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The Effect of Shame in Dictator Games with Information Asymmetry

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The Effect of Shame in Dictator Games with Information Asymmetry

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Abstract

This study introduces a theoretical model of inequality aversion which can also be used in an environment with information asymmetries. The model is based on the non-paternalistic approach where, the own utility function incorporates the utility of other people as perceived by a decision maker. Moreover it allows extensions for other motives which may result in pro-social behavior. I extend the model by adding shame aversion as an additional driver for apparently altruistic behavior. Threat of shame is induced by different levels of exposure of either own actions or identity to the third party observers. I also experimentally test predictions of the model using a very simple environment of a dictator's game. The experimental design aims to remove additional confounding behavioral effects present in the previous literature. The results suggest that even a very small exposure results in significantly higher amounts sent to recipients. The analysis also shows that the agents, who believe that they can conceal their own actions in front of the less informed counterpart, exploit this information asymmetry for their monetary benefit.

Keywords: shame, dictator game, anonymity, experiment

JEL Classification: C91, D03

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1 Introduction

Selfishness and altruism in human behavior have been examined by experimental economists using dictator games. In these games, one player (a dictator) decides how to split a certain amount of money between himself/herself and the other player (a recipient). If dictators were maximizing only their monetary payoffs, they would keep everything for themselves and leave recipients empty handed. However, dictators do not usually make such decisions. Holt (2007) provides evidence of experiments in which the average share for the recipient is 31 percent; only fewer than 10% of dictators keep everything for themselves. Similarly, Andreoni and Miller (2003) also found in their experimental study that only around 23 percent of their subjects behave "perfectly selfishly". The described behavior might be sensitive to the design of the experiment and socio-demographic characteristics, but in general the subjects mostly transfer non-zero amounts to recipients. See Camerer (2011) for a detailed overview.

This contradiction to the theory of purely selfish people has been explained by fairness concerns and inequality aversion. Fehr and Schmidt (2006) review many theories of other-regarding preferences based on different assumptions and models. These theories work well in an environment where both parties are fully informed about all aspects of the game. There are, however, many situations when both parties are not symmetrically informed about everything and one party has some information advantage over the other (e.g. principal-agent situations). The behavior in such situations differs from full and can not be explained by current inequality aversion models (Andreoni and Bernheim, 2009, Charness and Dufwenberg, 2006;Mitzkewitz and Nagel, 1993, Rapoport and Sundali, 1996, Straub and Murnighan, 1995).

The first new contribution of this paper to the current state of knowledge is an introduction of the theoretical model which extends inequality aversion principles into the information asymmetry environment. Even though the model imposes only minimal assumptions about the functional forms, it gives important predictions for behavior of people in different information environments. It is based on an (apparently) non-paternalistic[1], pro-social approach of the fully informed party.

[1]Non-paternalistic altruism describes the situation when a decision-maker values the utility of an affected indi-

The crucial feature of the model is the belief of a fully informed party about the beliefs of the less informed party induced by action of the fully informed agent.

The second contribution is that the model does not restrict the set of motives for the observed pro-social behavior only to the innate altruistic motives. It can easily be extended by other different motives. In this paper I add shame aversion as one of the drivers for "fair" behavior. So model is extended by the shame features based on the psychological literature. Following Tangney (1995) the shame is induced by exposure of the actions and/or identity to other people . If an unfair (from the decision maker's point of view) decision leads to negative emotions (Reuben and Van Winden, 2010), some agents may prefer to avoid such behavior by choosing the action which would not lead to such emotions. A potential change in behavior depends on the strength of the agent's exposure. In the second half of the paper I experimentally test the predictions of the model along two dimensions using a one-shot dictator game.

The first dimension is investigation of the information environment predictions. Here, the decision of an agent is fully or partially disclosed only to his or her counterpart who is financially affected by this decision. In my study, the opportunity to conceal own action for a dictator will come from the random pie size which is always known only for dictators. The second dimension is investigation of the potential shame effect in line with the situation captured by the model. Usually, the exposure is done publicly in front of all subjects in the experimental works when studying "audience effects" (e.g. Andreoni and Bernheim, 2009). So, I experimentally test the effect of shame on decisions of dictators in a one-shot dictator game.

The third contribution of this paper is in the exclusion of many confounding effects which are present in the previous experimental literature (more details in Section 3). Regarding the exposure, I plan to introduce a more realistic, and for the application less costly, environment where each decision making agent is observed by only a limited number of observers (in this case only one observer per agent).

The results observed are mostly in line with the predictions of the model. Even a small level of

vidual as opposed to a paternalistic approach when this decision-maker values consumption or distribution of some goods irrespective of the preferences of the affected individual. See Flores (2002) for more information.

exposure leads to an up to 8 percentage point increase in monetary transfers. Interestingly, almost all of the change caused by the exposure is driven by a higher share of non-zero contributors rather than by an increase in the average contributions (conditional on contributing). Regarding the information asymmetry predictions, the results show that the mean share sent to recipients depends on the perceived beliefs induced in the less informed party. If agents believe that they can induce beliefs in the less informed party that their behavior is closer to fair behavior than it actually is, then the difference in amounts sent could be up to 18 percentage points lower (depending on the treatment). Given the parametrization and design of the experiment, the results are supposed to be more likely lower bounds of the shame and information asymmetry effects.

2 The basic model

The model, introduced in this section, formalizes principles of inequality aversion with non-paternalistic pro-social preferences. Moreover, it analyzes behavior in an environment with different levels of information completeness and decision maker's anonymity. The model preserves the Fehr and Schmidt (1999) spirit in a way that agents derive utility from monetary earnings and dislike inequality. However, it can be used for explaining exploitation of information asymmetry and different motivations for the observed, apparently pro-social, behavior. I start from the simplest setting of complete information and then I will add more complicated (and usually more realistic) features of the environment.

This model could be used to describe the situations when one side of the contract has a power to conceal, at least partially, information about the surplus to be divided. Wage offers from employers to employees depending on the observability of the firm profits could serve as an example. The extension of the model into the shame dimension could approximate situations like publishing a list of tax debtors or possible changes in decisions between secret vs. non-anonymous voting procedures.

2.1 Complete information

Let's start, for simplicity, with the setting of a standard dictator game of dividing an amount of π. Let's suppose that the size of the pie, π, is general knowledge. Agent i makes a decision about how much to transfer to agent j, the transferred amount is denoted by x_j. The rest of the pie, the amount x_i is kept by agent i. The agents in the model dislike disadvantageous inequality only and care about the (perceived) utility of the other player. Disutility from inequality depends on the difference between the monetary outcomes, denoted by the function $h(x_j - x_i)$. I do not assume any specific functional form of the inequality aversion function, but I assume, for simplicity, that it is continuous and twice differentiable for all possible values of the argument and $h(x_j - x_i) = 0$ if $x_i \geq x_j$. I also impose the reasonable assumptions on the shape of this function. The first derivative of this function $h'(x_j - x_i)$ is positive, so the higher the inequality, the higher the disutility. The second assumption is that the h function is convex ($h''(x_j - x_i) > 0$). Both assumptions are also justified by empirical evidence (Loewenstein et al., 1989). So the utility of agent i is the following:

$$U_i = x_i - h(x_j - x_i) + \gamma U_j$$

where parameter γ expresses individual sensitivity to the perceived utility of the other player[2], I assume this parameter is weakly greater than 0 and strictly lower than 1.

