variance. Therefore, we have more coordination failures in this case. This is summarized in Result 1.

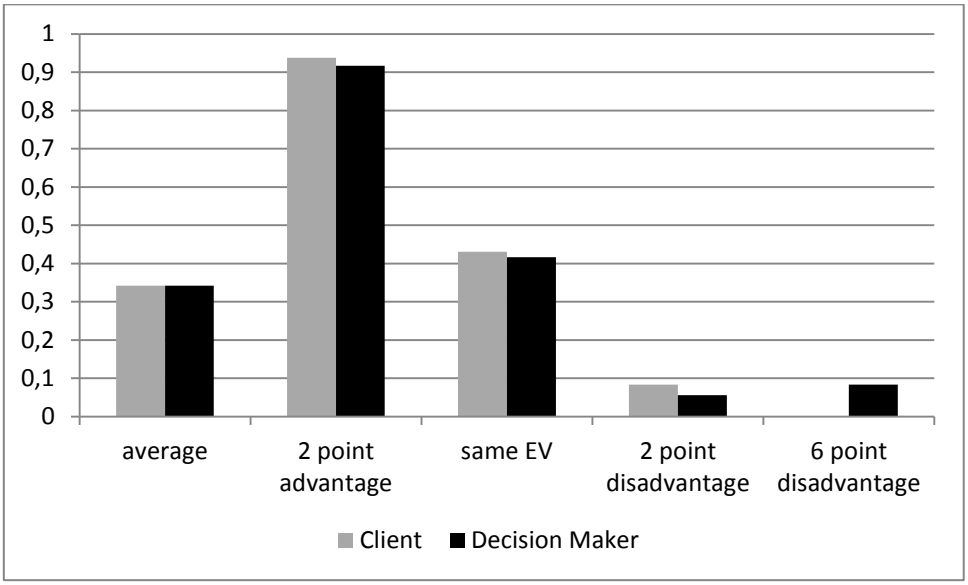

FIGURE 1: Percentage of Periods in which Producer X is chosen by

[18] A Wilcoxon-Mann-Whitney test comparing the decisions of DMs and the preferred choices of the clients does not reject the hypothesis that the two are drawn from the same distribution, both when expected values differ and when they are equal ($p = 0.912$ and $p = 0.618$).

Clients and Decision Makers in the Baseline Treatment

Result 1 (Decisions on Behalf of a Client): In the Baseline Treatment there is no statistically significant difference between the actual choices of DMs and the preferred choices of clients. If the two lotteries differ in expected value, the decisions of decision makers coincide with the preferred choices of clients in 92.3 percent of all cases (155 of 168). If the expected value is the same, the two decisions coincide in 56.9 percent (41 of 72) of all cases.

On average over all 20 periods clients preferred producer X in 34 percent of all cases (82 of 240) and decision makers chose producer X in 35 percent of all cases (85 of 240).[19]

4.2 Gift Giving

Consider now what happens if producer X can make a gift to the decision maker. In the Gift Treatment 71.5 percent of the potential gift givers passed on the gift to decision makers (343 out of 480 cases). Comparing the decisions of decision makers in the Gift Treatment (GT) to decisions in the Baseline Treatment (BT) we find:

Result 2 (Effects of Gift Giving): The behavior of decision makers is strongly affected by the possibility of passing on the gift.

(a) If the gift is given, DMs choose producer X much more often than in the Baseline Treatment. Even if product X has a large disadvantage as compared to product Y it is chosen in 50 percent of all cases.

(b) If the gift is not given, DMs choose producer X less often than in the Baseline Treatment. Even if the product of the potential gift giver is better in terms of expected value it is not chosen in more than 40 percent of all cases.

[19] Note that these numbers differ from 50 percent. The reason is that there are only 4 periods in which producer X (the "potential gift giver") offers a product with the higher expected value but 10 periods in which his product has the lower expected value; in six periods expected values are the same.In four of the six periods with equal expected values product X has a larger variance than product Y and in two periods it has a smaller variance. If the expected value is the same, about two thirds of the subjects (70.8 percent of the clients and 55.6 percent of DMs) choose the product with the smaller variance. Thus, risk aversion does not seem to play a big role which is confirmed by our regression results. This also explains why less than 50 percent of clients and decision makers choose product X when expected values are equal.

Support for Result 2 is offered by Figure 2 that compares the choices of the decision makers in the Baseline Treatment (middle bar) to the choices in the Gift Treatment when the gift was passed on and when the gift was not passed on.

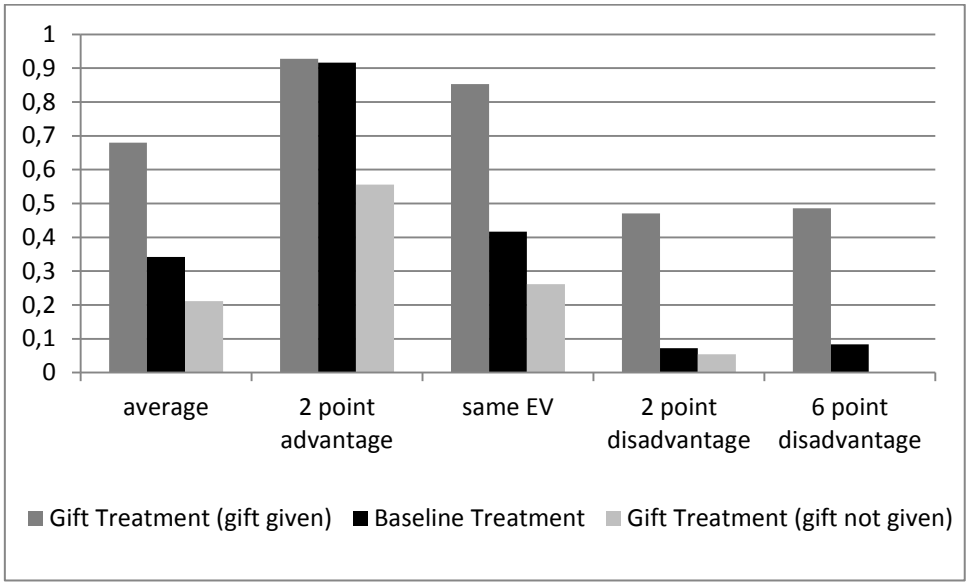

FIGURE 2: Percentage of Periods in which DMs choose Producer X in Baseline and Gift Treatment

Figure 2 shows that the overall effect of the gift is very large. In the Gift Treatment, decision makers opted for producer X (the potential gift giver) in 67.9 percent of all cases (233 of 343) when the gift was passed on, but only in 21.2 percent of all cases (29 of 137) when the gift was not passed on. In the Baseline Treatment producer X was chosen in 34.2 percent of all cases (82 of 240). This shows that decision makers strongly reciprocate to the gift by favoring the gift giver. Even more surprisingly there is also strong negative reciprocity if a gift could have been passed on but the potential gift giver chose to keep it.

Figure 2 also shows the effects of the gift for the four different types of decision problems classified by the difference in expected values of the two lotteries.

- If the lottery offered by the potential gift giver had a two point advantage in terms of expected value it was chosen in 91.7 percent of all cases (44 of 48) in the Baseline Treatment and in 92.8 percent of all cases (64 of 69) in the Gift Treatment when the gift was passed on. However, when the gift was not passed on, only 55 percent of the decision makers choose this product. Thus, more than 35 percent of DMs "punish" producers for not passing on the gift at the expense of the client.
- If the expected value of the two products is the same, 41.7 percent (30 of 72) of DMs choose producer X in the Baseline Treatment, but 85.3 percent (87 of 102) choose him

in the Gift Treatment if he passed on the gift, while only 27 percent choose him if he did not pass on the gift.

- If the expected value of product X is two or six points lower than the expected value of product Y, X is chosen in 5.6 (8.3, respectively) percent of all cases (4 of 72 and 4 of 48) in the Baseline Treatment and almost never in the Gift Treatment when the gift was not passed on (7.1 and 0 percent, i.e. in 3 of 42 and 0 of 26 of all cases). However, if producer X did pass on the gift, his product is chosen in 47.1 and 48.6 percent of all cases (48 of 102 and 34 of 70 of all cases). Recall that if the gift giver's product has a six point disadvantage it is first order stochastically dominated by product Y. Thus there can be no ambiguity what the preferred product of the client is. Nevertheless X is chosen almost half of the time when the gift was given.

These descriptive results are confirmed by the regression analysis reported in Table 1. Here we pooled the data of the Baseline Treatment and of the Gift Treatment. EVx is a dummy variable that takes the value 1 if the expected value of the product offered by the potential gift giver is x points higher than the expected value of the alternative product. The linear probability model (OLS) reports the probability that producer X was chosen when the gift was given (not given, respectively) as compared to the Baseline Treatment where no gift was available. Regression (1) looks at the overall effect of the gift. Gender has no significant effect, nor does the field of study (economics and business administration students versus others). There is no time trend in decision maker's inclination to choose the gift giver's product. Moreover, in unreported results we also find that there are no such trends conditional on receiving or not receiving the gift, i.e., the interaction of period and the "gift given" and the "gift not given" dummies are insignificant (and very small). Regression (2) controls for the differences in expected values between the two products in the different periods. It shows that even if product X has a two-point or six-point disadvantage as compared to product Y, decision makers reward producer X for passing on the gift by buying his product with a 40 percent higher probablity than in the Baseline Treatment. Furthermore, they punish the potential gift giver for not passing on the gift by choosing the inferior product Y of his competitor with a 36 percent higher probability even if X has a two point advantage over Y. These results are highly significant which is confirmed by the logit regressions (3) and (4).

TABLE 1—Probability that DM choses potential gift giver in BT and GT

	(1)	(2)	(3)	(4)
	OLS	OLS	Logit	Logit
EV+2	0.261***	0.500***	0.400***	0.542***
	(0.054)	(0.053)	(0.076)	(0.058)
EV-2	-0.341***	-0.361***	-0.439***	-0.529***
	(0.042)	(0.039)	(0.046)	(0.067)
EV-6	-0.335***	-0.333***	-0.417***	-0.428***
	(0.051)	(0.061)	(0.050)	(0.100)
gg (gift given)	0.333***	—	0.470***	—
	(0.059)		(0.079)	
gng (gift not given)	-0.132***	—	-0.237***	—
	(0.048)		(0.082)	
gg × EV0	—	0.436***	—	0.439***
		(0.062)		(0.054)
gng × EV0	—	-0.154*	—	-0.168*
		(0.082)		(0.090)
gg × EV+2	—	0.011	—	0.038
		(0.067)		(0.242)
gng × EV+2	—	-0.361***	—	-0.403***
		(0.120)		(0.081)
gg × EV-2	—	0.415***	—	0.516***
		(0.091)		(0.088)
gng × EV-2	—	0.016	—	0.067
		(0.050)		(0.204)
gg × EV-6	—	0.402***	—	0.457***
		(0.119)		(0.118)
gng × EV-6	—	-0.083*	—	—
		(0.047)		
female	0.050	—	0.083	—
	(0.044)		(0.075)	
economist	0.061	—	0.103	—
	(0.045)		(0.075)	
period	-0.002	—	0.003	—
	(0.003)		(0.004)	
constant	0.396***	0.417***	—	—
	(0.064)	(0.047)		
observations	720	720	720	694
(Pseudo) R^2	0.393	0.407	0.341	0.325

Notes: The table reports coefficients of OLS and Logit regressions (marginal effects). Standard errors are adjusted for clustering at the decision maker level. The dummy variable gng × EV-6 perfectly predicts the outcome in logit regression (4).

