Us and Them: Distributional Preferences in Small and Large Groups*

Iris Kesternich† Michael Kosfeld‡
Heiner Schumacher§ Joachim Winter¶

September 4, 2013

Abstract

We analyze distributional preferences in games where a decider chooses the provision of a good that benefits a receiver and creates costs for a group of payers. The average decider takes into account the welfare of all parties, but large groups receive the same weight as small groups. Hence, she is insensitive to provision costs when costs are dispersed among many individuals. This holds regardless of whether the decider benefits from the provision or not. A CES utility function which rationalizes our results implies altruism in bilateral situations (like charity donations) and welfare-damaging behavior when costs are dispersed (like corruption).

Keywords: Social Preferences, Distribution Games, Concentrated Benefits and Dispersed Costs

JEL Classification: C91, D63, H00

*This research has profited through financial support by the DFG through MELESSA and SFB-Transregio 15. We would like to thank Guido Friebel, Dirk Engelmann, Martin Kocher, Henry Mak, Petra Nieken, Maximilian Rueger, Klaus Schmidt, Joergen Weibull and Nick Zubanov as well as seminar audiences at the Ifo/ CESifo & University of Munich & MEA Conference on Empirical Health Economics, the Hamburg Center for Health Economics, Harvard Health Care Policy, IUPUI, Marburg University and the Munich experimental brown bag seminar for valuable comments and discussions. We thank Suzan Elshout and the team of programmers at CentERdata Tilburg. We thank Rene Cyranek and the whole MELESSA team for their support. We thank Hendrik Brackmann for excellent research assistance.

†University of Munich, Germany, iris.kesternich@lrz.uni-muenchen.de.

‡Goethe-University Frankfurt, kosfeld@econ.uni-frankfurt.de.

§Goethe-University Frankfurt, heiner.schumacher@econ.uni-frankfurt.de.

¶University of Munich, joachim.winter@lrz.uni-muenchen.de.

1 Introduction

In many domains, an agent's decisions create both benefits for a small, well-defined group and costs that are dispersed among many individuals. When a politician decides about a policy that is favored by a special interest group, she has to weigh the benefits for this group against the costs that the policy creates for the general public. When a physician determines a patient's treatment, she affects not only the patient's well-being, but also the treatment costs that the insurance company (and hence the customers of this company) have to pay. Individuals engaged in illegal behaviors such as corruption or tax evasion typically redistribute income to themselves or their families at the expense of society.

To analyze these behaviors, we need to know how agents trade-off concentrated benefits against dispersed costs. Most theoretical work on special interests, physician behavior, corruption or tax evasion assumes perfectly selfish agents. However, most economists agree that such an assumption is made only to keep models tractable. There is substantial evidence from the lab and the field that a majority of individuals do not act in completely selfish manner when making decisions that affect the payoff of others.[1] One robust finding is that many individuals have a concern for helping the least well-off person in a group and/or a preference for efficient outcomes (Andreoni and Miller 2002, henceforth AM, Charness and Rabin 2002, Engelmann and Strobel 2004, Fisman et al. 2007). Nevertheless, it is unclear how social preferences are coined in situations where the costs of an action are large, but dispersed among many individuals. Does the average decider then still take into account the welfare of all parties? Or are social concerns restricted to small groups so that dispersed costs are neglected?

We use a controlled experiment to study preferences in distribution games with concentrated benefits and dispersed costs. In each game, a decider chooses the provision of a good which benefits a receiver, but also creates costs for P payers. The decider may or may not benefit from the provision of the good. The treatment variation is the number P of payers; we have $P = 1, 3, 6, 40$. In some distribution games, we keep the costs of provision constant across treatments so that a larger number of payers implies smaller costs per payer. In others, we keep the costs per payer constant, so that an increasing number of payers implies increasing costs of provision. If we assume that subjects are motivated by selfishness, maximin preferences and efficiency, the provision of the good should increase under the first variation (due to maximin preferences); and decrease under the second one (due to efficiency concerns).