As I will later extend the model into the situations when the amount kept by the decision maker, x_i, is not known to everybody I express the argument of the h function in the terms of π and x_j ($x_i = \pi - x_j$). It is difficult to tell what is the utility of agent j from the point of view of agent i. If agent i does not have any additional information about agent j I use the straightforward approach by using the own inequality aversion function of agent i even for agent j. So the utility function can be rewritten to:[3]

[2] The model allows for heterogeneity in the parameter γ but I will omit the individual subscripts for convenience at this point.

[3] An alternative approach is to include the utility of agent i into the utility of agent j. This recursive process could continue infinitely. Given the range for the γ values, the final result for the utility of agent i is multiplied by $1/(1-\gamma)^2$ and the qualitative predictions of the model would be preserved. Therefore, for the rest of the paper I disregard the possibility of second and higher -order beliefs about the utility function. For the discussion about the

$$U_i = \pi - (1-\gamma)x_j - h(2x_j - \pi) - \gamma h(\pi - 2x_j)$$

Given the restriction on the γ parameter, it is obvious that agent i never chooses x_j greater than $\pi/2^4$. Then the utility function shrinks to $U_i = \pi - (1-\gamma)x_j - \gamma h(\pi - 2x_j)$.[5] The solution to the utility maximization problem is trivial in this case and gives the optimal transfer under complete information,x_j^c, being either zero for a corner solution or some positive transfer up to one half of the pie which is given by condition $1 - \gamma = 2\gamma h'(\pi - 2x_j^c)$ (see Appendix for more details on derivation of results). Similarly to the Fehr and Schmidt (1999) model the utility function also contains aversion to the advantageous inequality. In my model such aversion arises because of non-paternalistic altruism in this model as opposed to their model where it is directly innate in an agent's distributional preferences. It might seem of minor importance how both types of the models come to the same predictions, which are observationally impossible to distinguish. However, the structural analysis of underlying preferences plays an important role when the information asymmetry is introduced.

2.2 Information asymmetry

Now suppose that agent j observes only the amount x_j transferred for her and has no exact information about the pie size π. Even if π is not known to agent j, she is not prevented from having either information about the objective distribution of π and from creating her own inferences about the pie size after observing transfer x_j. There could be many ways the agents could create beliefs about the pie size if they can observe only transfer x_j. Therefore, I use only a very general function, $m(x_j)$, which describes agent i's beliefs about how recipient maps the observed transfer x_j into the expectation of the pie size (dictator believes that $E_{\text{recipient}}(\pi|x_j) = m(x_j)$). I assume

depth of reasoning on theoretical and empirical grounds see Binmore (1987), Bacharach (1992), Nagel (1995).

[4] Also supported by the empirical evidence (e.g. Camerer, 2011)

[5] Alternatively, it is possible to keep direct expression for advantageous inequality aversion in the utility function and proceed in that way. However, it would drop when solving for optimal transfer. So, for simplicity I decided to omit it at this step.

this function to be differentiable and increasing in $x_j (m'(x_{j0}) > 0)$. Now the utility of the agent i for a given transfer x_j is:

$$U_i = \pi - (1-\gamma)x_j - \gamma h(m(x_j) - 2x_j)$$

Again, depending on the values of parameters and functional forms, the solution to the utility maximization could be a corner solution with zero transfer. More interesting is the interior solution satisfying the condition: $1 - \gamma = 2\gamma h'(m(x_j^a) - 2x_j^a) + m'(x_j^a)(1 - \gamma h'(m(x_j^a) - 2x_j^a))$, where x_j^a denotes the optimal transfer under information asymmetry.

Comparing the optimality conditions for interior solutions in both information availability environments, there is no clear prediction for the comparison of the transferred amount x_j in both environments. The amount sent depends on the exact form m and h functions and on the parameter γ.

Claim 1. Let x_j^a denote the optimal transfer under information asymmetry and x_j^c denote the optimal transfer in a complete information setting. If there is an optimal transfer x_j^a such that for a given pie size π it satisfies the condition $m(x_j^a) = \pi$, then it holds that:

i) $x_j^a > x_j^c$ if $1 > \gamma h'(m(x_j^a) - 2x_j^a)$

ii) $x_j^a < x_j^c$ if $1 < \gamma h'(m(x_j^a) - 2x_j^a)$

iii) $x_j^a = x_j^c$ if $1 = \gamma h'(m(x_j^a) - 2x_j^a)$

If the dictator assumes that he induces correct beliefs with the optimal transfer x_j^a, then a comparison of outcomes in different information environments depends on the marginal disutility from the induced inequality and on sensitivity to the other player's utility (see appendix for derivation of all claims). Intuitively, each additional unit of the transfer decreases inequality faster in the environment with full information. This is because the additional unit of transfer under information asymmetry also increases the recipient's expectation about the pie size. So in the domain of the inequality aversion function where marginal disutility is really high ($1 < \gamma h'(.)$ and due to the convexity of the h function) it is relatively more utility-harming to increase the transfers in order to decrease inequality in an asymmetry of information setting.

So far the reasoning about the difference between the transfers in those two environments has been based on the assumption that the agent induces correct beliefs about the pie size with each transfer under information asymmetry. This assumption might not necessarily be correct. As the agent does not know the exact mapping function m of her counterpart, she can either use her own mapping function or have some beliefs about the counterpart's function. Both options may lead to inaccuracy in the induced pie size ($m(x_j^a) \neq \pi$). This leads to different predictions about the optimal transfer which depend on the exact shape of the h and m functions, and on theγ parameter.

Claim 2. Let x_j^a denote the optimal transfer under information asymmetry and x_j^cdenote the optimal transfer in a complete information setting. If $m(x_j^a) \neq \pi$ then the comparison between x_j^a and x_j^cdepends on the combination of h and m functions shape, and on the γ parameter as is stated in the following table:

Table 1: Predictions under information asymmetry

	$1 > \gamma h'(m(x_j^a) - 2x_j^a)$	$1 < \gamma h'(m(x_j^a) - 2x_j^a)$	$1 = \gamma h'(m(x_j^a) - 2x_j^a)$
$m(x_j^a) > \pi$	$\hat{x}_j > x_j^c$	ambiguous	$x_j^a > x_j^c$
$m(x_j^a) < \pi$	ambiguous	$x_j^a < x_j^c$	$x_j^a < x_j^c$

Combining *Claims 1* and *2*, there are nine possible resulting predictions for the comparison of different information environments. This ambiguity in the predictions is caused by the fact that I do not impose any specific functional forms of the functions. Another important implication of this model is the fact that an increase in an induced pie size expectation leads to an increase in the optimal transfer (for a given actual pie size). In other words, if the agent believes that she can induce higher beliefs about the pie size and thus induce a higher inequality, a higher transfer is needed to achieve optimal inequality.

If advantageous inequality aversion is acquired into the own utility function through the utility function of the other agent (as opposed to innate advantageous inequality aversion) then the model introduced could explain differences in pro-social behavior under information asymmetry. The crucial feature of this model is that people care about the utility of other people. So far, I have not discussed the motives behind such behavior.

3 Beyond non-paternalistic altruism

It would be a hasty conclusion to say that people care about the utility of other people only because of pro-social motives. There have been other explanations of giving positive amounts in dictator games such as guilt, shame, the effort to be considered as a "fair" person, reputation building and other. Some of these motives can be present only under certain conditions. If those motives are not stable, but depend on the environment for the model, it would mean that the parameter γ is a function of the environment. This is the parameter reflecting how people care about the utility of others. The experiments of Reuben and Van Winden (2010) illustrate that unfair actions of the players are correlated with a higher intensity of emotions like shame and guilt. Without ruling out other motives I am going to focus on the shame effects. Following similar reasoning and implications as for shame, the model could also be easily extended using other motives.