*** denotes significance at 1 percent, ** at 5 percent, and * at 10 percent.

4.3 Awareness

Are decision makers aware how strongly their behavior has been influenced by the gift? To answer this question we asked them at the end of the experiment to

> *"...estimate in how many periods the product that you chose coincided with the product your client would have chosen by himself"*

We also asked them to estimate in how many periods the other decision makers had chosen the preferred product of the client. Finally we asked the clients and the producers for their estimate of the performance of the decision makers. All subjects were paid for the precision of their estimates using a quadratic scoring rule.

The result is remarkable: In the Gift Treatment decision makers on average predict that they chose the preferred product of the client in 64.0 percent of all cases, clients predict that this was the case in 66.4 percent, and producers predict 65.3 percent. All of these estimates are very close to each other and to the actual frequency of 63.9 percent. Thus, neither DMs nor clients or producers seem to systematically overestimate or underestimate the actual quality of the decisions.[20] However, when decision makers are asked to estimate how often *other* decision makers chose the preferred product of the client their estimate drops to 57.9 percent. This difference is significant at the 10 percent level.[21]

When decision makers estimate how often they chose the right product of the client, they have to make two different assessments. First, they have to ask themselves how accurately they predicted the preferences of the client. Second they have to estimate how often they deviated from their best prediction under the influence of receiving (or not receiving) the gift. We can disentangle these two effects by considering DM's actual decisions and their estimates in the Baseline Treatment. In the Baseline Treatment decision makers estimate on average that they chose the most preferred product of the client in 69.2 percent of all cases. However, they did in fact choose the client's preferred product much more often, namely in 81.7 percent of all decisions. Thus, decision makers systematically

[20] A Wilcoxon signed rank test comparing the decisions of DMs and the predictions of their own behavior does not reject the hypothesis that the two are drawn from the same distribution ($p = 0.829$). A Wilcoxon-Mann-Whitney test comparing the decisions of DMs and the predictions of clients and producers does not reject the hypothesis that the two are drawn from the same distribution ($p = 0.764$ and $p = 0.791$).

[21] A Wilcoxon signed rank test comparing the decisions of DMs and the predictions of DMs about the behavior of the other DMs rejects the hypothesis that the two are drawn from the same distribution at the 10 percent level ($p = 0.096$).

underestimate their ability to correctly predict what the most preferred product of the client is by about 12.5 percentage points. Comparing their estimate in the Baseline Treatment (69.2 percent) to their estimate in the Gift Treatment (64.0 percent) the estimated effect of the gift is only 5.2 percent. However, if we compare the actual fraction of correct decisions in the Baseline Treatment (81.7 percent) to the actual fraction of correct decisions in the Gift Treatment (63.9 percent), we find that the actual effect of the gift is much larger, namely 17.8 percent. Thus, DMs overestimate their ability to resist the influence of the gift by 17.8-5.2=12.6 percent). This is almost identical to the amount by which DMs underestimate their ability to correctly predict the clients' preferences (12.5 percent)! Hence, the accurate prediction of their own behavior in the Gift Treatment is the result of two mistakes that cancel out each other. This is illustrated in Figure 4.

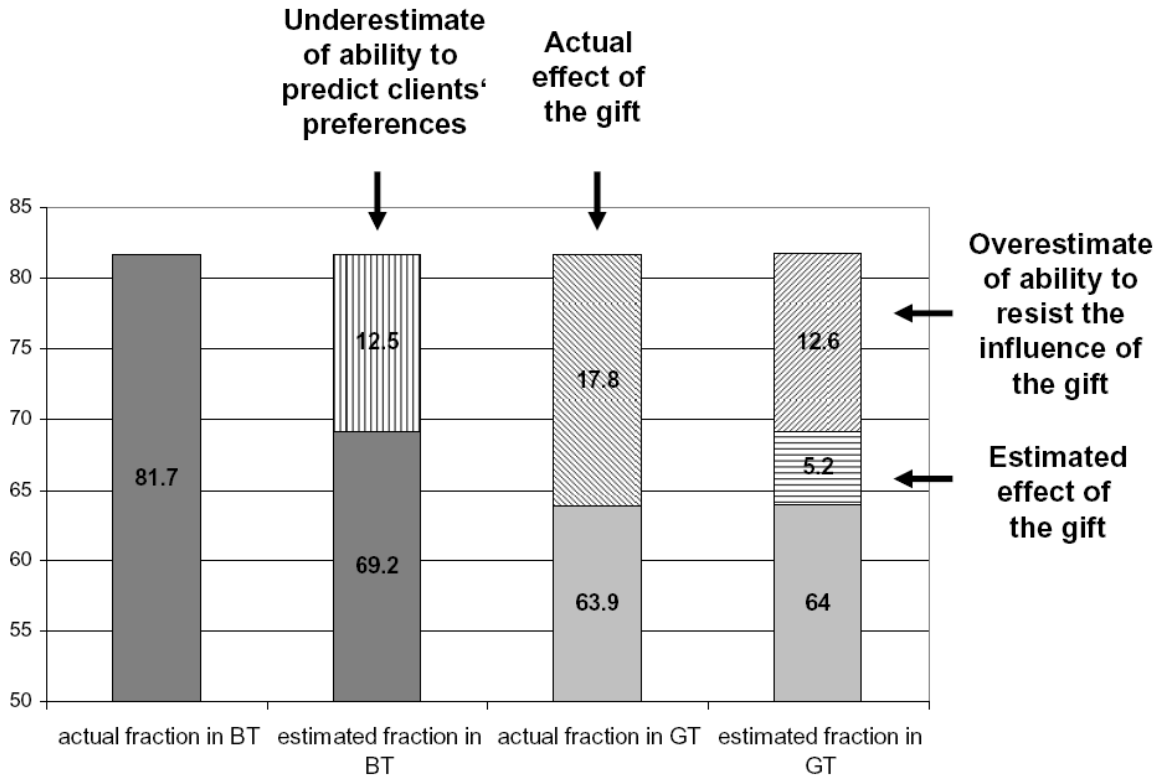

FIGURE 3: Actual and estimated quality of decisions in BT and GT

It is interesting to note that clients make the same mistakes. In the Baseline Treatment they estimate that the decision makers chose the right product in 69.6 percent of all cases, very similar to the prediction of the decision makers but far too low compared to the actual number of 81.7 percent. However, in the Gift Treatment their estimate is fairly accurate. Hence, by the same argument as above, clients must overestimate the ability of the decision makers to resist the influence of the gift in the Gift Treatment.

Finally, when decision makers are asked to estimate the fraction of correct decisions of the *other* decision makers in the Baseline Treatment, they believe that only 64.2 percent of these decisions match the preferred choices of the clients. This is 5.0 percent less than their estimate of the quality of their *own* decisions. In the Gift Treatment this difference was somewhat higher (6.1 percent). This suggests that decision makers believe that other decision makers make worse decisions than they do for two reasons: First, because they believe that they are better able to predict the preferred product of the client, and second because they believe that other decision makers are more strongly influenced by the gift.

> **Result 3 (Awareness):** Decision makers, clients and producers have an unbiased estimate of how often the decision maker picked the preferred product of the client in the Gift Treatment. However:
>
> (a) Subjects underestimate the ability of the decision maker to correctly predict the most preferred product of the client, but they overestimate the decision maker's ability to resist the influence of the gift. These two mistakes cancel out each other.
>
> (b) Decision Makers believe that other decision makers make worse decisions than they do because they believe that other DMs are less able to predict the client's preferences and are less resistant to the gift.

4.4 Questionnaire Evidence

Decision makers are at least partially aware that they are being influenced by the gift. What explains this influence? At the end of the experiment we asked the subjects several questions about their own motivation and the perceived motivation of the other players. Subjects had to answer these questions by choosing a natural number between 1 (= fully agree) and 6 (= do not agree at all). If the average of the reported numbers is below 3.5 subjects tend to agree with a statement, if the average is above 3.5 they tend to disagree. If a subject reports 1 or 2 (5 or 6) we say that this subject "strongly agrees" ("strongly disagrees") with the statement.

The first set of questions in the Gift Treatment refers to the motivation of the gift giver. When asked why the producers passed on the gift, almost all decision makers strongly agree with the statement that "The producer wants to influence my behavior" (1.42 on average). Most of them do not agree with the statement that "The producer wants to be nice to me" (3.92) or that the producer does so for efficiency reasons because the gift is doubled and

"my gain is larger than his" (4.71). Furthermore, they do not agree with the statement that if the producer did not pass on the gift he did so because he "does not want to leave the impression that he wants to influence my decision" (4.67). The answers of the clients to these questions were very similar.

These perceptions of decision makers and clients are strongly confirmed by the self-reported motivations of producers. Producers openly admit that they offered the gifts "to influence the decision of the decision maker in my favor" (1.82 on average), and not because they wanted to be nice (4.5) or for efficiency reasons (4.67). They also agree to the concern that "(H)ad I not passed on the premium to the decision maker he would not have bought my product" (2.59).

> **Result 4 (Actual and Perceived Motives for Gift Giving)**: Producers report that they pass on the gift because they want to influence the behavior of the decision maker and because they are afraid that otherwise the decision maker will not buy their product. They do not claim that they wanted to be nice or to increase efficiency. Decision makers and clients perceive this motivation correctly.

We have shown already that decision makers overestimate their ability to resist the influence of the gift. However, when asked directly whether their decisions have been influenced, the clear majority (62.5 percent) strongly agrees that their decisions have been affected, while only 20.8 percent strongly deny that they have been influenced. Furthermore, when asked whether they believe that other decision makers have been influenced, they agree with this statement even more strongly.[22] Decision makers were also confronted with the statement: "When one of the producers did not pass on the premium to me even though he could have done so, I did not buy his product". One quarter of the subjects strongly agreed with this statement.

What explains the influence of the gift? When asked whether they "liked a producer who passed on the premium better than the other producer" 45.8 percent of the decision makers strongly agree. When asked whether the gift giver "deserves that his product is bought", 33.3 percent strongly agree, and when asked whether they "felt obliged to buy the product" of the gift giver, 12.5 percent strongly agree. If we consider only those subjects who strongly agree with at least one of the three statements above, we find that all of them also

[22] The average response to the statement „My decisions have not been influenced" is 4.33 as compared to the average response of 4.46 to the statement "The decisions of the other decision makers have not been influenced".

strongly agree with the statement that the "The producer wants to influence my behavior". In fact, all but one of the decision makers who report an influence on their behavior strongly agree with this statement.

> **Result 5 (Emotions towards Gift Giver):** Almost two thirds of the decision makers strongly agree with the statement that their decisions have been influenced by the gift. Of those who admit that they have been influenced 80 percent report positive emotions towards the gift giver or a sense of obligation to buy his product. This is despite the fact that all of these 80 percent also strongly agree with the statement that the gift was passed on to influence their behavior.