[1] See, for example, Fehr and Schmidt (2006) for a review of the evidence from laboratory experiments. Bandiera et al. (2005) provide field evidence for social concerns at the workplace, and DellaVigna et al. (2012) for the role of altruism in charitable giving.

The experimental data exhibit the following deviation from these predictions. When we keep the costs per payer constant and increase the number of payers from one to three, we observe, as expected, a significant drop in the provision of the good. However, if we further increase the number of payers from three to six, and from six to forty, the average provision of the good remains constant. The average decider takes into account the payoff of all parties, but large groups of payers seem to receive just the same weight as small groups. This result holds regardless of whether the decider benefits from the provision of the good or not.

As an example, consider the distribution game where the decider's payoff is kept fixed at 15 tokens, the receiver's final payoff is $5+x$ tokens (where $x \in \{0, ..., 10\}$ is the provision of the good) and the final payoff of each of the P payers is $15-x$ tokens. If there is only one payer, subjects provide on average 4.98 units of the good so that the receiver's and the payers' payoffs are equalized. If there are three, six or forty payers, the average provision is around 3.40 units. For the treatment with forty payers this means that the average receiver additionally earns 3.40 tokens through the provision of the good, while the group payoff decreases by 132.60 tokens.

Our study proceeds in three steps. First, we report the experiment and its results. We find that the average decider has concerns for efficiency: in dictator games between the decider and the receiver (the decider pays for the provision of the good, while the payers' payoff is fixed), the average provision of the good is larger if the receiver's marginal benefit exceeds the decider's marginal costs than if it is the other way round; in games with concentrated benefits and dispersed costs, the average provision of the good increases in the receiver's marginal benefit (the opposite should be true if subjects were only motivated by selfishness and maximin preferences). However, if we increase the number of payers while keeping the marginal cost per payer constant, the average provision of the good is the same for small and large groups.

In a second step, we develop a social preference model that rationalizes these seemingly contradictory patterns. Specifically, we update the CES utility function that AM use to estimate preferences in dictator games. The only new element that we introduce is the weight of a single payer's payoff as a function of the number of payers P. We can rationalize our results qualitatively if we assume that this function is concave and quickly converges to a finite value for $P \to \infty$ so that large groups receive the same weight as small groups.

In the third step, we discuss the economic implications or this social preference model. First, it admits "moral ambiguity": altruistic behavior in bilateral situations (or small groups) as well as welfare-damaging behavior in large groups when the costs of an action are dispersed among many individuals. Or, to put it in more picturesque terms, both charity donations to a clearly specified victim and tax evasion can be optimal behaviors for the average decider. Second, it implies that insurance coverage matters for medical decision making. Physicians may recommend an expensive but inessential treatment only to those patients whose insurance company pays for the treatment costs. Third, our social preference model predicts that altruism is congestible. Donations can be large for a single victim, but may be very small or zero when they are distributed among many recipients.

The rest of the paper is structured as follows. Section 2 describes the experimental setup. In Section 3, we present the experimental results. In Section 4, we develop a social preference model that rationalizes our results. In Section 5, we discuss the economic implications of this preference model. Section 6 concludes.

2 Experimental Design

Basic Set-Up. We adopted an experimental design that allows us to study distributional preferences in games with concentrated benefits and dispersed costs. In each game, the decider chooses the provision $x = 0, 1, ..., 10$ of a good, which affects her own payoff, $\pi_d = 15 + ax$, the payoff of a single receiver, $\pi_r = 5 + bx$, and the payoff of P payers, $\pi_p = 15 - cx$. The receiver has a lower endowment than the other parties so that there exists a motive to redistribute payoffs. The parameters a, b and c vary between treatments and games. In each treatment, the number of payers is fixed. We have four treatments with P equal to one, three, six and forty. We call them $P1$, $P3$, $P6$ and $P40$, respectively. Table 1 displays the parameter values for all treatments and games.

[**Insert Table 1 about here**]

We briefly describe our distribution games. The first four games in each treatment are dictator games between the decider and the receiver. In each dictator game, we have $a = -1$ and $c = 0$; the parameter b varies between games. With the dictator games we can test whether subjects' behavior in our experiment is comparable to that observed in previous studies on dictator game giving.