3.1 Shame in literature

In order to examine the possible effects of shame, it is necessary to have definitions and understanding of what it is. Tangney (1995) provides an overview of shame-related studies in the psychological literature. At first, shame was studied together with guilt without a clear distinction. Then a distinction was made in a way that describes guilt as an inner feeling, which we do not need other people to know about our action in order to feel it, while for shame, we need other people to be aware of our actions in order to feel it (Tangney and Dearing, 2003). Later defining the difference between the two included the criteria of the role of the "self" (Lewis, 1971). For the feeling of shame, the evaluation of some action needs to be focused on self, while for feelings of guilt, the evaluation needs to be focused on the action done. So for shame, it is not necessary to be directly observed, it is enough to have a feeling of being observed or evaluated. However, exposure to other people still plays an important role (Tangney, 1995):

> "...shame experiences were more likely to involve a concern with others' evaluations of self, whereas guilt experiences were more likely to involve a concern with one's effect on others" (p. 1136).

In the experimental economics literature, there are studies focusing on behavior which may be attributed to shame effects. Such effects are in general examined by providing an opportunity to conceal own behavior from other participants under experimental conditions. Studies have been performed on different types of games. Fehr and Gächter (1999) and Rege and Telle (2004) study shame in public good games. Both studies vary the level of ex-post anonymity after all decisions are made. Rege and Telle (2004) find a positive effect of the higher exposure on public good contributions, while Fehr and Gächter (1999) find an effect only when anonymity has been removed before the game and combined with the meeting of group members, after the game.

Tadelis (2007) uses a trust game design with varying disclosures of the subject's anonymity, and information about random intervention. Tadelis (2007) also introduces a model with shame aversion in this paper. His results confirm the effect of shame on the behavior of agents. However, here the decision of the possibly shame-affected decision maker comes into effect only after the other player trusts him/her. So, the shame effects are confounded with reciprocity effects in this paper (unless we impose a restriction of additivity and no interaction of these effects).[6]

There are also studies of ultimatum games which may have a connection to shame effects (Mitzkewitz and Nagel, 1993, Rapoport and Sundali, 1996). Here, the pie size is unknown to the recipients and level of exposure is varied by changing the variance of the pie size (note that according to the psychological literature, only a feeling of being observed or evaluated is enough for shame) which is fully known only to proposers. A higher variance provides more opportunities to "hide behind a small pie" as it makes a proper evaluation from the side of the recipients more difficult. The

[6] Ong and Lin (2011) show that "kind" behavior evokes reciprocation even in cases when first movers do not know about any possibility of reciprocation by other subjects, and second movers could keep everything without first movers knowing this.

evidence suggests that for higher variances of the pie size, proposers keep larger shares of it. The question here is which part of the observed behavior is caused by shame and which by the strategic behavior present in ultimatum games and its possible interaction with shame effects.

There has been an experimental study using the dictator game with asymmetric information. Andreoni and Bernheim (2009) developed a theoretical model which is based on the utility coming from the dictator's social image. They completely remove anonymity among the participants. Subjects in their experiment are undergraduate economics students from the same university, so the removal of anonymity may lead also to concerns for future interaction. They argue that this is not a problem for the purpose of their work. However, I will try to filter out this concern or minimize its impact in this study. Exogenous change in exposure levels is governed by different probabilities of nature intervening and deciding about the split at certain default values (what is general knowledge for everybody). They find a significant effect of this exposure on proportions of people sending either half of the pie or nothing (in this case, nature's intervention led to 0 or 1 for the recipient, depending on the treatment). However, different outside options and different natural intervention probabilities may draw the attention of subjects from a pure distributional problem to thinking about different entitlements to the pie and different beliefs about expectations (also the experimenter's expectations). Although the aim of their study is not directed at shame effects it provides some patterns of how shame may affect the behavior of agents.

It is possible to find a possible flavor of shame effects also in studies which are focused on an other possible motivator of the observed pro-social behavior. Their authors call it guilt aversion and it is defined as failing somebody's expectations in these experiments. If people are guilt averse (in the way, how they define it[7]), they have negative utility from not fulfilling these expectations. In their actions, this would look like non-selfish behavior, if they believe that their counterparts have "non-selfish" expectations. Charness and Dufwenberg (2006) vary expectations in trust games by allowing communication which anchors the expectations of the subjects. Dana, Cain, and Dawes (2006) exclude the expectations in dictator games completely by announcing to recipients that

[7] I will stick to the definition of guilt from the psychological literature in this study. Then guilt effects should be the same regardless of the exposure level.

some game has been played only in cases where the dictator decides to send a positive amount. Both of these studies find an effect of not fulfilling somebody's expectations on the decision making of more informed players. Although these effects are strong, they may be confounded with the effects of shame or shame aversion. The decision to send zero to a recipient in the mentioned dictator game does not only exclude any expectations of the recipient but also prevents any feeling of exposure to others and therefore any evaluation of the dictator by the recipient.

Given the psychological literature, the emotion of shame is induced by exposure of own actions to other people. Even if the above mentioned experimental evidence may be confounded by other motives, it creates a strong suspicion about the ability shame to change behavior of the agents. If a selfish (from the decision maker's point of view) decision would lead to negative emotions, some agents may prefer to prevent such emotions by choosing more pro-social action. If the exposure of own decisions to the other people leads to the threat of shame the agent could put more weight on the utility of other agents in order to prevent negative emotions.

3.2 Shame in the model

Suppose that the strength of exposure could be expressed by one variable denoted by e. Alternatively, I can break down the exposure level into more variables, each capturing different channels (e.g. shame, loss of anonymity, reputation building, probability of future interaction). However, this is beyond the scope of this paper and for this moment I stick to one variable capturing the strength of exposure which is the main driver of shame intensity. Then the parameter γ can be expressed as a function of e, $\gamma(e)$. To be consistent with literature about the shame I assume $\gamma(e)$ to be increasing in the level of observability. The utility functions then change to:

$$U_i = \pi - (1-\gamma(e))x_j - \gamma(e)h(\pi - 2x_j) \quad \text{or} \quad U_i = \pi - (1-\gamma(e))x_j - \gamma(e)h(m(x_j) - 2x_j)$$

depending on information availability. The value of $\gamma(0)$, i.e. the value with complete anonymity, expresses a true altruistic behavior or true altruistic behavior with motives which do not depend on observability. Given the assumption of increasing $\gamma(e)$, the predictions of the model are very trivial for varying observability in both information settings. For information asymmetry I need to impose two realistic assumptions: for no value of x_j an additional amount of transfer would increase the expectation about the pie size by more than double of this amount, $m'(x_j) < 2$, for all values of x_j which could be rationally expected for a given distribution of π; [8] and there are no strong convexities or concavities in m function (value of $m''(x_j)$ is "very small"). More on the derivation of the following claim can be found in the Appendix.

Claim 3. For any optimal transfer greater than zero (interior solution) in both information situations, an increase in observability leads to a decrease in inequality.

Intuitively, the increased observability of an agent's decisions is connected with a judgment of these decisions. Therefore the feeling of shame should be greater for any "unfair" decision. In order to prevent such negative emotions the agent should shift her decision more towards to an equal split. [9] In this section of the paper I incorporate the influence of shame in the model of inequality aversion with non-paternalistic utility features.

The model described extends the inequality aversion models to an environment with varying information asymmetry or observability of decisions. It analyzes giving behavior with only a few assumptions which are consistent with empirical evidence or psychological theories. Despite its parsimony, the model predicts changes in behavior of the agents within the inequality aversion framework. The agents who are averse to inequality and also care about such inequality aversion for their counterparts may transfer a different amount of money in the situation when this counterpart is fully informed about the pie size or the amount they keep for themselves. Increased observability should lead to higher transfers in order to prevent a possible threat of shame. I test some predictions of the model with an economic experiment which is described in the following section.