5. Mitigating the Effects of the Gift Giving

5.1 The Effects of Gift Giving when there Are No Externalities

The effects of gift giving in the Gift Treatment are problematic because of the externality they impose. The decision maker is unaffected by the consequences of his decision that are fully borne by her client. An important question is whether gift giving has the same effect if there are no externalities, i.e., if the decision maker is full residual claimant of all financial consequences of her decisions. If this was the case, it would be more difficult to argue that gift giving induces inefficient behavior. However, if decision makers behave very differently if they act on their own account, the possibility of gift giving to people who take decisions on behalf of third parties is clearly welfare reducing.

In the No Externality Treatment (NET) there is no client. The decision maker decides on her own behalf and, instead of receiving a fixed wage, she is full residual claimant of all monetary consequences of her decision. We compare the decisions of decision makers in the No Externality Treatment to their choices in the Baseline Treatment and in the Gift Treatment.

> **Result 6 (No Externality Treatment):** If decision makers act on their own behalf, they choose the potential gift giver significantly more often when he passes on the gift than when he does not or when there is no possibility for passing on a gift. However, the effect is significantly less strong than in the Gift Treatment.

In the No Externality Treatment the gift was passed on by 49.1 percent (157 of 320) of the potential gift givers. Figure 4 compares the choices of decision makers when the gift was passed on to their choices when the gift was not passed on and to the choices of the decision makers in the Baseline Treatment.

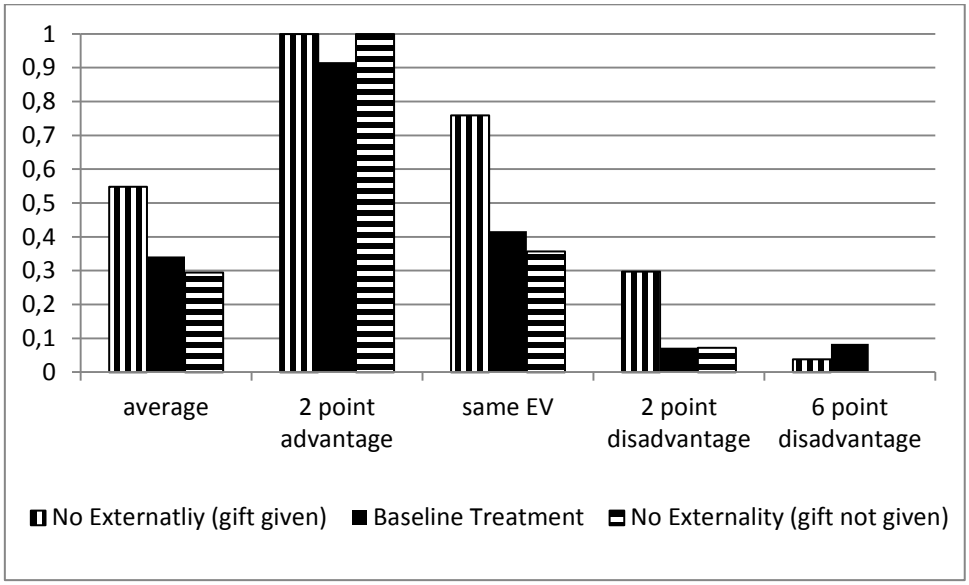

FIGURE 4: Percentage of Periods in which DMs choose Producer X in the No Externality Treatment compared to the Baseline Treatment

The result is qualitatively similar to Result 2. With no externalities decision makers opted for the potential gift giver in 54.8 percent of all cases (86 of 157) when the gift was passed on, but only in 28.8 percent of all cases (47 of 163) when the gift was not passed on. Thus, the gift still has a large effect, but the effect is smaller than in the Gift Treatment. A closer look at Figure 4 reveals that there are two main differences to Figure 2. First, when decision makers act on their own behalf they punish less often potential gift givers who did not pass on the gift. Second, when the difference in expected values of the two lotteries is large (6 point disadvantage of the potential gift giver) the influence of the gift vanishes. This is confirmed by regression (2) reported in Table 2 below.

There are two main conclusions to be drawn from these results. First, offering a gift is effective even when the decision maker acts on her own behalf. This is consistent with the large experimental evidence on gift exchange games without externalities. It also explains why many firms offer small gifts to their final customers. If the price or quality differences to competing products are not too large, these gifts may tip the balance and induce customers to buy from the gift giving firm.

Second, if there are no externalities the effect of the gift disappears when the product of the gift giver has a large disadvantage as compared to the competing product. This is not the case if DM acts on behalf of a client. If product X has a six point disadvantage compared to product Y, almost 50 percent of all decision makers in the Gift Treatment choose product X, while less than 5 percent do so in the No Externality Treatment. Thus, the differences in behavior are particularly strong when the external effect is very large. This suggests that gift giving can have a large negative impact on social welfare.

5.2 The Two-sided Sword of Profit Sharing

The gift induces many decision makers to favor the gift giver. To counteract this effect the client could align the payoff of the decision maker with his own payoff, e.g. by offering DM a share of his profits. In the Incentive Treatment (ICT) the client can decide whether to give DM a 10 percent share of his profits in addition to the fixed wage of 20 (without knowing whether the producer offers a gift or not). If profit sharing is offered the client loses 5 percent of his profits.[23] In the Incentive Treatment 25.4 percent of the clients decided to offer profit sharing. The effect of the option to offer profit sharing is remarkable:

> **Result 7:** If the client offers profit sharing the decision maker reacts positively to the gift but much less so than in the Gift Treatment. Furthermore, the effect of the gift vanishes when product X is much worse than product Y. This is very similar to her behavior in the No Externality Treatment.
> However, if the client does not offer profit sharing (but could have done so), the effect of the gift is even stronger than in the Gift Treatment, in particular when product X is much worse than product Y. Thus, DMs punish the client for not offering profit sharing.

Result 7 is supported by Figure 5 and regressions (3) and (4) in Table 2. The most interesting part of Figure 5 is when product X has a 2 point or 6 point disadvantage as compared to product Y. With a 2 point disadvantage decision makers who have been offered profit sharing reciprocate in about 30 percent of all cases to the gift, very similar to the No Externality Treatment but much less than in the Gift Treatment. With a six point disadvantage the effect of the gift completely disappears. However, if they have not been offered profit sharing they

[23] The client has to pay only 50 percent of the cost of offering incentives in order to keep his reward symmetric to the gift given producer X who also pays only 50 percent of the value of the gift to DM.

strongly favor the gift giver, even more often than in the Gift Treatment. If no profit sharing has been offered and there is a 6 point disadvantage of product X decision makers choose the gift giver in 67.9 percent of all cases!

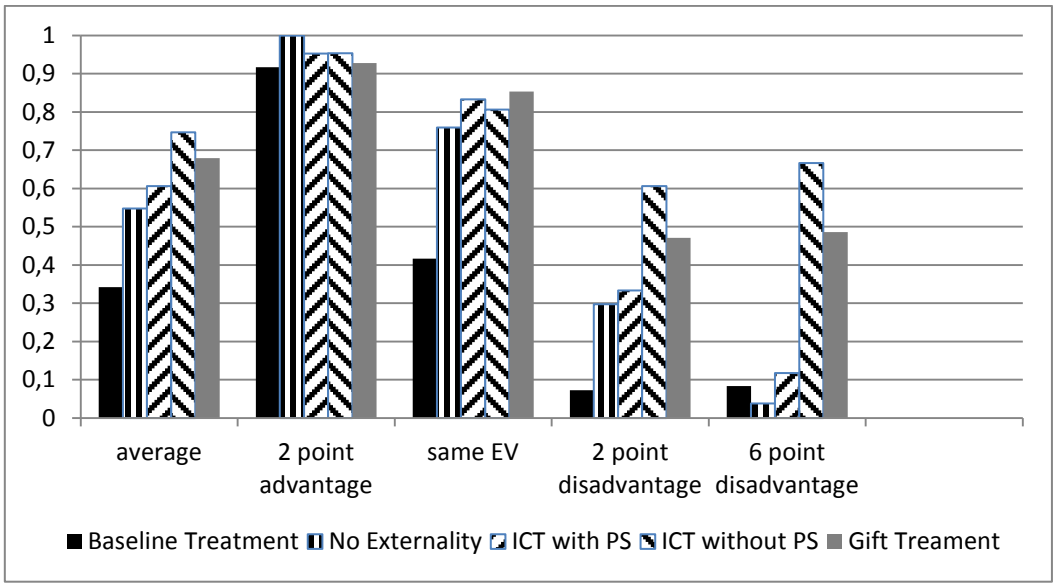

FIGURE 5: Percentage of Periods in which DMs choose Producer X when the gift has been given in BT, NET, ICT with profit sharing, ICT without profit sharing and GT

Regressions (3) and (4) in Table 2 confirm that these effects are statistically significant.

Table 2—Probability that DM chooses potential gift giver in GT, NET, and ICT with and without profit sharing as compared to BT

	GT	NET	ICT with profit sharing	ICT without profit sharing
	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
EV+2	0.500***	0.500***	0.500***	0.500***
	(0.053)	(0.053)	(0.053)	(0.053)
EV-2	-0.361***	-0.361***	-0.361***	-0.361***
	(0.040)	(0.040)	(0.040)	(0.040)
EV-6	-0.333***	-0.333***	-0.333***	-0.333***
	(0.061)	(0.061)	(0.061)	(0.061)
gg × EV0	0.436***	0.343***	0.417***	0.389***
	(0.062)	(0.072)	(0.077)	(0.085)
gng × EV0	-0.154*	-0.059*	-0.186	-0.167
	(0.082)	(0.093)	(0.137)	(0.107)
gg × EV+2	0.011	0.083**	0.036	0.037
	(0.067)	(0.035)	(0.056)	(0.047)

gng × EV+2	-0.361***	-0.093	-0.042	-0.767***
	(0.120)	(0.065)	(0.125)	(0.087)
gg × EV-2	0.415***	0.242***	0.278**	0.551***
	(0.091)	(0.086)	(0.115)	(0.102)
gng × EV-2	0.016	0.026	0.144	0.139
	(0.050)	(0.054)	(0.114)	(0.096)
gg × EV-6	0.402***	0.045	0.034	0.583***
	(0.119)	(0.073)	(0.106)	(0.111)
gng × EV-6	-0.083*	-0.083*	-0.083	0.292**
	(0.047)	(0.063)	(0.063)	(0.110)
Constant	0.417***	0.417***	0.417***	0.417***
	(0.047)	(0.047)	(0.047)	(0.047)
Observations	720	560	371	569
(Pseudo) R^2	0.407	0.490	0.487	0.396

Notes: The table reports coefficients of OLS regressions, clustering for decision makers. Robust standard errors are reported in parentheses. Note that the coefficients for EV+2, EV-2, EV-6 and constant refer to the BT only, so they must be identical in all regressions.
*** denotes significance at 1 percent, ** at 5 percent, and * at 10 percent.

In the questionnaire the large majority of subjects confirm that their behavior has been influenced by the additional profit sharing offered by the client. Almost all of them (95.7 percent) believe that the client offered the additional reward in order to give better incentives to choose the best product for him. Most clients strongly confirm that this is their dominant motive. Furthermore, 65 percent of decision makers agree with the statement that if they are not offered a profit share then they are also not obliged to choose the best product for the client.

The main conclusion from the results of the Incentive Treatment is that rewards that align the interests of the client with the interest of the decision maker can be highly effective. However, once decision makers are aware that clients could offer profit sharing they punish clients if they do not get the additional reward.