The remaining distribution games have concentrated benefits and dispersed costs. We are interested in the role of concerns for efficiency and for the least well-off individual in these games. Will subjects help the receiver even if the provision of the good substantially reduces the group payoff, but costs are distributed among many payers? To what extent do monetary incentives matter for subjects' decisions in these situations?

In games 5 and 6 of the treatments $P1$, $P3$ and $P6$, we keep the cost per unit of the good ($P \times c$) constant across treatments. The larger the number of payers, the smaller is the cost per unit and payer. We call these games "cost dispersion games". The provision of the good benefits both the decider and the receiver, but decreases the group payoff.

In each cost dispersion game, we have $a = 0.5$, $Pc = 1.5$; the parameter b varies between games.
In the last six games of the treatments $P1$, $P3$ and $P6$, we keep the cost per unit and payer (c) constant across treatments. The larger the number of payers, the larger is the cost per unit. In games 7 to 10, the provision of the good benefits both the decider and the receiver. We call these games "growing inefficiency games". In each of these games, we have $a = 1.0$, $c = 1.0$; the parameter b varies between games. In games 11 and 12, the decider has no monetary incentives. We call these games "discrimination games". There we have $a = 1.0$, $c = 1.0$; b again varies between games. By comparing behavior in the growing inefficiency and discrimination games we can study the impact of economic incentives on behavior.
With the last eight games of the treatment $P40$, we can study how subjects trade-off their own and the receiver's payoff against the payers' payoff when the provision of the good is very costly for the group. For example, in game $P40.5$ (where decider benefits from the provision) the group payoff decreases by 38 tokens for each unit provided, and in game $P40.10$ (where the decider has no monetary incentives) the group payoff decreases by 39 tokens for each unit provided.

Experimental Procedures. In a treatment with P payers, subjects are paired up randomly into groups of size $P + 2$. Each subject chooses the provision of the good x in the 12 distribution games. After the experiment (that is after all choices have been made), we randomly pick one game for each group that is implemented. We also randomly select one subject from each group that takes on the role of the decider and one subject that takes on the role of the receiver. The other subjects of the group take on the role of payers. The decider's action in the chosen game then determines the payoffs of all group members. Hence, subjects' decisions can only affect their own payoff when they are chosen to be the decider, not when they are in the role of the receiver or of a payer. This is explicitly communicated to participants.
Subjects get no feedback about the actions of others except through their payment after the experiment. When making their decision, subjects receive detailed information about the (potential) consequences of their action on the decision screen: their own payoff, the receiver's payoff, the payoff of each payer, and the group payoff (see the Online Appendix for a typical decision screen).
The experiment was conducted over the internet and administered by CentERdata, Tilburg University. We obtained the data in anonymized form (this was made clear to participants in the invitation e-mails and on the first screen of the experiment). All screens shown to the subjects in our internet experiment are displayed in the Online Appendix. We recruited 383 subjects through ORSEE (Greiner 2004) from the subject pool

of the Munich Experimental Laboratory for Economic and Social Sciences (MELESSA). Participants were students of all faculties of the University of Munich. 98 subjects were randomly assigned to treatment $P1$, 101 to treatment $P3$, 91 to treatment $P6$ and 93 to treatment $P40$. On the first screens of the experiment, participants answered several survey questions on demographic variables. We then carefully explained the design using several numerical examples. Subjects could participate in the experiment only if they correctly answered two control questions. Access to the experiment was open for two weeks. Payments were made one week after the experiment. A participant's payoff of π tokens was converted into 0.5π EUR. Average earnings (which include a 4 EUR show-up fee) were 10.06 EUR.