[8] So the value of $m(0)$ is at least minimum possible value of π and condition $m'(x_j) < 2$ holds only if x_j is lower than half of the maximum value of the pie size.

[9] Which is in most of the situations assumed to be fair (Andreoni and Bernheim, 2009).

4 Experimental design

It is not feasible to test all predictions of the model with many different parametrizations. I focus on testing hypotheses about the predictions for the small exogenous variations in the environment. If there is significant change in outcome for small variations in environment, it is very likely that this effect could be amplified using greater variations. For testing the predictions about the information environment I use a randomly drawn pie size while varying the information availability about the pie size for a recipient of the transfer. I use distribution of the pie size, which allows for exploitation of information asymmetry, but the range of the values is still relatively narrow. For exposure predictions I cannot test all the possible channels of its effect (mentioned above) so I concentrate on the effects of shame and try to minimize other effects which can in general be called audience effects. Here I use exposure of the dictator's picture and decisions to only one anonymous observer, without any power to interfere. So the aim of my experimental design is in the lower bounds of effects connected with varying information completeness and exposure.

If the game is more complex, the cognitive process of the subject may focus on the very structure of the game, and perceived exposure in the game is considered only to a certain extent. Because the crucial aim of my study is to trigger thoughts about exposure and the consequent possible shame, I use a dictator game which has a very simple setting and does not include strategic concerns or reciprocity concerns.

The novelty of my approach lies in disentangling the information completeness from exposure effects. In dictator game studies done so far, the change in exposure was automatically connected with the exposure to the subjects directly financially influenced by the dictators. There could be a potential interaction between the exposure effects and the fact that a decision maker is exposed to the agent she/he can directly affect in monetary terms. Therefore, I employ third party observers who are not affected by the decisions of the dictators.

4.1 The dictator game with a randomly drawn pie size

I use the dictator game with a randomly drawn pie size with asymmetric information about the realized value. In particular, the information advantage is on the side of the dictator (male pronouns further on) who knows the exact realized value of pie size before the splitting decision, while the recipient (female pronouns further on) observes only the amount transferred to her. This allows the dictator to partially conceal full information about his decision and prevents any proper evaluation from the side of recipient (reducing the feeling of exposure). Varying the ex-post disclosure of the actual pie size and the presence of the third party observer allows me to test the predictions of the model.[10]

Subjects are randomly assigned to one of two (or three, depending on the treatment, see the next section) types, labeled Type A or Type B (or Type C). They remain the same type for the rest of the experiment. The pie size is drawn from U[50, 150], where dictators know the exact realization, and recipients know only the ex-ante distribution. This information is explained in the instructions to all subjects. Then, the dictators are instructed to split the pie according to how much they have decided to transfer to a randomly chosen recipient, keeping the rest for themselves. Depending on the treatment, the subjects are informed about ex-post disclosure of the pie size to the receivers. The subjects are also informed about a demographic questionnaire at the end of the experiment. All earnings during the experiment are stated in experimental units (EU). Conversion rate, 1 EU= 2 Czech crowns (CZK),[11] is announced to subjects in written instructions at the beginning of the experiment. The instructions are available upon request from the author.

For the dictators' decisions, I use a strategy method (Selten, 1967) with five different pie sizes. The pie sizes are drawn from U[50,70], U[70,90]...U[130,150], respectively. They are displayed

[10] Also varying exposure to the experimenter (single-blinded vs double-blinded designs) may be considered as shame effects sticking to the above mentioned definitions. As this is not the main goal of this study and exploring this area is beyond the possibilities of this project, I will not vary the level of exposure to the experimenter. There is also evidence when exposure to the experimenter is not very strong, that the observed behavior does not differ significantly between single- and double-blind settings in the most common games (Barmettler et al., 2012). Moreover, in my experiment, an experimenter can immediately observe only earnings of the subjects, not their decisions, and it is difficult to infer decisions from earnings (details later).

[11] The exchange rate at the time of the experiment was approximately 1 USD = 19.2 CZK or 1 EUR=25 CZK.

sequentially in random order. After all five decisions are made, one of the presented pie sizes and corresponding decision is chosen as payoff-relevant[12]. This way I have five decisions spread across the whole support of the distribution. Also this design allows me to test whether there are some effects of the absolute size of the pie on the share given to receivers. After the dictators make their decisions in this stage of the experiment, I elicit estimates from the recipients about the pie size based on the amounts observed that they receive and also the estimates of dictators about the recipients' estimates (second-order beliefs).[13] If their estimate is correct within range $\pm$ 7 from the true value, they earn an additional bonus. These data allow me to control for an effect of fulfilling somebody's expectations when making decisions (trying to avoid guilt).

In the next stage, I ask the subjects to rate the intensity of ten emotions [14] on a scale from 1 (very low) to 7 (very high). They are chosen in a way that includes a spectrum of positive/negative emotions towards either self or others. Another reason to include more emotions was to dilute the salience of the emotion of core interest (shame). Consequently, they are asked to estimate the intensity of these emotions by their counterpart. If this estimate is at most 1 point from the true value, they earn an additional bonus (40 CZK). The purpose of this elicitation is to control for another channel as to how shame may step into the decision making process. Some subjects may not realize the utility consequences of pie revelation ex ante in a one shot game without previous experience. Therefore the threat of negative emotion may not change their behavior. However it may lead to an increased intensity of some emotions ex post.

Finally, subjects are asked to fill out a questionnaire asking for their basic socio-demographic characteristics, what they consider to be a "fair" split, and the number of people in the lab they knew before the experiment (to control for a potentially different initial level of anonymity they perceived). Female subjects are also asked questions about their menstrual cycle, as different levels

[12]Using the strategy method should not lead in this case to qualitatively different results than using the direct method (Brandts and Charness, 2009).

[13]Because this takes some time I need to keep recipients busy with a different task to prevent revealing the type of each player. Recipients are asked to complete a general knowledge test with multiple choices. They are motivated by some small reward for each correct answer. The presence of this test has not been mentioned in the paper instructions and dictators are not informed about this for the duration of the whole experiment in order to prevent possible distributional effects.

[14]Happiness, Disappointment, Envy, Shame, Regret, Guilt, Contempt, Anger, Sympathy, and Gratitude

of estrogen in different phases of the cycle could significantly influence their behavior; for more details see Chen et al. (2013). Then subjects are presented with a screen which informs them about their earnings from the experiment with an added show-up fee. In order to prevent inference about the pie size from possibly earned bonuses in some treatments, the feedback consists only of the sum of all earnings.

4.2 Treatments

One dimension of this experiment is based on a varying ex-post disclosure of the pie size. In the first alternative, the pie size is not revealed to recipients. In the second alternative, both player types are ex-ante informed that the pie size will be revealed ex-post, after the decision about splitting it is made. In this case the level of the dictator's anonymity in front of the recipient is held constant. This variation is aimed at testing the predictions of the model about the information asymmetry.

The second dimension of the experiment is aimed at the effect of exposure and more specifically at the threat of shame (which is not connected to the financial consequences of someone's decision). Therefore, a third party observer is added (Type C). This observer has no power to influence the outcome of splitting. On the other hand, an observer can always see the camera shot of the dictator's face, together with the pie size and his decisions (no connection to the variation of the pie-size disclosure to the recipients). Each dictator is observed by one observer. Earnings of observers are determined by a random draw from four possible values at the end of the experiment[15]. So, a combination of two possible ex-post pie size disclosure options (pie size not known to the recipient at the end of the experiment - NK, pie size known - K) and two options for the presence of observers (observer present - O, no observer - NO) gives a 2x2 factorial design.