6. Decisions of Producers

Producers could choose whether to keep the gift to themselves or whether to pass it on the decision maker. Figure 6 shows the percentage of gift givers in the different treatments.

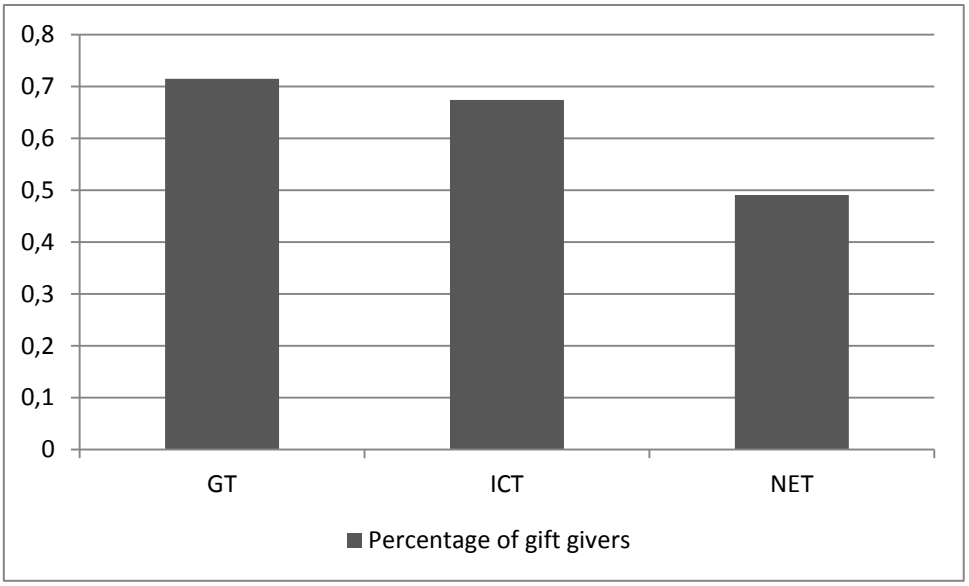

FIGURE 6: Percentage of Gift Givers

In the Gift Treatment 71.4 percent of the producers pass on the gift. In the Incentive Treatment this fraction is only slightly (and insignificantly) lower. While gift giving is less effective in the Incentive Treatment when there is profit sharing it is even more effective if the client chose not to offer profit sharing (which they did in 74.6 percent of all cases). In the No Externality Treatment the fraction of producers passing on the gift drops significantly to 49.1 percent. Thus, producers seem to have anticipated correctly that the gift is much less effective in this treatment. Table 3 below reports that passing on the gift significantly increases sales and profits in all treatments (with the smallest effect in the No Externality Treatment).

TABLE 3 — Gift giving, sales and profits of producers

	(1)	(2)	(3)	(4)	(5)	(6)
dependent variable	gift given	gift given	gift given	sold	sold	profit
type of regression	OLS	OLS	Logit	OLS	Logit	OLS
gift given	—	—	—	0.397***	0.403***	5.348***
				(0.026)	(0.025)	(0.423)
NET	-0.224***	-0.221***	-0.227***	-0.042	-0.052	-0.395
	(0.080)	(0.080)	(0.083)	(0.029)	(0.034)	(0.502)
ICT	-0.041	-0.042	-0.046	0.031	0.037	0.349
	(0.068)	(0.068)	(0.074)	(0.028)	(0.033)	(0.444)
producer A	0.035	0.043	0.045	0.074***	0.088***	1.233***
	(0.060)	(0.061)	(0.064)	(0.023)	(0.028)	(0.385)
female	—	-0.093	-0.096	0.004	0.006	0.013
		(0.065)	(0.067)	(0.024)	(0.029)	(0.399)

economist	—	0.006	0.004	-0.007	-0.007	-0.198
		(0.079)	(0.083)	(0.035)	(0.041)	(0.561)
period	—	-0.001	-0.001	-0.006***	-0.007***	-0.077**
		(0.002)	(0.002)	(0.002)	(0.002)	(0.041)
constant	0.697***	0.762***		0.288***		7.605***
	(0.058)	(0.072)		(0.037)		(0.632)
observations	1260	1260	1260	1260	1260	1260
(Pseudo) R^2	0.037	0.046	0.035	0.166	0.125	0.118

Notes: The table reports coefficients of OLS and logit regressions (marginal effects), clustering for producers. Robust standard errors are reported in parentheses.
*** denotes significance at 1 percent, ** at 5 percent, and * at 10 percent.

7. What Explains the Observed Reciprocal Behavior?

The experimental results show a clear pattern of reciprocal behavior. Decision makers favor producer X if he gives the gift and discriminates against him if he does not. However, the most prominent theories of social preferences cannot explain these observations. In Section 3 we have shown that (given the parameters of the experiment) altruism, maximin preferences and inequality aversion predict that DM favors the client, not the gift giver. Type-based reciprocity predicts that both the kind and the selfish type will pass on the gift if passing on the gift increases the probability that product X is chosen by more than 6.25 percent. This probability increases by almost 50 percent in the Gift Treatment, so it is impossible to infer the producer's type from his decision. Intention-based reciprocity implies that giving the gift must signal "kind intentions", but decision makers are fully aware that the dominant intention for gift giving is that producers want to influence their behavior to the detriment of their clients.

Why is gift giving so effective? Decision makers report that they feel more positive towards the gift giver, even though they understand that the dominant reason for giving the gift is to influence their behavior. This suggests that the gift establishes a bond between the gift giver and the receiver of the gift.[24] The anthropological and sociological literature is well aware of this effect, [25] but it has been widely neglected in the economic literature so far.

[24] This is reflected in a German synonym for "thank you": "Ich bin Ihnen sehr verbunden" (literally: "I am bound to you"), and similarly in French "Je vous suis très obligé" and in English "Much obliged."
[25] Anthropologists claim that reciprocity is the essential lubricant to sustain social exchang. Malinowski (1922), in a path breaking field study of the Trobrianders (islanders in the Western Pacific), distinguishes 80 different forms of social and economic exchange. He concludes that they are all based on reciprocity. In a highly influential essay Mauss (1924) argued that in archaic societies humans are under an *obligation to give, to receive, and then to repay*. Sociologists such as Gouldner (1960) and Blau (1964) argue that reciprocity is a universal social norm that is not just enforced by social pressure and self-interest to maintain a mutually

In the following we suggest a simple model that accounts for the reciprocal behavior in the Gift Treatment but also for the observations made in the control treatments. The model extends standard outcome based social preferences by endogenizing the reference group. The basic idea is that a gift creates a bond between the giver and the recipient of the gift. Before the gift is given the decision maker is equally concerned about the welfare of all other players. However, once he receives the gift the welfare of the gift giver gets a higher weight in DM's utility function. If DM knows that one of the producers could have given a gift but chose not to do so, the weight of this producer in DM's utility function is reduced. Similarly, if the client offers (does not offer) profit sharing to DM the bond between DM and the client is strengthened (diminished) and the client's welfare gets a higher (lower) weight in DM's utility function.[26]

More formally, consider an N-player game of perfect information in which each player $i \in \{1,...,N\}$ chooses strategy s_i out of his strategy set S_i. Let $s = (s_1,...,s_N)$ denote a pure strategy profile of all players. The utility of player i is given by

$$U^i = m^i(s) + \sum_{j \neq i} \alpha_i^j(s|\sigma) \cdot m^j(s)$$

where $\alpha_i^j(s|\sigma)$ is the weight that player i puts on the payoff of player j. Thus, the utility of player i depends not only on his own (expected) material payoff $m^i(s)$, which is a function of the strategies chosen by all players, but also on the (expected) material payoffs of all other players.[27] Furthermore, the weights of these payoffs in player i's utility function depend on the strategies chosen by these players as compared to the "expected" strategy profile σ. The "expected" strategy profile is a (possibly mixed) strategy profile that players expect to be played in the game under consideration, e.g. because of past experience in similar circumstances, or because σ constitutes a social norm, or because σ is an equilibrium of the game that players expect to be played.

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beneficial relationship in the future, but is often *internalised*. This is confirmed by experiments in social psychology (Whatley et al. 1999). People tend to have positive emotions towards the gift giver and feel a sense of "moral indebtedness" (Kolm 2006) to repay the gift. Many people are willing to comply with requests from those who have done them a favor, even if the favor was unsolicited and if they do not like the gift giver (Regan 1971, Cialdini 1993).

[26] The idea of endogenous reference groups is related to the idea of "social ties" developed by van Dijk and van Winden (1997). They are interested in the dynamics of a repeated public good game and model a social tie as a capital good in the utility function that parties can invest in and that depreciates over time. The idea is also related to Cox et al (2008) who propose a model that may be called "action-based reciprocity". They assume that if a first mover takes an action that increases the maximum attainable payoff of a second mover, then the second mover's preferences will become more altruistic towards the first mover. Their model is restricted to two stage games with two players and with perfect information, so the reference group is trivially restricted to the two players and the model is not directly applicable to our set-up.

[27] As in Section 3 we assume that all parties are risk neutral.

Assumption: If player *j* chooses a pure strategy s_j that increases (reduces) player *i*'s payoff compared to the payoff that player *i* would have received if player *j* had chosen the expected strategy σ_j, then the weight that player j's payoff has in the utility function of player i increases (decreases) as compared to his weight if he had chosen σ_j, i.e.

$$m_i(s_j \,|\, \sigma_{-j}) \geq m_i(\sigma_j \,|\, \sigma_{-j}) \quad \Leftrightarrow \quad \alpha_i^j(s_j, \sigma_{-j} \,|\, \sigma) \geq \alpha_i^j(\sigma \,|\, \sigma) .$$

Let us apply this simple model to our gift giving game. Suppose that in the Baseline Treatment where no gift can be made the decision maker puts equal weight on the client and on producers X and Y, i.e. $\alpha^C = \alpha^X = \alpha^Y = \alpha > 0$. Therefore, in the Baseline Treatment DM favors the client. Consider now the Gift Treatment and suppose DM expects that the gift is given with probability $\sigma^X \in (0,1)$. Thus, if producer X passes on the gift, DM's payoff increases (to 22) as compared to what he expected ($20 + 2 \cdot \sigma^X$), so the weight that he attaches to the welfare of producer X also increases, i.e. $\alpha^X(gg \,|\, \sigma^X) > \alpha$. On the other hand, if producer X keeps the gift to himself, DM's payoff decreases as compared to what he expected, so the weight that he attaches to producer X decreases, i.e. $\alpha^X(gng \,|\, \sigma^X) < \alpha$. Similarly, in the Incentive Treatment DM expects that the client offers profit sharing with probability $\sigma^C \in (0,1)$. Thus, if profit sharing is offered, DM's payoff increases by $0.1 \cdot m^C$ as compared to the expected increase of $\sigma^C \cdot 0.1 \cdot m^C$. Hence, the weight that she attaches to her client increases to $\alpha^C(ps \,|\, \sigma) > \alpha$ if profit sharing is offered and decreases to $\alpha^C(nps \,|\, \sigma) < \alpha$ if profit sharing is not offered. In the following Proposition we assume for simplicity that $\alpha^X(gg \,|\, \sigma^X) = \alpha^C(ps \,|\, \sigma^C) = \overline{k} \cdot \alpha$ that $\alpha^X(gng \,|\, \sigma^X) = \alpha^C(nps \,|\, \sigma^C) = \underline{k} \cdot \alpha$, where $\alpha < 1$. The parameters $\overline{k} \geq 1$ and $\underline{k} \leq 1$ are individual characteristics that are distributed across subjects according to some cdfs $F(\overline{k})$ and $G(\underline{k})$.