Conjectures. We derive a set of conjectures about subjects' behavior in the experiment. Previous studies have shown that the dominant behavioral motives in distribution games are selfishness, efficiency and the maximization of the payoff of the least well-off individual. In the following, we assume that subjects care about these motives.
Consider first the dictator games. If subjects only care about their own payoff, the group payoff and the payoff of the least well-off individual, the average provision of the good in the dictator games is independent of the number of payers. Next, consider the cost dispersion games. For any given action, the decider's own payoff and the efficiency of provision are constant across treatments. However, the costs per payer decrease as the number of payers increases. The optimal provision for subjects who care for the least well-off individual increases in the number of payers. We therefore expect that concerns for the least well-off individual increase the provision of the good when the number of payers increases. Finally, consider the growing inefficiency and discrimination games. In each of these games, the decider's monetary payoff and the maximin action do not vary across treatments. Since provision cost increase in P, we expect that efficiency concerns decrease the provision of the good when the number of payers increases. We summarize our conjectures:

CONJECTURE 1: In the dictator games, the provision of the good is independent of the number of payers.

CONJECTURE 2: If we keep a, b and provision costs $P \times c$ constant, the provision of the good increases in the number of payers.

CONJECTURE 3: If we keep a, b and provision costs per payer c constant, the provision of the good decreases in the number of payers.

Finally, the variation of the receiver's marginal benefit b in each class of games allows us to check within-subject which motive is on average the stronger one: efficiency or concerns for the least well-off individual. If efficiency concerns are stronger than concerns for the least well-off individual, the provision of the good should increase in b (and vice versa).

3 Experimental Results

3.1 Average Behavior in the Dictator Games

Figure 1 shows the average amounts provided in each treatment and dictator game. One third of our subjects are purely selfish and provide 0 units in all dictator games. Over all parameter values and treatments, subjects provided on average 20.4 percent of the maximum possible amount. Hence, average behavior is very similar to typical mean allocations in the studies reported by Camerer (2003). In games 1 and 2, the average provision is 2.43 and 2.47 units, respectively; in games 3 and 4, the average provision is 1.61 and 1.63 units, respectively. Subjects' average reaction to the price of giving is close to the one reported in AM.[2]

[Insert Figure 1 about here]
[Insert Table 3 about here]

The number of payers has no influence on subjects' decisions. A non-parametric rank-sum test does not reject the equality of the distributions of provisions by P in pairwise comparisons (p-values lie between 0.55 and 0.99). Table 3 confirms this result in a linear regression. We regress the number of units provided on the number of payers P, the receiver's marginal benefit b and gender. Standard errors are clustered by subject. The number of payers has no significant influence on the provision of the good. Also, subjects do not react differently to changes in b when P changes (see the interaction terms between b and P in the second specification).

OBSERVATION 1: In the dictator games, the provision of the good is independent of the number of payers. This confirms Conjecture 1.

This result also indicates that there are no demand effects in our experiment (see the discussion in Levitt and List 2007). The probability that one's decision in a given dictator game becomes implemented in a treatment with P payers equals $1/12 \times 1/P$. Hence,

[2] If the relative price of giving (in our case $-a/b$) equals 2, 1, and 0.5, the average provision in AM is 20.7-21.2, 16.9-24.3 and 30.3-32.3 percent, respectively (see Table 1 in AM). In our data, if the relative price of giving equals 2, 1.11 and 0.5 the average provision is 16.3, 16.1 and 24.3 percent, respectively.

it's much cheaper to make altruistic choices when the group is large (in treatment $P40$) than when it is small (in treatment $P1$). If a fraction of subjects cares for its reputation of being an altruistic person, we should observe higher average provision of the good in $P40$ than in $P1$. However, this is not the case.

Like Andreoni and Vesterlund (2001) we find a significant gender-effect, see specification 3 of Table 3. Men provide more of the good than women if the provision of the good increases the group payoff, and less if it decreases the group payoff.

Following AM, we use behavior in the dictator games to classify subjects into (weak) selfish, maximin and efficiency types according to the smallest Euclidean (mean square) distance between their choices and the prediction of the pure types.[3] We thereby get a coarse estimate about their dominant behavioral motive in distribution games. Of course, a subject may care for more than one of these motives. However, this classification will facilitate the interpretation of the subsequent results.