[15]I also needed to keep observers busy at the time dictators are splitting the pie in order not to reveal the role assignment. They are asked to estimate the decisions of the observed dictators and are motivated by a small bonus (40 CZK or 2 USD) or if they are close to the actual decision. This is not announced to the players in the written instructions and only observers learn this from additional on-screen instructions.

4.3 Hypotheses to be tested

The described design allows me to test the following hypotheses connected with the effect of exposure on dictators' decisions. All of them are in the form of null hypotheses with alternative hypotheses of dictators sending different amounts in different treatments.

- *Hypothesis 1: Dictators do not send a different share of the pie when their decision is fully revealed to the recipients.*
- *Hypothesis 2: Dictators do not send a different share of the pie when their decision is fully revealed to the financially unaffected observers when their anonymity is partially broken.*

I will test both hypotheses at the level of overall means but also at the extensive or intensive margins, in order to have more information about the source of the possible variation in the overall outcome values.

4.4 Procedure

The experiment took place in the Laboratory of Experimental Economics at the University of Economics in Prague at the end of October 2012 and in the first half on November 2012. The experiment was computerized using zTree software (Fischbacher, 2007). The experiment was conducted in English and subjects knew this when they registered for the sessions[16]. For O sessions, there were also 6 observers in each session and each observed two dictators. However, subjects were only told that each dictator is observed by one observer in the written instructions.

As the assignment of the roles is random and subjects need to understand this, a photo of each subject was required in the O sessions. This was done when they were entering the lab [17].

[16]There may be slight differences in understanding the meaning of various emotions across languages. So, in order to unify it, there was a brief English explanation of the emotions on the screen and also a Czech translation of these emotions (for the vast majority of the subjects, the Czech language is either their mother tongue or they have perfect command of it).

[17]Before this, the subjects needed to sign a consent form which stated they were informed about the photography issues together with the notice that the photo will be used for research purposes only and will not be shown in any output from the project. No one refused to participate in the experiment after finding out about this procedure.

4.5 Subjects

Together, 430 subjects participated in 16 sessions of this experiment (4 for each treatment)[18]. There were 12 dictator - recipient pairs (11 for one NO-K session due to an unexpectedly low turnout of participants) for all treatments in each session. The whole session lasted around 40 minutes for NO sessions and 45 minutes for O sessions. The average experimental payoff was 305 CZK including a show-up fee of 150 CZK. Subjects received their payoff privately in cash at the end of the experiment.

Subjects were mostly students studying at various universities in Prague[19]. The gender ratio was almost balanced (females 47.4%, males 52.6%)[20]. Regarding the country of origin, 69.3% of subjects were from the Czech Republic , 20.2% from Slovakia , 3.5% from Russia or Ukraine , 7% from other countries. For their majors, 76.3% of subjects have economics or business as their major, 8.4% science, engineering or medicine , 5.1% mathematics or statistics , 4.9% other social sciences , 5.3% humanities and other . Subjects also differ in the academic degree they hold: 57.2% of subject do not hold any degree, 35.6% hold a bachelor's degree, 7% a master's degree. The average age of the subjects was 22.3 years ranging from 18 to 38.

5 Results

5.1 Basic results

As there is absolutely no effect of the pie size on the share given to recipients, I normalize and report the decisions of the dictators in shares given to recipients for most of the analysis. Overall,

[18] The ORSEE database has been used for recruitment (Greiner, 2004).

[19] This minimizes concerns for future interaction and perception of the game continuation after the experiment. The subjects were asked to report on the number of people in the lab they knew before the experiment. 56% of dictators did not know anyone, 82.2% of dictators knew at most one person, 92.1% of dictators knew at most two people out of 23 (or 29, depending on treatment) subjects in the lab.

[20] In order to prevent big gender imbalances through the sessions, male and female subjects were recruited separately with the equal proportion of free places for each gender. This specific recruitment procedure was not known to the subjects. However, when the subjects came to the lab I did not insist on exactly balanced gender ratio of participants in order not to trigger thinking about possible experimenter's expectations.

Table 2: Mean share of the pie transferred to recipients with standard errors

		Disclosure	
		NK	K
Observer	NO	0.225 (0.030)	0.240 (0.027)
	O	0.269 (0.027)	0.319 (0.024)

in 13.2% of decisions, dictators kept the whole pie. The mean value of amount for the recipient across the treatments was 0.263. Offers higher than 0.5 could be observed in 6.4% of the cases with about half of such decisions are only slightly above half of the pie.[21]

Table 2 presents the mean share of the pie transferred to recipients together with the standard errors in parentheses (clustered at the subject level) for each treatment. Means are slightly higher for K and O treatments, what is in line with the predictions of the model. The subjects send the highest share of the pie when an observer is present and a recipient knows the exact size of the pie. A more detailed overview of decisions are in Figures 1 and 2 which present the cumulative distribution functions and histograms of the dictators' decisions in each treatment. From Figure 1 it is obvious that the distribution of the O-K treatment first-order stochastically dominates the distributions of all other treatments. Histograms show a higher share of the lowest offers in the treatments without observer and somewhat lower proportion of decisions sending around half of the pie.

As the decisions of one dictator cannot be considered to be independent, I use two approaches for the statistical analysis. In the first approach, I average the decisions within the subjects and then use the Mann-Whitney ranksum test (AV). In the second approach, I use the Mann-Whitney ranksum test with clustering at the subject level (CL) [22]. In both cases the null-hypothesis is that decisions in two compared treatments are from the same distribution.

[21]Most unusually high offers are caused by few subjects. This behavior may be caused by a misunderstanding of the instructions as these subjects reported very high levels of regret, envy and disappointment compared to other dictators and their reported fairness perceptions do not differ from other dictators. Omitting these subjects from data analysis does not qualitatively change the main results so I decided to keep them in the data set for further analysis. If their presence will changes the results, I will comment on it.

[22]For the details of this method see Newson (2002) or Datta and Satten (2005)