Let $\Delta = m^C(Y) - m^C(X)$ denote the disadvantage of product X as compared to product Y (in terms of expected values) and let $s = 0.1$ denote the share of the client's profits offered to DM in the Incentive Treatment. Then we have:

Proposition 5a: Suppose that the decision maker has outcome-based social preferences over an endogenously formed reference group, and suppose that producer X has given the gift.

(a) In GT DM chooses X if and only if $\bar{k} \geq \frac{16+\Delta}{16}$.

(b) In NET DM chooses X if and only if $\bar{k} \geq \frac{16\alpha+\Delta}{16\alpha} > \frac{16+\Delta}{16}$, i.e. DM is less likely to favor X than in GT.

(c) In ICT, if C has offered profit sharing, DM chooses X if and only if $\bar{k} \geq \frac{16\alpha+s\Delta}{16\alpha-(1-s/2)\alpha\Delta} > \frac{16+\Delta}{16}$, i.e. DM is less likely to favor X than in GT.

However, if C has not offered profit sharing, DM chooses X if and only if $\bar{k} \geq \frac{16+\underline{k}\cdot\Delta}{16}$, i.e. DM is more likely to favor X than in GT.

(d) Suppose that C has offered profit sharing in ICT. Then there exists $\bar{k} > 1$ such that DM does not favor X in ICT even though he does favor X in NET if and only if $\Delta \geq 16\cdot\left(\frac{2\cdot(1-s)}{2-s}-\alpha\right)$..

The proof is relegated to the Appendix. There we also report Proposition 5b that complements Proposition 5a and shows that DM favors producer Y if the gift was not given, but less so in ICT and NET than in GT.

The intuition for these results is as follows. In GT, if producer X passes on the gift, his weight in DM's utility function increases from α to $\bar{k}\cdot\alpha$. Thus, if $\bar{k}$ is sufficiently large, DM will favor X even though he offers the worse product. In NET there is no client. Here DM has a financial incentive to choose the better lottery. However, if Δ is small and $\bar{k}$ is sufficiently large, the decision maker favors producer X, because the financial cost of reciprocity is small while the gift giver gains 16. In ICT, if the client has offered profit sharing, the client's weight in DM's utility function increases, partially neutralizing the effect of the gift. Furthermore, DM has a small monetary incentive to choose the better lottery. Nevertheless, if Δ is small, i.e. product X is not much worse than product Y, and if $\bar{k}$ is sufficiently large, the decision maker may still favor producer X, because the gift giver gains 16 while the client loses only Δ if X is chosen. However, if the client does not offer profit sharing even though he could

have done so, the client's weight in DM's utility function is reduced and he is even more likely to favor X than in GT.

If DM favors producer X in NET it seems natural that he will also favor him in ICT with profit sharing. After all, in NET he bears 100 percent of the cost of the favor while he bears only 10 percent in ICT. However part (d) of the Proposition shows that this need not be the case. The reason is that favoring X is more costly to DM in ICT than in NET because in ICT favoring X imposes a cost not only on herself but also on the client, while in NET the cost accrues only to herself.

8. Conclusions

This paper fills a critical gap in the literature on social preferences by extending the analysis to situations where reciprocal behavior gives rise to negative external effects. In these situations a person may be "kind" to a decision maker because he wants to influence her decision in his favor at the detriment of a third party. Such situations are common in many industries (business-to-business gifts) and other settings (such as lobbyism), but the motivating behavioral forces are underexplored.

We have shown that the possibility of gift giving *causes* a change in behavior. If a gift is given the decision maker tends to favor the gift giver, if no gift is given the decision maker tends to discriminate against him, both at the expense of the third party. Gift giving is also effective when the decision maker buys the product for herself, but the effect is much weaker, in particular when product X is much worse than product Y. This suggests that offering financial incentives that align the interests of the decision maker and her client may mitigate the negative external effects of gift giving. This is indeed the case, but introducing the possibility of financial incentives is a two-sided sword. Once decision makers are aware that additional rewards can be offered they expect them to be given and punish the client for not doing so.

The most prominent existing theories of social preferences fail to explain the observed behavior. They do not capture the fact that a gift creates an obligation that is largely independent of the intentions of the gift giver and the distributional consequences. One possibility to model this is a model of outcome based social preferences in which the reference group is formed endogenously. By giving or withholding a gift the potential gift giver receives a larger or smaller weight in the utility function of the decision maker.

How to deal with business gifts is an important economic policy issue that has received a lot of attention. Our results show that small gifts can have a large impact, even if they are given unconditionally in a one-shot relationship and if the gift cannot convey any information. In a follow-up project we want to analyze more systematically how gift giving is affected by different policy proposals such as various disclosure policies or regulations that limit the size of business gifts.

References

Abbink, Klaus; Irlenbusch, Bernd and Elke Renner. 2002. "An Experimental Bribery Game." *Journal of Law, Economics, and Organization,* Vol. 18, 428–454.

Abbink, Klaus. 2004. "Staff rotation as an anti-corruption policy: an experimental study." *European Journal of Political Economy,* Vol. 20, 887–906.

Akerlof, George A. 1982. "Labor Contracts as Partial Gift Exchange." *The Quarterly Journal of Economics*, 97(4): 543–69.

Andreoni, James and John H Miller. 2002. "Giving According to GARP: An Experimental Test of the Consistency of Preferences for Altruism." *Econometrica,* Vol. 70, 737–753.

Blau, Peter. 1964. *Exchange and Power in Social Life*. New York: Wiley.

Blumenthal, David. 2004. "Doctors and Drug Companies." *N Engl J Med,* Vol. 351, 1885–1890.

Bolton, Gary E and Axel Ockenfels. 2000. "ERC: A Theory of Equity, Reciprocity, and Competition." *The American Economic Review,* Vol. 90, 166–193.

Campbell, Eric G; Gruen, Russell L; Mountford, James; Miller, Lawrence G; Cleary, Paul D and David Blumenthal. 2007. "A National Survey of Physician-Industry Relationships." *New England Journal of Medicine,* Vol. 356, 1742–1750.

Charness, Gary and Martin Dufwenberg. 2006. "Promises and Partnership." *Econometrica,* Vol. 74, 1579–1601.

Charness, Gary and Matthew Rabin. 2002. "Understanding Social Preferences with Simple Tests." *The Quarterly Journal of Economics,* Vol. 117, 817–869.

Cialdini, Robert B. 1993. "Influence: The Psychology of Persuasion." New York: Quill William Morrow.

Cox, James C; Friedman, Daniel and Vjollca Sadiraj. 2008. "Revealed Altruism." *Econometrica,* Vol. 76, 31–69.

Dana, Jason and George Loewenstein. 2003. "A Social Science Perspective on Gifts to Physicians From Industry." *JAMA,* Vol. 290, 252–255.

Dufwenberg, Martin and Georg Kirchsteiger. 2004. "A Theory of Sequential Reciprocity." *Games and Economic Behavior,* Vol. 47, 268–298.

Falk, Armin. 2007. "Gift Exchange in the Field." *Econometrica,* Vol. 75, 1501–1511.

Fehr, Ernst; Kirchsteiger, Georg and Arno Riedl. 1993. "Does Fairness Prevent Market Clearing? An Experimental Investigation." *Quarterly Journal of Economics,* Vol. 108, 437–459.

Fehr, Ernst and Klaus M Schmidt. 1999. "A Theory of Fairness, Competition and Cooperation." *Quarterly Journal of Economics,* Vol. 114, 817–868.

Fehr, Ernst and Klaus M Schmidt. 2006. "The Economics of Fairness, Reciprocity and Altruism - Experimental Evidence and New Theories." In: Kolm, Serge-Christophe; Ythier, Jean Mercier (eds..): *Handbook on the Economics of Giving, Reciprocity and Altruism, Vol. 1.* Amsterdam: Elsevier, 615–691.

Fischbacher, Urs. 2007. "z-Tree: Zurich Toolbox for Ready-made Economic Experiments." *Experimental Economics,* Vol. 10, 171–178.

Geanakoplos, John; Pearce, David and Ennio Stacchetti. 1989. “Psychological games and sequential rationality.” *Games and Economic Behavior,* Vol. 1, 60–79.

Gneezy, Uri and John List. 2006. “Putting Behavioral Economics to Work: Testing for Gift Exchange in Labor Markets Using Field Experiments.” *Econometrica*, 74(5): 1365–84.Gouldner, Alvin W. 1960. “The Norm of Reciprocity: A Preliminary Statement.” *American Sociological Review,* Vol. 25, 161–178.

Grande, David. 2009. “Limiting the Influence of Pharmaceutical Industry Gifts on Physicians: Self Regulation of Government Intervention.” *Journal of General Internal Medicine,* Vol. 25, 79–83.

Greiner, Ben. 2004. “An Online Recruitment System for Economic Experiments.” In: Kremer, Kurt; Macho, Volker (eds.): *Forschung und wissenschaftliches Rechnen.* Göttingen (GWDG Bericht 63), 79–93.

Gul, Faruk and Wolfgang Pesendorfer. 2010. “The canonical type space for interdependent preferences.” Princeton Univerisity,

Katz, Dana; Caplan, Arthur L and Jon F Merz. 2003. “All Gifts Large and Small.” *The American Journal of Bioethics,* Vol. 3, 39–46.

Kolm, Serge-Christophe. 2006. “Reciprocity: Its Scope, Rationales and Consequences.” In: Kolm, Serge-Christophe; Ythier, Jean Mercier (eds.): *Handbook of the Economics of Giving, Altruism and Reciprocity,* 23. Foundations. Volume 1. Amsterdam: North-Holland (Handbooks in economics), 371–541.

Levine, David K. 1998. “Modeling Altruism and Spitefulness in Experiments.” *Review of Economic Dynamics,* Vol. 1, 593–622.

Malinowski, Bronislaw. 1922. *Argonauts of the Western Pacific.* London: Routledge & Kegan Paul.

Manacorda, Marco, Edward Miguel, and Andrea Vigorito. 2011. "Government Transfers and Political Support." *American Economic Journal: Applied Economics*, 3(3): 1–28.

Mauss, Marcel. 1990 [1924]. *The Gift. The Form and Reason for Exchange in Archaic Societies.* London: Routledge & Kegan Paul; Routledge.

Morgan, M. A; Dana, Jason and George Loewenstein. 2006. “Interactions of Doctors with the Pharmaceutical Industry.” *Journal of Medical Ethics,* Vol. 32, 559–563.

Murphy, Patrick E. 1995. “Corporate ethics statements: Current status and future prospects.” *Journal of Business Ethics,* Vol. 14, 727–740.

Rabin, Matthew. 1993. “Incorporating Fairness into Game Theory and Economics.” *The American Economic Review,* Vol. 83, 1281–1302.

Rabin, Matthew. 2000. “Risk Aversion and Expected-utility Theory: A Calibration Theorem.” *Econometrica,* Vol. 68, 1281–1292.

Regan, Dennis T. 1971. “Effects of a Favor and Liking on Compliance.” *Journal of Experimental Social Psychology,* Vol. 7, 627–639.