Over all treatments, 60.6 percent are selfish, 31.5 percent are maximin, and 7.9 percent are efficiency types. The respective numbers in AM are 47.2, 30.4 and 22.4 percent. However, their sample consisted of economics students who have a higher preference for efficiency, see Fehr et al. (2006). The distribution over types is almost the same across all treatments.[4]

3.2 The impact of cost dispersion on behavior

We next explore to what extent subjects change the provision of the good when the costs are dispersed among an increasing number of payers. Subjects who are only motivated by selfishness and/or efficiency should provide the same amount, regardless of the degree of cost dispersion. Subjects who are partially motivated by maximin preferences should provide more of the good if the number of payers increases.

[Insert Figure 2 about here]
[Insert Table 4 about here]

Figure 2 displays the average amounts provided in the cost dispersion games. In both games, average provision increases by about 27 percent if the costs of provision are distributed among six payers instead of one single payer (from 5.16 to 6.53 units in game 5,

[3]The utility function of the purely selfish type is given by $U(\pi_d, \pi_r, \pi_p) = \pi_d$, that of the pure maximin type by $U(\pi_d, \pi_r, \pi_p) = \min\{\pi_d, \pi_r, \pi_p\}$, and that of the pure efficiency type by $U(\pi_d, \pi_r, \pi_p) = \pi_d + \pi_r + P\pi_p$. In the four dictator games, the selfish type always provides zero, the maximin type provides 3-4/4/5-6/6-7, and the efficiency type provides 10/10/0/0, respectively.

[4]The share of (weak) selfish types in a given treatment varies between 58.2 and 62.2 percent, the share of (weak) maximin types varies between 28.9 and 36.3 percent, and the share of (weak) efficiency types varies between 5.5 and 9.0 percent, see Table 7 in the Appendix for details.

and from 5.03 to 6.38 units in game 6). Equality of the distributions of units provided in $P1$ and $P6$ can be rejected at the 5 percent level using a nonparametric rank-sum test. Table 4 provides further support for our result in a linear regression analysis. The effect is always significant at the 5 percent level if we compare the treatments $P1$ (the reference category) and $P6$. The difference between $P3$ and $P6$ is not significant. This may be due to the fact that the optimal action for maximin types is the same in $P3$ and $P6$.

OBSERVATION 2: The provision of the good is increases in the number of payers if the cost per unit remain constant. This confirms Conjecture 2.

If we distinguish between social preference types, we see that the increase in the provision of the good is significant at the 1 percent level for the maximin types (according to a one-sided t-test between $P1$ and $P6$), but not for selfish and efficiency types. However, if we consider more extreme versions of cost dispersion, the effect of cost dispersion is significant at the 5 percent level for all preference types (see games $P6.7/P40.9$ or $P3.11/P40.12$ in Table 7).

3.3 The impact of provision costs on behavior

To what extent do subjects reduce the provision of the good when its costs increase while the costs per payer remain constant? Subjects who are motived only by selfishness and/or maximin preferences should provide the same amount in all conditions. However, subjects who are partially motivated by efficiency should reduce the provision of the good when more payers are affected by its costs. Hence, for the growing inefficiency and discrimination games we expect that average provision decreases in the number of payers.

[Insert Figure 3 about here]
[Insert Table 5 about here]

Figure 3 shows the average amounts provided in the growing inefficiency games. When the number of payers increases from one to three, the average amount provided drops by around 25 percent. In a linear regression, this effect is significant for all games at the 1 percent level, see Table 5. However, when we further increase the number of payers from three to six, the average amount provided remains largely constant. The coefficients of $P3$ and $P6$ are not statistically different. Apparently, aggregate behavior becomes unresponsive to increasing costs of provision when the costs per payer remain constant. This result holds if we further increase the number of payers. The average provision in games $P6.7$ and $P40.5$ is 5.83 and 5.68, respectively.[5] So although there are much more payers affected in the last game, the provision of the good is essentially the same (when we test for equality of coefficients, the p-value is 0.784). The implied average damage for the group payoff is substantial. In game $P40.5$, for example, the decider and the receiver each earn on average 5.69 tokens through the provision of the good, while the group payoff decreases by 216.22 tokens.