Figure 1: Cumulative distribution functions

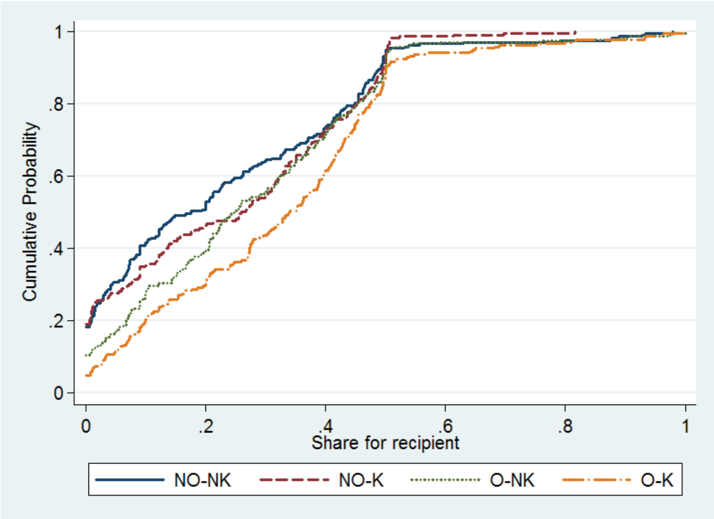

Figure 2: Histograms

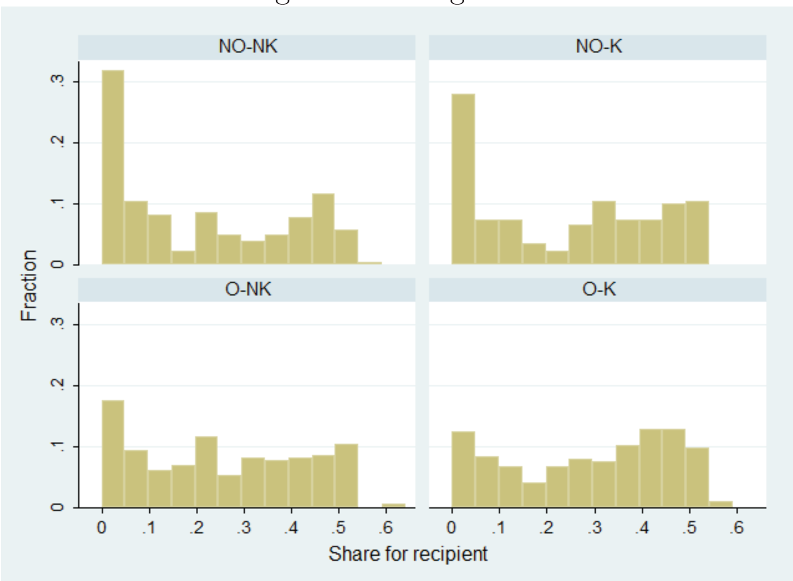

Table 3 presents p-values of all relevant comparisons. The effect of disclosure is not significant given that the observer is not present, with the presence of an observer the subjects send higher shares when the pie size is disclosed after the decision, and this effect is marginally significant. A more detailed analysis of disclosure is provided in the separate subsection. Comparing treatments with and without an observer, dictators send higher shares when somebody observes them, but this difference is statistically significant only when a recipient can ex-post observe the pie size. Testing for the joint effect of observer and disclosure (O-K treatment compared to NO-NK treatment), dictators send significantly higher shares when both players, recipient and observer, are fully informed about their decisions.

Table 3: Testing for the equality of distributions, p-values of the ranksum tests for different comparisons

Compared treatments	**Mann- Whitney**	**M-W with clustering at the subject level**
NO-NK vs NO-K	0.599	0.618
O-NK vs O-K	0.098	0.176
NO-NK vs O-NK	0.202	0.194
NO-K vs O-K	0.060	0.056
NO-NK vs O-K	0.009	0.011

Imposing distributional restrictions and performing robustness checks with OLS or tobit specifications and share on the pie given to recipients as a dependent variable, the qualitative results are stable across different regression specifications. Changing the set of exogenous variables and clustering on the subject level, the dummy variable for observer presence has p-value at most 0.031 with a positive coefficient; the dummy variable for the presence of disclosure is insignificant at conventional levels regardless of the regression specification. There is only one other variable which is significant across all specifications and it is the gender dummy with a higher given share when a dictator is female. Other variables such as age, income, the number of people the subject knows present in the lab, degree held, major or reported fair split are not significant in any used specification[23].

Naturally, one could possibly argue that a change in behavior may be caused by the change in

[23]The results are available from the author upon request

second order beliefs. In that case, dictators just adjust their behavior in order to fulfill different beliefs they have about the recipients' expectations. That would support the guilt aversion approach in the previous literature (Dana et al., 2006, Charness and Dufwenberg, 2006). Comparing beliefs about a recipient's expectations, there is no statistically significant difference between beliefs in all treatment comparisons.[24] This result does not contradict the conclusions of the literature dealing with behavior motivated by fulfilling somebody's expectation but suggests the existence of some other channel causing the observed behavior. The predictions of the model about the exposure to the observer are confirmed by the data even for such small levels of exposure. The results suggest that even a much smaller intensity of exposure can change the behavior of people compared to the previous studies (e.g. Andreoni and Bernheim, 2009).

5.2 Information asymmetry

Comparing only the overall results for the disclosure dimension may be misleading, as the model allows different kinds of results depending on the heterogeneity in individual parameters, namely γ, and the functional form of the m function, in the total utility function. It may also be the reason for not obtaining significant differences in the disclosure dimension. Average data do not reflect heterogeneity in the utility functions. Even when there could be a significant difference at the individual level, it can be averaged close to zero in the aggregate data. As the purpose of this project was not calibration of these functions or parameters I can not test all the predictions of this model for the introduction of information asymmetry. However, I can examine the relation between m function value and the transfer in the information asymmetry environment. This examination tests Claim 2, that a higher induced pie size (belief of dictator about induced pie size) leads to a higher transfer, discussed in Section 2.2

The recipients were asked to provide their estimate of the pie size when they were able to observe only the transfer to them. Dictators were asked to provide their estimate of the recipient's estimate. Both estimates were incentivized. I can use the estimate of dictators about the induced pie size

[24]Either when using t-test (p-values are in the range from 0.282 to 0.943) or when relaxing the distributional assumptions and using the Wilcoxon rank-sum test (p-values from 0.424 to 0.834).

as a proxy for m function value in the information asymmetry treatments. Then I can compare this belief about the induced pie size with the actual pie size. Transfers by dictators, according to their beliefs about the induced pie size are presented in Table 4.[25]

Table 4: Transfers by the beliefs about the induced pie size

Mean share transferred (Number of subjects in the group)		
	NO-NK	O-NK
$m(x_j) > \pi$	0.311 (16)	0.384 (17)
$m(x_j) < \pi$	0.185 (30)	0.201 (28)

It is apparent that people with beliefs that they induce higher than actual pie size transfer higher amounts. I test for the statistical difference between the transfers using two approaches; comparing means of two different groups or using difference $m(x_j) - \pi$ as a predictive variable and share sent as a predicted variable.

I compare mean transfer by different groups ($m(x_j) > \pi$ vs. $m(x_j) < \pi$) using either t-test or ranksum test. There is statistically significant difference in transfer for O-NK treatment between two groups. For NO-NK the difference is marginally significant and depends on the test used.[26] I can also explore the relationship between the transfer size and deviation of $m(x_j)$ from the actual pie size, π. Results are qualitatively similar using either OLS or tobit specification. The relationship is statistically significant for O-NK treatments (p-value 0.002 for both specifications) and statistically significant for NO-NK treatment only at a 10% significance level (p-value 0.085 for OLS and 0.098 for tobit). Difference $m(x_j) - \pi$ is uncorrelated with any demographic measure (correlation coefficient at most 0.1)

Even though the data for testing information environment predictions is limited (caused by the focus of the experimental design), the results are in line with the predicted outcome. Higher induced pie size is connected with higher transfers to recipients.

[25] I exclude 2 resp. 3 subjects from NO-NK resp. O-NK treatments with $m(x_j) = \pi$ as there are only few of them for a proper analysis.

[26] p-value for O-NK (NO-NK) treatments is 0.005 (0.059) for two tailed t-test, and p-value for Wilcoxon rank-sum test is 0.003 (0.124)

5.3 Intensive margin vs. Extensive margin

A detailed inspection of both intensive and extensive margins is needed for a better understanding of the treatment effects. If the mean of the shares for a recipient is higher in one treatment compared to another there are two possible reasons behind it (or a combination of them): first, the increase in mean contribution for dictators giving a positive amount (intensive margin) and second, an increase in the number of dictators giving a positive amount (extensive margin).[27] Also if there is no treatment effect in the overall means, we cannot make conclusions about the effects at the margins.