Sobel, Joel. 2005. “Interdependent Preferences and Reciprocity.” *Journal of Economic Literature,* Vol. 43, 392–436.

Steinman, Michael A; Shlipak, Michael G and Stephen J McPhee. 2001. “Of principles and pens: attitudes and practices of medicine housestaff toward pharmaceutical industry promotions.” *The American Journal of Medicine,* Vol. 110, 551–557.

Strassmair, Christina. 2009. "Can Intentions Spoil the Kindness of a Gift? - An Experimental Study," mimeo.

Susman, Thomas M. 2008. "Private Ethics, Public Conduct. An Essay on Ethical Lobbying, Campaign Contributions, Reciprocity, and the Public Good". *Stanford Law and Policy Review,* Vol. 19, 10–22.

Van Dijk, Frans and Frans van Winden. 1997. "Dynamics of Social Ties and Local Public Good Provision." *Journal of Public Economics*, 64(3): 323–41.

Wazana, Ashley. 2000. "Physicians and the Pharmaceutical Industry: Is a Gift Ever Just a Gift?" *JAMA,* Vol. 283, 373–380.

Whatley, Mark A; Webster, J. M; Smith, Richard H and Adele Rhodes. 1999. "The Effect of a Favor on Public and Private Compliance: How Internalized is the Norm of Reciprocity." *Basic and Applied Social Psychology,* Vol. 21, 251–259.

Appendix A

Before proving Proposition 1 we have to properly define the three types of social preferences that we consider.

(i) *Altruism* (*Utilitarianism*): A decision maker is utilitarian if her utility function is strictly increasing in $\left(m^X + m^Y + m^C\right)$, i.e. $\dfrac{\partial U^{DM}\left(m^{DM}, m^X + m^Y + m^C\right)}{\partial\left(m^X + m^Y + m^C\right)} > 0$.

(ii) *Maximin Preferences*: The decision maker has maximin preferences if

$$U^{DM} = (1-\lambda)\cdot m^{DM} + \lambda \cdot \min\left\{m^{DM}, m^X + m^Y + m^C\right\} > 0,$$

where $0 < \lambda < 1$. Thus, if m^{DM} is unaffected by DM's decision, she maximizes the payoff of the player who is worst off in the group.[28]

(iii) *Inequality Aversion*: The decision maker is inequality averse if she wants to minimize the payoff differences between her own payoff and the payoffs of each of the other players (Fehr and Schmidt, 1999), i.e.,

$$U^{DM} = m^{DM} - \frac{\alpha}{3}\sum_j \min\left\{m^j - m^{DM}, 0\right\} - \frac{\beta}{3}\sum_j \min\left\{m^{DM} - m^j, 0\right\} \text{ with } j \in \{X, Y, C\},$$

where $0 < \beta \le \alpha$. An alternative formulation is that she wants to minimize the difference between her own payoff and the average payoff of the other players (Bolton and Ockenfels, 2000), i.e.,

$$U^{DM} = U^{DM}\left(m^{DM}, m^{DM} \Big/ \sum_j m^j\right) \text{ with } j \in \{DM, X, Y, C\},$$

where $\dfrac{\partial U^{DM}}{\partial m^j} > 0$, $j \in \{X, Y, C\}$ if $m^{DM} \Big/ \sum_j m^j > \dfrac{1}{4}$. Note that the material payoff of the decision maker is 20 plus the gift, which is (weakly) greater than the material payoff that any other player can get in any state of the world, and strictly greater than the average payoff of all other players in any state of the world. Thus, like an altruist, an inequality averse decision maker always wants to increase the material payoffs of the other players.

Proof of Proposition 1: We consider the three cases of the proposition in turn. Note that in all cases the decision maker cannot affect his own material payoff.

(a) Baseline Treatment. The decision maker cannot affect the distribution of material payoffs of the two producers: One of them must get 0 and the other one must get 16. However, the

[28] Charness and Rabin (2002) consider the case where the decision maker maximizes a weighted sum of his own payoff, the sum of all payoffs and the payoff of the worst off in the group. Thus, this is a convex combination of utilitarianism and maximin preferences. The extension of our results to this case is straightforward.

decision does affect the payoff of the client. Since DM's payoff is always weakly greater than the realized payoff of any other player (and strictly greater than the average of the other players' payoffs), all three outcome-based preference models predict that DM maximizes the payoff of the client.

(b) Gift Treatment, gift given: As in the Baseline Treatment the distribution of material payoffs of the two producers is unaffected by DM's choice. Thus, she favors the client.

(c) Gift Treatment, gift not given: If producer X did not pass on the gift, DM can affect the payoff distribution of the producers. If she chooses product X the material payoffs of the producers are (17,0), if she chooses Y they are (1,16). If she is utilitarian or inequality averse, she is indifferent between these two distributions – in the case of utilitarian preferences because the sum of payoffs is unaffected, in the case of inequality aversion because DM's utility depends on the average difference between her payoff and the payoff of other players' who are behind, regardless of the distribution among those players. Thus, she maximizes the payoff of the client. However, if she has maximin preferences she favors producer Y because

$$20 + \min\{20,1,16, m^C(Y)\} > 20 + \min\{20,17,0, m^C(X)\}$$
$$\Leftrightarrow \qquad 1 > 0$$

where $m^C(i) > 0$ is the expected payoff of the client if product $i \in \{X, Y\}$ is chosen. ***Q.E.D.***

Proposition 2b: Suppose that the decision maker has type-dependent preferences as described in Section 3.

(a) There always exists a pooling equilibrium in which no gift is given and DM favors the client.

(b) For $1/(8+\alpha+\sqrt{64+\alpha^2}) \le \mu \le 1/16$, there also exists a pure strategy separating equilibrium in which the "kind" type of producer X passes on the gift and the "selfish" type keeps it. In this equilibrium the kind type of DM favors X if the gift is passed on and favors Y is the gift is kept.

Proof of Proposition 2b: (a) We construct a pooling equilibrium in which the gift is not passed on and DM favors the client. If DM is selfish, she is indifferent and will favor the client, as assumed above, no matter whether the gift was passed on or not. If DM is kind and the gift was not passed on, she maximizes the sum of payoffs since, in a pooling equilibrium, she does not learn anything about the types of the other players on the equilibrium path.

Hence, a kind DM also favors the client. Whether it is optimal for producer X to keep the gift depends on DM's beliefs about producer X's type if the gift is passed on. Note that this is an out off equilibrium event that happens with probability 0 in equilibrium. Thus, we are free to specify DM's beliefs in this case. If DM believes that if producer X passes on the gift he must be a selfish type with probability 1, then, a kind DM will favor Y because

$$22 + \alpha \cdot \mu \cdot [16 + m^C(Y)] > 22 + \alpha \cdot \mu \cdot [0 + m^C(X)],$$

which is equivalent to

$$16 + m^C(Y) - m^C(X) > 0,$$

always holds since $m^C(Y) - m^C(X) \geq -2$ in all periods. Thus, producer X has no incentive to pass on the gift. This proves the existence of the pooling equilibrium.

(b) Now we construct a separating equilibrium in which the gift is passed on if and only if producer X is the kind type and in which the kind type of DM buys product X if and only if the gift is given.

Stage 2: The selfish type of DM will always favor the client, whether the gift was given or not. The decision of the kind DM depends on her beliefs about the type of producer X. In the separating equilibrium we are considering the kind type of producer X passes on the gift while the selfish type keeps it. Thus, if DM observes that the gift was given she believes that producer X is kind with probability 1. In this case, it is optimal for the kind DM to choose product X if and only if

$$22 + \alpha \cdot 16 + \mu \cdot \alpha \cdot m^C(X) \geq 22 + \mu \cdot \alpha \cdot [16 + m^C(Y)],$$

which is equivalent to

$$\mu \leq \frac{16}{16 + m^C(Y) - m^C(X)}.$$

Note that the difference between the expected value of product Y and product X is at most 6. Thus, if $\mu \leq \frac{8}{11}$, this condition is always satisfied.

If DM observes instead that producer X kept the gift she believes that she faces the selfish type with probability 1. In this case, it is optimal for the kind type of DM to choose product Y if and only if

$$20 + \mu \cdot \alpha \cdot (16 + m^C(Y)) \geq 20 + \mu \cdot \alpha \cdot m^C(X)$$

which is always true because $m^C(X) - m^C(Y) \leq 2$ in all periods.

Stage 1: Consider now the decision of producer X whether to pass on the gift. Let p^{gg} denote the probability that DM will choose product X if the gift is given, and p^{gng} the probability that

DM will choose product X when the gift is not given. For a selfish type of producer X it is optimal not to pass on the gift if and only if

$$1+16\cdot p^{gng}\geq 16\cdot p^{gg} \quad \Leftrightarrow \quad p^{gg}-p^{gng}\leq \frac{1}{16}$$

Note that if the gift is given the DM believes that she faces the kind type of producer with probability one, so $p^{gg}=\mu\cdot 1+(1-\mu)\cdot p$ where p is the probability with which a selfish type of DM chooses product X. If the gift is not given DM believes that she faces the kind type with probability zero, so $p^{gng}=\mu\cdot 0+(1-\mu)\cdot p$. Thus, $p^{gg}-p^{ng}=\mu$. Hence, for a selfish type of producer X it is optimal not to pass on the gift if and only if

$$\mu\leq\frac{1}{16}.$$

For a kind type of producer X it is optimal to pass on the gift if and only if

$$\begin{aligned}
&p^{gg}\cdot 16+\mu\cdot\alpha\cdot 22+\mu\cdot\alpha\cdot(1-p^{gg})\cdot 16+\mu\cdot\alpha\cdot E\left[m^C(X)\right]\\
&\geq 1+p^{gng}\cdot 16+\mu\cdot\alpha\cdot 20+\mu\cdot\alpha\cdot(1-p^{gng})\cdot 16+\mu\cdot\alpha\cdot E\left[m^C(Y)\right]\\
&\Leftrightarrow\left(p^{gg}-p^{gng}\right)\cdot 16+\mu\cdot\alpha\cdot 2-\mu\cdot\alpha\cdot(p^{gg}-p^{gng})\cdot 16+\mu\cdot\alpha\cdot\left(E\left[m^C(X)\right]-E\left[m^C(Y)\right]\right)\geq 1
\end{aligned}$$

Using $p^{gg}-p^{gng}=\mu$, we simplify the inequality to

$$16\mu+2\mu\alpha-16\mu^2\alpha+\mu\alpha\left(E[m^C(X)]-E[m^C(Y)]\right)\geq 1$$

Since producer X does not know products X and Y when deciding on the gift (and assuming that he does not interpret the fact that he was chosen randomly as the potential gift giver as a signal about the quality of his product) we have

$$E[m^C(X)]=E[m^C(Y)].$$

Thus, it is optimal for the kind type of producer X to pass on the gift if and only if

$$16\mu+2\mu\alpha-\mu^2\alpha 16\geq 1 \quad \Leftrightarrow \quad \mu^2-\frac{8+\alpha}{8\alpha}\mu+\frac{1}{16\alpha}\leq 0$$

Solving for the points where the above weak inequality is equal to 0 we get

$$\mu_{1,2}=\frac{8+\alpha}{16\alpha}\pm\sqrt{\left(\frac{8+\alpha}{16\alpha}\right)^2-\frac{1}{16\alpha}}=\frac{8+\alpha}{16\alpha}\pm\sqrt{\frac{64+16\alpha+\alpha^2-16\alpha}{(16\alpha)^2}}=\frac{8+\alpha}{16\alpha}\pm\sqrt{\frac{64+\alpha^2}{(16\alpha)^2}}.$$

We can further simplify

$$\mu_1=\frac{1}{16\alpha}\left((8+\alpha)-\sqrt{64+\alpha^2}\right)=\frac{1}{16\alpha\left((8+\alpha)+\sqrt{64+\alpha^2}\right)}\left((8+\alpha)-\sqrt{64+\alpha^2}\right)\left((8+\alpha)+\sqrt{64+\alpha^2}\right)$$

$$=\frac{1}{16\alpha\left((8+\alpha)+\sqrt{64+\alpha^2}\right)}\left((8+\alpha)^2-64+\alpha^2\right)=\frac{16\alpha}{16\alpha\left((8+\alpha)+\sqrt{64+\alpha^2}\right)}=\frac{1}{8+\alpha+\sqrt{64+\alpha^2}}$$

and, similarly, $\mu_2=\frac{1}{8+\alpha-\sqrt{64+\alpha^2}}$.