[Insert Figure 4 about here]
[Insert Table 6 about here]

Figure 4 shows the average provision in the discrimination games. When the number of payers increases from one to three, the average amount provided drops by around 33 percent. In a linear regression, this effect is significant at a 1 percent level, see Table 6. When we further increase the number of payers from three to six, and from six to 40, the average amount provided again remains constant. Hence, even if it is costless for the decider to make choices that maximize group welfare, subjects become unresponsive to increasing costs of provision when the costs per payer remain constant. We summarize our results.

OBSERVATION 3. Average behavior becomes unresponsive to an increase in provision costs when the costs per payer remain constant. This rejects Conjecture 3. The result holds independent of whether the provision benefits the decider or not.

Can we conclude that our subjects do not care about efficiency when the number of payers is large? The answer is no. In all types of games of the treatments $P1$, $P3$ and $P6$, we vary b, the receiver's payoff per unit provided. A larger b implies that the provision of the good is less harmful for the group payoff. Efficiency concerns then increase the provision of the good when b increases. On the contrary, the maximin action decreases in b. Concerns for the least well-off individual decrease the provision of the good when b increases. We observe that the first effect dominates so that the provision of the good increases in b (see Tables 3-6). Hence, the average decider takes into account the payoff of all parties, but large groups of payers receive just the same weight as small groups. Consequently, the provision of the good under dispersed costs is substantial even if provision costs are very large.

We obtain some information about the behavioral motives that lead to this result if we compare the average behavior of the three preference types. Consider the average provision in the following growing inefficiency games (with $a = 1.0$, $b = 0.8/1.0$, $c = 1.0$):

[5] The parameters are identical among these games except that $b = 1.0$ in $P40.5$ instead of $b = 0.8$ in the other games.

	$P1.7$	$P3.7$	$P6.7$	$P40.5$
Selfish:	8.17	7.26	6.96	6.49
Maximin:	6.00	4.38	4.62	4.70
Efficiency:	9.63	2.33	2.63	3.60

Selfish types on average reduce the provision of the good as the number of payers increases, but at a decreasing rate. For the first two additional payers, provision decreases by 11.1 percent, while for the last 34 payers provision decreases by only 6.8 percent. Obviously, they care about the group payoff to some extent, but they do not reduce the provision of the good to low levels if the costs of provision become very large. Maximin types reduce the provision of the good on average by 27.0 percent for the first two additional payers, but then become unresponsive to further changes (which is what we would expect given their dominant behavioral motive). Efficiency types reduce the provision of the good to low levels once it reduces the group payoff (again, this is the expected outcome). Differences in means are significant for the first two additional payers for all types (p-values for one-sided t-tests ≤ 0.0518), while there are no statistically significant differences for the increases from three to six or 40 payers (p-values ≥ 0.2504).
A similar picture obtains if we consider the discrimination games with $a = 0.0$, $b = 1.0$, $c = 1.0$:

	$P1.11$	$P3.11$	$P6.11$	$P40.10$
Selfish:	4.88	3.52	3.32	2.94
Maximin:	5.00	3.69	4.42	4.61
Efficiency:	5.63	0.56	0.13	1.60

Selfish types again respond to growing costs at a decreasing pace: For the first two additional payers, provision decreases by 27.9 percent (p-value = 0.004), while for the last 34 payers provision only decreases by 11.4 percent (p-value = 0.267). So even if choices that maximize the group payoff are costless, selfish types become insensitive to increasing provision costs as long as the costs per payer remain constant. For maximin types, it hardly makes a difference whether the number of payers is one or 40. Efficiency types drastically reduce the provision of the good once it decreases the group payoff.
In summary, all preference types contribute to the unresponsiveness result. Maximin and efficiency types (roughly) act according to their dominant motivation, which implies the observed patterns. On average, selfish types are concerned with the group payoff to some degree, but the weight of additional payers becomes small as the number of payers increases.

4 Rationalizing Behavior with CES-Preferences

We develop a parsimonious social preference model that can rationalize our experimental data. It will capture the following observations: (a) giving in dictator games is strictly positive and independent of the number of payers; (b) cost dispersion increases the provision of the good; (c) the provision of the good reduces if we increase the number of payers from one to three, but (d) converges to a positive value if we further increase the number of payers; (e) the provision of the good increases in b, regardless of the number of payers.