For the extensive margin, I was comparing the share of decisions giving positive amounts between the treatments (summarized in Table 5). Comparisons between O and NO treatments show a significant difference between the proportions of subjects giving something positive(p-values at most 0.013)[28]. Comparisons between K and NK differ in their results. While in the O dimension there is also a significant difference between the K and NK treatments (p-values from 0.026 to 0.05), there is no such result in the NO dimension (p-values from 0.577 to 0.942). For the intensive margin, comparing the means of the subject who gave something positive, dictators send slightly higher amounts in K treatments compared to NK treatments and also in O treatments compared to NO treatments. However, this difference is not statistically significant.[29]

So, the differences between the amounts sent in different treatments are caused mainly by the different share of decisions keeping the whole pie. However, the sent positive amounts (conditional on sending a positive amount) do not differ statistically between the treatments. The change in proportion of people keeping the whole pie is in line with the results of Andreoni and Bernheim (2009). However, there is no significant increase in the decisions around the 50-50 division of the

[27]It is straightforward to make a division between no giving at all and giving something positive at the zero contributions. But some subjects may perceive also giving 1 to the recipient as giving "nothing" for some reasons. For some of them, the lowest possible amount in their mental domain of splitting the pie may be 1 or they might have understood the instructions in a way that they need to transfer at least something. In order to see whether the results are sensitive to this division, I performed all the following tests considering either 0 or 1 or 2 as giving nothing.

[28]Using a proportion test

[29]the Wilcoxon rank-sum tests

Table 5: Share of the non-zero amounts given (with the clustered standard errors)

		Disclosure	
		NK	K
Observer	NO	0.817 (0.052)	0.809 (0.054)
	O	0.896 (0.043)	0.95 (0.029)

pie. This may be due to already mentioned differences between the experimental designs.

5.4 Reported emotions

The subjects were also asked to report the intensity of their emotions after a random choice of payoff relevant split and a possible disclosure in this experiment. Also they were asked to guess at the intensity of the emotions of their counterpart. Regarding the emotions of dictators, I have two relevant sets of emotions in the data. The first set comes directly from dictators and the second set comes from recipients when they were asked to estimate the intensity of emotions for dictators (incentivized).

For the first set, reported intensities of emotions are largely concentrated around the lowest values. The modal value is 1 for 9 out 10 emotions (except for happiness) and the median value is at most 2 for 7 out of 10 emotions. For some emotions it could obviously be expected given their essence and purpose of their presence (see Section 3.1.). However, lower intensities are frequently also reported for the emotions of interest (shame, guilt). There is obviously some weak linear relationship for shame depending on the shares, which is stronger when I exclude the six clearly outstanding observations for the subjects giving unusually high shares to recipients (correlation coefficient changes from -0.21 to -0.27).[30] For the second set of reported emotions coming from the estimates of recipients, the same concentration of data around the lowest values and weak correlation with dictators' decisions can be observed.

[30]These subjects report a relatively high intensity of shame together with anger, disappointment or envy. As there is strong suspicion that these subjects did not understand the instructions correctly, it is very likely that their reported emotions are confounded also with emotions coming from this fact (besides the decision itself).

This may be caused by a few reasons which may be crucial for different subjects reporting their emotions: subjects make decisions in order to avoid a higher intensity of negative emotions, they lack the incentives to report their true emotions, or the experimental setting, in general, does not induce these kinds of emotions for them. Although I cannot rule out the last two reasons completely, there is evidence in previous works that subjects do not report their emotions only at the lowest intensities (e.g. Reuben and Van Winden, 2010). The results of emotion elicitation are in line with the argument that subjects try to prevent negative emotions by changing their actions (and this is expected also by the recipients).

6 Discussion

Information asymmetry is very likely to occur in social interactions. It is not possible to explain observed behavior within the framework of current inequality aversion models. I introduce a model which studies inequality aversion also in the environment of information asymmetry. The model can be extended by different motives as to why people care about others. In this paper it incorporates the level of observability from the other people as well. So, in this way it can be used to analyze different forms of shame effects. I test predictions of the model in the economic experiment.

This experimental design was aimed at testing the effects of shame coming from exposure in an environment where subjects have the possibility to partially hide their true actions in front of their counterparts. Compared to the previous literature, the experiment was designed in a way which removes any strategic or efficiency concerns. The purpose was to focus the attention of subjects to the exposure and trigger their thinking about it before making their distributional decisions.

There are two main contributions of this paper. The first is in creating a unified theoretical framework for studying wide a range of behavior in an environment with various information asymmetries and exposure levels. The second is in the experimental design, which studies the shame effects without the confounds present in the previous studies.

The aggregate results show that exposure, even to a third party observer, has a significant effect on dictators' decisions in dictator games. The result is in line with the results of audience-effects literature (Andreoni and Bernheim, 2009), but the effect is present in an environment with much lower level of observability. Another important theoretical and experimental result is that behavior in the information asymmetry environment is sensitive to the beliefs of the decision maker about the beliefs which his actions would induce in the less informed agent. A more detailed inspection of the data showed that decreased anonymity leads to a lower fraction of dictators keeping the whole pie but does not lead to an increase in average positive transfers. This suggests that policies aimed at the public disclosure of actions or identity are more likely to cause an increase in the share of giving people rather than an increase in given amounts.

The results suggest that the ex-post removal of anonymity or information asymmetry has the power to trigger thinking about consequent exposure and the possible threat of shame. More importantly, this cognitive process is transferred to different actions more likely than to different intensities of emotions. Given the experimental design (only one anonymous observer, anonymity in front of the recipient, no punishment etc.) the observed results are very likely to describe a lower bound of the possible effects. Although there is need for further research regarding the various forms or intensities of exposure, the relatively cheap ex-post disclosure of either actions or of the identity of the agents is able to change their decisions ex-ante.

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References

Andreoni, J., Bernheim, B. D., 2009. Social image and the 50–50 norm: A theoretical and experimental analysis of audience effects. Econometrica 77 (5), 1607–1636.

Andreoni, J., Miller, J., 2003. Giving according to garp: An experimental test of the consistency of preferences for altruism. Econometrica 70 (2), 737–753.

Bacharach, M., 1992. Backward induction and beliefs about oneself. Synthese 91 (3), 247–284.

Barmettler, F., Fehr, E., Zehnder, C., 2012. Big experimenter is watching you! anonymity and prosocial behavior in the laboratory. Games and Economic Behavior 75 (1), 17–34.

Binmore, K., 1987. Modeling rational players: Part i. Economics and philosophy 3 (02), 179–214.

Brandts, J., Charness, G., 2009. The strategy method: A survey of experimental evidence. Tech. rep., mimeo, Department of Business Economics U. Autònoma de Barcelona and Department of Economics, UC Santa Barbara.

Camerer, C. F., 2011. Behavioral game theory: Experiments in strategic interaction. Princeton University Press.

Charness, G., Dufwenberg, M., 2006. Promises and partnership. Econometrica 74 (6), 1579–1601.

Chen, Y., Katuščák, P., Ozdenoren, E., 2013. Why can't a woman bid more like a man? Games and Economic Behavior 77 (1), 181 – 213.

Dana, J., Cain, D. M., Dawes, R. M., 2006. What you don't know won't hurt me: Costly (but quiet) exit in dictator games. Organizational Behavior and Human Decision Processes 100 (2), 193–201.

Datta, S., Satten, G. A., 2005. Rank-sum tests for clustered data. Journal of the American Statistical Association 100 (471), 908–915.

Fehr, E., Gächter, S., 1999. Cooperation and punishment in public goods experiments. Institute for Empirical Research in Economics Working Paper (10).

Fehr, E., Schmidt, K. M., 1999. A theory of fairness, competition, and cooperation. The quarterly journal of economics 114 (3), 817–868.

Fehr, E., Schmidt, K. M., 2006. The economics of fairness, reciprocity and altruism–experimental evidence and new theories. Handbook on the economics of giving, reciprocity and altruism 1, 615–691.