To summarize, a separating equilibrium requires for the kind DM to favor producer X after receiving the gift that $\mu \le \frac{8}{11}$, for the selfish producer X not to pass on the gift that $\mu \le \frac{1}{16}$ (which implies $\mu \le \frac{8}{11}$), and for the kind producer X to pass on the gift that

$$\frac{1}{8+\alpha+\sqrt{64+\alpha^2}} \le \mu \le \frac{1}{8+\alpha-\sqrt{64+\alpha^2}}$$

Furthermore, $\frac{1}{8+\alpha+\sqrt{64+\alpha^2}}$ is always strictly smaller than 1/16. Thus, a pure strategy separating equilibrium exists if and only if $\frac{1}{8+\alpha+\sqrt{64+\alpha^2}} \le \mu \le \frac{1}{16}$, as claimed in the proposition. ***Q.E.D.***

> **Proposition 3b:** Suppose that DM and X are motivated by intention-based reciprocity as described in Section 3. If both producer X and DM care strongly enough about the kindness of the intentions of the other player, then there are multiple sequential reciprocity equilibria (SRE). In particular, there exists a SRE in which producer X passes on the gift and DM chooses X. But there also exists a SRE in which player X does not pass on the gift and DM chooses C.

Proof of Propositions 3a and 3b: At stage 1 producer X can choose whether to pass on the gift (G) or not to pass on the gift (N). Then DM decides whether to choose X's product (X) or the product that yields the highest expected payoff for the client (C). The expected payoffs are given in the normal form of this sequential game:

DM \ X	XX	XC	CX	CC
G	16, 22	16, 22	8,22	8, 22
N	17, 20	9, 20	17,20	9, 20

We have to introduce some notation. Let m_i denote player i's material payoff, $i \in \{X, DM\}$. Player i's strategy is denoted by a_i, player i's belief about the strategy chosen by player j is b_{ij} (first order belief), and player i's belief what player j believes about his own (i's) strategy is c_{iji} (second order belief), with $j \neq i$. Player i's utility function is given by

$$U_i(a_i, b_{ij}, c_{iji}) = m_i(a_i, b_{ij}) + n_i \cdot \kappa_{ij}(a_i, b_{ij}) \cdot \lambda_{iji}(b_{ij}, c_{iji})$$

The first term is just his expected monetary payoff. The second term is his reciprocity payoff. Here $n_i \geq 0$ is a parameter reflecting how much player i cares about the perceived kindness of player j. The kindness of player i is given by the function

$$\kappa_{ij}(a_i, b_{ij}) = m_j(a_i, b_{ij}) - m_j^{e_i}(b_{ij}).$$

This is the payoff that player i "gives" to j by choosing a_i assuming that j chooses b_{ij}, minus the "equitable" payoff of j which is defined as the average of the maximum and the minimum payoff that player i can "give" to player j (assuming that j chooses b_{ij}):

$$m_j^{e_i}(b_{ij}) = \frac{\max_{a_i}\{m_j(a_i, b_{ij})\} + \min_{a_i}\{m_j(a_i, b_{ij})\}}{2}$$

The perceived kindness of player j is given by the function

$$\lambda_{iji}(b_{ij}, c_{iji}) = m_i(b_{ij}, c_{iji}) - m_i^{e_j}(c_{iji})$$

This is the payoff that player i believes that player j is giving to him minus the "equitable" payoff that is again the average of the maximum and the minimum payoff that player j can give to player i. Note that if player i expects j to give him less than the equitable payoff, j 's perceived kindness is negative, so i wants to give player j also less than the equitable payoff, and vice versa. A strategy profile $a^* = (a_i^*)_{i \in \{X, DM\}}$ is a sequential reciprocity equilibrium (SRE) if a_i^* maximizes $U_i(a_i, b_{ij}, c_{iji})$ and if $b_{ij} = a_j^*$ and $c_{iji} = a_i^*$. [29]

Proposition 3(a): Getting back to the game under consideration the first observation is that if X chooses G then DM always gets 22, and if X chooses N then she always gets 20. The equitable payoff for DM is 21. Thus, no matter what DM believes, if action G is taken we have $\lambda_{DM,X,DM} = 22 - 21 = 1$, i.e. DM must perceive X's intentions to be "kind". Similarly, if action N is taken we have $\lambda_{DM,X,DM} = 20 - 21 = -1$, i.e. DM must perceive X's intention as unkind.

Proposition 3(b): We now show that it is a sequential reciprocity equilibrium if X chooses G and DM chooses XC. We know already that if X chooses G then DM must perceive this as kind ($\lambda_{DM,X,DM} = 22 - 21 = 1$), so DM wants to reciprocate and to choose a kind action as well. By choosing action X DM gives X a payoff of 16, by choosing C she gives X an expected payoff of 8. The equitable payoff is $\frac{16+8}{2} = 12$. Thus, DM will choose X which yields $U_{DM}(X, G, XC) = 22 + n_{DM} \cdot (16 - 12) \cdot (22 - 21) = 22 + 4n_{DM}$. If DM chooses C, her

[29] See Dufwenberg and Kirchsteiger (2004) for more details and a discussion of the notion of SRE.

payoff is $U_{DM}(C,G,XC) = 22 + n_{DM} \cdot (8-12) \cdot (22-21) = 22 - 4n_{DM}$. Thus, for any $n_{DM} > 0$ choosing X is optimal. Consider now producer X. He believes that DM chooses the strategy XC. Furthermore, he believes that DM believes that X chooses G. Thus, X believes that DM is kind, because she reacts with X to G and gives him a payoff of 16 rather than 8 ($\lambda_{X,DM,X} = 16-12 = +4$). Therefore player X wants to be kind as well. If she passes on the gift $U_X(G,XC,G) = 16 + n_X \cdot (22-21) \cdot (16-12) = 16 + 4n_X$. If she does not pass on the gift she gets $U_X(N,XC,G) = 9 + n_X \cdot (20-21) \cdot (16-12) = 9 - 4n_X$. Thus, for any $n_X > 0$ choosing G is indeed optimal.

Finally, we show that it is a sequential reciprocity equilibrium that X chooses N and DM chooses XC. We know already that if X chooses N then DM must perceive this as unkind ($\lambda_{DM,X,DM} = 20-21 = -1$), so DM wants to reciprocate and choose an unkind action as well. By choosing action C DM gives X a payoff of 1+8=9, by choosing X she gives X a payoff of 1+16=17. The equitable payoff is $\frac{17+9}{2} = 13$. Thus, DM will choose C which yields $U_{DM}(C,N,XC) = 20 + n_{DM} \cdot (9-13) \cdot (20-21) = 20 + 4n_{DM}$. If DM chooses X, her payoff is only $U_{DM}(X,N,XC) = 20 + n_{DM} \cdot (17-13) \cdot (20-21) = 20 - 4n_{DM}$. Thus, for any $n_{DM} > 0$ choosing C is optimal. Consider now producer X. He believes that DM chooses the strategy XC. Furthermore, she believes that DM believes that X chooses N. Thus, X believes that DM is unkind, because she reacts with C to N and gives him a payoff of 9 rather than 17 ($\lambda_{X,DM,X} = 9-13 = -4$). Therefore player X wants to be unkind as well. If she does not pass on the gift $U_X(N,XC,N) = 9 + n_X \cdot (20-21) \cdot (9-13) = 9 + 4n_X$. If she passes on the gift she gets $U_X(G,XC,N) = 17 + n_X \cdot (22-21) \cdot (9-13) = 17 - 4n_X$. Thus, if $n_X > 1$ choosing N is indeed optimal. ***Q.E.D.***

Proof of Proposition 5a: Suppose that producer X passed on the gift.

(a) In the Gift Treatment DM chooses X if and only if

$$\overline{m}^{DM} + \alpha^X \cdot 16 + \alpha^Y \cdot 0 + \alpha^C \cdot m^C(X) \geq \overline{m}^{DM} + \alpha^X \cdot 0 + \alpha^Y \cdot 16 + \alpha^C \cdot m^C(Y)$$

Note that $\overline{m}^{DM} = 22$ is fixed, $\alpha^X = \overline{k} \cdot \alpha$ and $\alpha^Y = \alpha^C = \alpha$. Hence DM chooses X iff

$$\overline{k} \cdot \alpha \geq \alpha + \frac{\alpha \cdot \Delta}{16} \quad \Leftrightarrow \quad \overline{k} \geq \frac{16 + \Delta}{16} > 1$$

(b) In the No Externality Treatment DM chooses X if and only if

$$m^{DM}(X) + \alpha^X \cdot 16 + \alpha^Y \cdot 0 \geq m^{DM}(Y) + \alpha^X \cdot 0 + \alpha^Y \cdot 16$$

Note that $\alpha^X = \overline{k} \cdot \alpha$ and $\alpha^Y = \alpha$. Hence DM chooses X if and only if

$$\overline{k} \cdot \alpha \geq \alpha + \frac{\Delta}{16} \quad \Leftrightarrow \quad \overline{k} \geq \frac{16\alpha + \Delta}{16\alpha}$$

Note further that $\frac{16\alpha + \Delta}{16\alpha} \geq \frac{16 + \Delta}{16}$ because $\alpha < 1$, i.e. DM is less likely to favor X in NET than in GT.

(c) Consider now the Incentive Treatment and suppose that the client offered profit sharing to DM. DM chooses X if and only if

$$\begin{aligned} &\overline{m}^{DM} + s \cdot m^C(X) + \alpha^X \cdot 16 + \alpha^Y \cdot 0 + \alpha^C \cdot (1 - \frac{s}{2}) \cdot m^C(X) \\ &\geq \quad \overline{m}^{DM} + s \cdot m^C(Y) + \alpha^X \cdot 0 + \alpha^Y \cdot 16 + \alpha^C \cdot (1 - \frac{s}{2}) \cdot m^C(Y) \end{aligned}$$

Note that $\overline{m}^{DM} = 22$ is fixed, $\alpha^X = \alpha^C = \overline{k} \cdot \alpha$ and $\alpha^Y = \alpha$. Hence DM chooses X if and only if

$$\overline{k} \cdot \alpha \geq \alpha + \frac{s + (1 - \frac{s}{2}) \cdot \overline{k} \cdot \alpha \cdot \Delta}{16} \quad \Leftrightarrow \quad \overline{k} \geq \frac{16\alpha + s\Delta}{16\alpha - (1 - \frac{s}{2})\alpha\Delta}$$

Note that

$$\frac{16\alpha + s\Delta}{16\alpha - \left(1-\frac{s}{2}\right)\alpha\Delta} \geq \frac{16+\Delta}{16}$$

$$\Leftrightarrow 16^2\alpha + 16s\Delta \geq 16^2\alpha + 16\alpha\Delta - 16\left(1-\frac{s}{2}\right)\alpha\Delta - \left(1-\frac{s}{2}\right)\alpha\Delta^2$$

$$\Leftrightarrow 16s \geq 16\alpha\left(1-1+\frac{s}{2}\right) - \left(1-\frac{s}{2}\right)\alpha\Delta$$

$$\Leftrightarrow 16s \geq 16\alpha\frac{s}{2} - \left(1-\frac{s}{2}\right)\alpha\Delta$$

$$\Leftrightarrow 16s\left(1-\frac{\alpha}{2}\right) \geq \left(1-\frac{s}{2}\right)\alpha\Delta$$

which is always true. Thus, DM is less likely to favor X in ICT if profit sharing has been offered than in GT.

If the client did not offer profit sharing, DM shooses X if and only if

$$\overline{m}^{DM} + \alpha^X \cdot 16 + \alpha^Y \cdot 0 + \alpha^C \cdot m^C(X) \geq \overline{m}^{DM} + \alpha^X \cdot 0 + \alpha^Y \cdot 16 + \alpha^C \cdot m^C(Y)$$

Note that $\overline{m}^{DM} = 22$ is fixed, $\alpha^X = \overline{k} \cdot \alpha$, $\alpha^C = \underline{k} \cdot \alpha$, and $\alpha^Y = \alpha$. Hence DM chooses X if and only if

$$\overline{k} \cdot \alpha \geq \alpha + \frac{\underline{k} \cdot \alpha \cdot \Delta}{16} \quad \Leftrightarrow \quad \overline{k} \geq \frac{16 + \underline{k} \cdot \Delta}{16}$$

Note that $\frac{16+\underline{k}\cdot\Delta}{16} \leq \frac{16+\Delta}{16}$, i.e. DM is more likely to favor X in ICT if no profit sharing has been offered than in GT.

(d) If profit sharing has been offered in ICT it is less likely that DM chooses X in ICT than in NET if and only if

$$\frac{16\alpha + s\Delta}{16\alpha - (1-s)\alpha\Delta} \geq \frac{16\alpha + \Delta}{16\alpha}$$

which is the case if and only if $\Delta > 16 \cdot (1-\alpha)$. ***Q.E.D.***

Proposition 5b: Suppose that the decision maker has outcome-based social preferences over an endogenously formed reference group. Furthermore, suppose that $\underline{k} \leq 1$ is distributed according to some cdf $G(\underline{k})$ and that $\overline{k} \cdot \alpha \leq 1$. If producer X has not given the gift and $\Delta \leq 0$ we have:

(a) In GT and DCT DM chooses Y if and only if $\underline{k} \le \frac{16+\Delta}{16}$.

(b) In NET DM chooses Y if and only if $\underline{k} \le \frac{16\alpha+\Delta}{16\alpha} \le \frac{16+\Delta}{16}$, i.e. DM is less likely to favor Y than in GT.

(c) In ICT, if C has offered profit sharing, DM chooses Y if and only if $\underline{k} \le \frac{16+\left[s+(1-s)\overline{k}\alpha\right]\cdot\Delta}{16} \le \frac{16+\Delta}{16}$, i.e. DM is less likely to favor Y than in GT.

(d) If C has offered profit sharing, DM is less likely to favor Y in ICT than in NET.

Proof of Proposition 5b: Suppose that producer X did not pass on the gift.

(a) In the Gift Treatment DM chooses Y if and only if

$$\overline{m}^{DM} + \alpha^X \cdot 16 + \alpha^Y \cdot 0 + \alpha^C \cdot m^C(X) \le \overline{m}^{DM} + \alpha^X \cdot 0 + \alpha^Y \cdot 16 + \alpha^C \cdot m^C(Y)$$

Note that $\overline{m}^{DM} = 22$ is fixed, $\alpha^X = \underline{k} \cdot \alpha$ and $\alpha^Y = \alpha^C = \alpha$. Hence DM chooses Y iff

$$\underline{k} \cdot \alpha \le \alpha + \frac{\alpha \cdot \Delta}{16} \quad \Leftrightarrow \quad \underline{k} \le \frac{16+\Delta}{16} \le 1$$

In the Disclosure treatment the strategic situation is exactly the same, so the prediction is the same.

(b) In the No Externality Treatment DM chooses Y if and only if

$$m^{DM}(X) + \alpha^X \cdot 16 + \alpha^Y \cdot 0 \le m^{DM}(Y) + \alpha^X \cdot 0 + \alpha^Y \cdot 16$$

Note that $\alpha^X = \underline{k} \cdot \alpha$ and $\alpha^Y = \alpha$. Hence DM chooses Y if and only if

$$\underline{k} \cdot \alpha \le \alpha + \frac{\Delta}{16} \quad \Leftrightarrow \quad \underline{k} \le \frac{16\alpha+\Delta}{16\alpha}$$

Note further that $\frac{16\alpha+\Delta}{16\alpha} \le \frac{16+\Delta}{16}$ because $\alpha < 1$, i.e. DM is less likely to favor Y in NET than in GT.

(c) Consider now the Incentive Treatment and suppose that profit sharing has been offered. DM chooses Y if and only if

$$\overline{m}^{DM} + s \cdot m^C(X) + \alpha^X \cdot 16 + \alpha^Y \cdot 0 + \alpha^C \cdot (1-s) \cdot m^C(X)$$
$$\leq \overline{m}^{DM} + s \cdot m^C(Y) + \alpha^X \cdot 0 + \alpha^Y \cdot 16 + \alpha^C \cdot (1-s) \cdot m^C(Y)$$

Note that $\overline{m}^{DM} = 22$ is fixed, $\alpha^X = \underline{k} \cdot \alpha$, $\alpha^C = \overline{k} \cdot \alpha$ and $\alpha^Y = \alpha$. Hence DM chooses Y if and only if

$$\underline{k} \cdot \alpha \leq \alpha + \frac{s + (1-s) \cdot \overline{k} \cdot \alpha \cdot \Delta}{16} \quad \Leftrightarrow \quad \underline{k} \leq \frac{16 + \left[s + (1-s)\overline{k}\alpha \right] \Delta}{16}$$

Note further that $\frac{16 + \left[s + (1-s)\overline{k\alpha} \right] \Delta}{16} \leq \frac{16 + \Delta}{16} \quad \Leftrightarrow \quad 1 \geq \overline{k}\alpha$, i.e. DM is less likely to favor Y in ICT than in GT.

If profit sharing has not been offered, DM chooses Y if and only if

$$\overline{m}^{DM} + \alpha^X \cdot 16 + \alpha^Y \cdot 0 + \alpha^C \cdot m^C(X)$$
$$\leq \overline{m}^{DM} + \alpha^X \cdot 0 + \alpha^Y \cdot 16 + \alpha^C \cdot m^C(Y)$$

Note that $\overline{m}^{DM} = 22$ is fixed, $\alpha^X = \alpha^C = \underline{k} \cdot \alpha$, and $\alpha^Y = \alpha$. Hence DM chooses Y if and only if

$$\underline{k} \cdot \alpha \leq \alpha + \frac{\underline{k} \cdot \alpha \cdot \Delta}{16} \quad \Leftrightarrow \quad \underline{k} \leq \frac{16}{16 - \Delta}$$

Note further that $\frac{16 + \Delta}{16} \leq \frac{16}{16 - \Delta}$, i.e. DM is more likely to favor Y in ICT if not profit sharing has been offered than in GT.

(d) If profit sharing has been offered, it is less likely that DM chooses Y in ICT than in NET if and only if

$$\frac{16 + \left[s + (1-s)\overline{k}\alpha \right] \Delta}{16} \leq \frac{16\alpha + \Delta}{16\alpha}$$

which is always true given that $\overline{k}\alpha \leq 1$. ***Q.E.D.***

Appendix B

Period	Po-tential gift giver	Possible payoffs of product A		Expec ted value of A	Spread btw. payoffs of A	Possible payoffs of product B		Expec ted value of B	Spread btw. payoffs of B	Diff. in EVs (pot. gift giver minus other)	Diff. in Spreads (pot. gift giver minus other)
		50%	50%			50%	50%				
1	A	13	15	14	2	20	12	16	8	-2	6
2	B	15	17	16	2	12	20	16	8	0	-6
3	B	16	14	15	2	14	20	17	4	2	-2
4	B	13	19	16	6	5	15	10	10	-6	-4
5	A	17	7	12	10	10	14	12	4	0	-6
6	B	12	16	14	4	19	13	16	6	2	-6
7	A	11	19	15	8	18	16	17	2	-2	-6
8	A	8	20	14	12	10	18	14	8	0	-4
9	B	17	19	18	2	10	14	12	4	-6	-2
10	A	19	13	16	6	20	8	14	12	2	6
11	B	20	12	16	8	7	13	10	6	-6	2
12	B	3	17	10	14	5	11	8	6	-2	8
13	A	16	12	14	4	8	20	14	12	0	8
14	A	9	15	12	6	19	5	12	14	0	8
15	B	19	11	15	8	7	19	13	12	-2	-4
16	A	8	12	10	4	13	3	8	10	2	6
17	B	20	16	18	4	16	8	12	2	-6	2
18	A	7	13	10	6	16	8	12	8	-2	2
19	A	8	14	11	6	14	12	13	2	-2	-4
20	B	13	19	16	6	18	14	16	4	0	2
min		3	7	10	2	5	3	8	2	-6	-6
max		20	20	18	14	20	20	17	14	2	8
avg		13.20	15.00	14.10	6.00	13.05	13.15	13.10	7.10	-1.40	0.30

TABLE 1: Payoffs of the different products in the 20 periods

There are

- four periods in which the potential gift giver's expected value is 2 points higher (periods 3, 6, 10, and 16)
- six periods in which there is no difference in expected value between producer A and producer B (periods 2, 5, 8, 13, 14, and 20)
- six periods in which the potential gift giver's expected value is 2 points lower (periods 1, 7, 12, 15, 18, 19)
- four periods in which the potential gift giver's expected value is 6 points lower (periods 4, 9, 11, 17)

Note that in the four periods in which the potential gift giver's expected value is 6 points lower, his lottery is first order stochastically dominated by the lottery of his competitor.
Note further that there are 10 periods in which the spread between possible payoffs is higher for the product of the potential gift giver than for the alternative product, and 10 periods in which it is lower. Among the six periods with equal expected values, the spread is larger in three periods and lower in the other three periods.

The subjects saw a table with information only on the possible payoffs the two products in a given period, as shown in the following example:

Payoff of the client	State 1 Probability: 50 percent	State 2 Probability: 50 percent
Product A	13	15
Product B	20	12

TABLE 2: Information on the two products displayed to the subjects (here for period 1).