Fischbacher, U., 2007. z-tree: Zurich toolbox for ready-made economic experiments. Experimental Economics 10 (2), 171–178.

Flores, N. E., 2002. Non-paternalistic altruism and welfare economics. Journal of Public Economics 83 (2), 293–305.

Greiner, B., 2004. The online recruitment system orsee 2.0-a guide for the organization of experiments in economics. Tech. rep., Working Paper Series in Economics, University of Cologne.

Holt, C. A., 2007. Markets, games, & strategic behavior. Pearson Addison Wesley.

Lewis, Helen, B., 1971. Shame and guilt in neurosis. Psychoanalytic review 58 (3), 419–438.

Loewenstein, G. F., Thompson, L., Bazerman, M. H., 1989. Social utility and decision making in interpersonal contexts. Journal of Personality and Social psychology 57 (3), 426.

Mitzkewitz, M., Nagel, R., 1993. Experimental results on ultimatum games with incomplete information. International Journal of Game Theory 22 (2), 171–198.

Nagel, R., 1995. Unraveling in guessing games: An experimental study. The American Economic Review 85 (5), 1313–1326.

Newson, R., 2002. Parameters behind "nonparametric" statistics: Kendall's tau, somers'd and median differences. Stata Journal 2 (1), 45–64.

Ong, D., Lin, H. H., 2011. Deserving altruism: An experiment in pure indirect reciprocity. Available at SSRN 1977665.

Rapoport, A., Sundali, J. A., 1996. Ultimatums in two-person bargaining with one-sided uncertainty: Offer games. International Journal of Game Theory 25 (4), 475–494.

Rege, M., Telle, K., 2004. The impact of social approval and framing on cooperation in public good situations. Journal of Public Economics 88 (7), 1625–1644.

Reuben, E., Van Winden, F., 2010. Fairness perceptions and prosocial emotions in the power to take. Journal of Economic Psychology 31 (6), 908–922.

Selten, R., 1967. Die strategiemethode zur erforschung des eingeschräncht rationalen verhaltens in rahmen eines oligopolexperiments', in beitraägge zur experimentellen wirtschaftforschung, ed. by h. sauermann, tübingen: Jcb mohr.

Straub, P. G., Murnighan, J. K., 1995. An experimental investigation of ultimatum games: Information, fairness, expectations, and lowest acceptable offers. Journal of Economic Behavior & Organization 27 (3), 345–364.

Tadelis, S., 2007. The power of shame and the rationality of trust. Available at SSRN 1006169.

Tangney, J. P., 1995. Recent advances in the empirical study of shame and guilt. American Behavioral Scientist.

Tangney, J. P., Dearing, R. L., 2003. Shame and guilt. Guilford Press.

Appendix

Derivation of model predictions

Complete information

For the basic setting with full information each agent faces the following maximization problem:

$$\arg\max_{x_j} \pi - (1-\gamma)x_j - \gamma h(\pi - 2x_j) \qquad \text{s.t. } x_j \geq 0$$

A solution of the problem gives the first order condition of $1 - \gamma = 2\gamma h'(\pi - 2x_j)$, equating the marginal loss of utility from own material payoff with marginal decrease in disutility from inequality. This leads to an optimal transfer of x_j^cgiven by:

$$x_j^c = \begin{cases} \frac{1}{2}[\pi - h'^{-1}(\frac{1-\gamma}{2\gamma})] & \text{if } 1-\gamma < 2\gamma h'(\pi) \\ 0 & \text{if } 1-\gamma \geq 2\gamma h'(\pi) \end{cases}$$

Checking for the second order condition and using the convexity of h function, we get $-4\gamma h''(\pi - 2x_j) < 0$. So indeed, the value of the interior optimal transfer maximizes the utility of the agent.

Information asymmetry

In the information asymmetry setting the agent faces the following maximization problem:

$$\arg\max_{x_j} \pi - (1-\gamma)x_j - \gamma h(m(x_j) - 2x_j) \ \ \text{s.t.}\, x_j > 0$$

Solving this optimization problem we get the optimal value of transfer, x_j^a. The first order condition is$1 - \gamma = 2\gamma h'(m(x_j) - 2x_j) + m'(x_j)(1 - \gamma h'(m(x_j) - 2x_j))$ which yields either zero transfer if $1 - \gamma > 2\gamma h'(m(0)) + m'(0)(1 - \gamma h'(m(0))$ or positive value of $x_j = x_j^a$ which satisfies the above mentioned condition.

Comparison of x_j^c and x_j^a

The first order conditions for both information environments differ in one additional term in information asymmetry and in the argument of the h function. Considering assumption of $m'(x_j) > 0$, the outcome of the comparison depends on the sign of the F.O.C.s second term in the information asymmetry setting , $(1 - \gamma h'(m(x_j) - 2x_j^a)$, and on the relation between actual size of the pie and value of the m function. Given three possibilities of that sign and three possibilities for the sign of $\pi - m(x_j)$ expression we get nine possible predictions of the x_j^a value compared to x_j^c. The predictions are all described in the text and their derivations follow trivially from comparison of the first order conditions.

Exposure variable in the model

All utility maximization results remain the same with the replacement of parameter γ by parameter $\gamma(e)$ with its value depending on the information environment.

Comparative statics

Increase in exposure increases the value of parameter γ in this model. Looking at the comparative statics for optimal solution in full information situation we get the straightforward result:

$$\frac{d\,x_j^c}{d\,\gamma(e)} = -\frac{1+2h'(\pi-2x_j^c)}{2\gamma(e)h''(\pi-2x_j^c)(-2)} > 0.$$

For the environment with information asymmetry we get the following expression:

$$\frac{d\,x_j^a}{d\,\gamma(e)} = -\frac{1+h'(m'(x_j^a)-2x_j^a)[2-m'(x_j^a)]}{m''(x_j^a)[1-\gamma(e)h'(m'(x_j^a)-2x_j^a)]+\gamma(e)h''(m'(x_j^a)-2x_j^a)[2-m'(x_j^a)][m'(x_j^a)-2]}.$$

Using the assumption $m'(x_j) < 2$ we can easily see that the nominator of the fraction is positive. The sign of denominator is negative using the fact that $[2-m'(x_j^a)][m'(x_j^a)-2]$ product is negative and using the assumption of $m''(x_j^a)$ being very small and thus keeping the whole denominator in the negative value. So the result of comparative statics is the same as for full information setting:

$$\frac{d\,x_j^a}{d\,\gamma(e)} > 0.$$

Abstrakt

Studie představuje teoretický model averze k nerovnosti, který má využití také v situacích informační asymetrie. Model je založen na nepaternalistickém přístupu, kde funkce vlastního užitku zahrnuje užitek ostatních tak, jak je vnímán tím, kdo rozhoduje. Model navíc umožňuje rozšíření motivů, které můžou vést k pro-sociálnímu chování. Dále je rozšířen přidáním averze ke studu jako další motivace pro navenek altruistické chování. Hrozba studu je vyvolaná různými úrovněmi odhalení buď vlastních rozhodnutí, nebo vlastní identity před nezúčastněnými pozorovateli. Experimentálně také testuji předpovědi modelu, přičemž využívám jednoduchého prostředí hry Diktátor. Cílem tohoto experimentálního designu je odstranění možných zkreslujících behaviorálních efektů, přítomných v jiných hrách. Výsledky ukazují, že i nepatrné vystavení se studu má za následek signifikantně vyšší částky pro přijímatele. Analýza rovněž ukazuje, že lidé, kteří si myslí, že můžou zatajit své rozhodování před míň informovanými protějšky, využívají tuto informační asymetrii pro dosažení vyššího finančního zisku.

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