AM rationalize the behavior of the three preference types in dictator games with the following CES-utility function:

$$U^{AM}(\pi_d, \pi_r) = (\alpha \pi_d^\rho + (1-\alpha)\pi_r^\rho)^{1/\rho}.$$

It provides a good fit for all preference types. The parameter α represents the weight of the own payoff relative to the payoff of others; the parameter ρ defines the convexity of the utility function. For the three preference types, AM estimate α in the range between 0.5 and 0.8, and ρ in the range between -0.4 and 0.7. We generalize AM's utility function to a setting with three parties where one party may consist of several individuals:

$$U(\pi_d, \pi_r, \pi_p) = \left(\frac{\alpha}{f(P)} \pi_d^\rho + \frac{0.5(1-\alpha)}{f(P)} \pi_r^\rho + \left(1 - \frac{\alpha}{f(P)} - \frac{0.5(1-\alpha)}{f(P)} \right) \pi_p^\rho \right)^{1/\rho}.$$

Compared to U^{AM} our utility function U contains one more object, $f(P)$. It captures the weight on a payer's payoff versus the own and the receiver's payoff as a function of the number of payers. We normalize $f(0) = 0.5(1+\alpha)$ so that for $P = 0$ our utility function U collapses to a linear transformation of U^{AM}. Moreover, we set $f(1) = 1$ so that for $P = 1$ the receiver's and the payer's payoff have the same weight in the utility function (note that the second term in U is multiplied by 0.5).

We show that if $\alpha < 1$, $\rho < 1$ and f is a weakly increasing function with $f(40) \approx f(6) \approx f(3) > 1$, then a decider with utility function U exhibits the behaviors (a) to (e). For convenience, we treat $x \in [0, 10]$ as a continuous variable. Recall that in each game $\pi_d = 15 + ax$, $\pi_r = 5 + bx$, $\pi_p = 15 - cx$. We abbreviate $U(x) = V(x)^{1/p}$. The first-order derivative is

$$\begin{aligned} U'(x) &= V(x)^{1/p-1} \frac{\alpha a}{f(P)} \pi_d^{\rho-1} + V(x)^{1/p-1} \frac{0.5(1-\alpha)b}{f(P)} \pi_r^{\rho-1} \\ &\quad - V(x)^{1/p-1} \left(1 - \frac{\alpha}{f(P)} - \frac{0.5(1-\alpha)}{f(P)} \right) c \pi_p^{\rho-1}. \end{aligned}$$

For all games, an interior optimum is characterized by the implicit function

$$\alpha a \pi_d^{\rho-1} + 0.5(1-\alpha) b \pi_r^{\rho-1} - (f(P) - \alpha - 0.5(1-\alpha)) c \pi_p^{\rho-1} = 0. \tag{1}$$

We prove property (a). In each dictator game, we have $a < 1$, $b > 0$ and $c = 0$. Since $\rho < 1$, the first term in (1) strictly increases in x, the second term strictly decreases in x, and the third term equals 0. Hence, there is a unique optimum, which is strictly positive if α is not too close to 1.

We prove property (b). In each game that is not a dictator game, we have $a \geq 0$, $b > 0$ and $c > 0$. Since $\rho < 1$, the first term in (1) equals 0 or strictly decreases in x, the second term strictly decreases in x, and the third term strictly increases in x. Consequently, there is a unique optimum in each distribution game. From the implicit function we get

$$\frac{dx}{dc} = \frac{-(1-\rho)^{-1}(f(P) - \alpha - 0.5(1-\alpha))\pi_p^{\rho-1}(1 + (1-\rho)cx\pi_p^{-1})}{\alpha a^2 \pi_d^{\rho-2} + 0.5(1-\alpha)b^2\pi_r^{\rho-2} + (f(P) - \alpha - 0.5(1-\alpha))c^2\pi_p^{\rho-2}}.$$

Since $f(P) \geq 1$ for $P \geq 1$ and $\rho < 1$, this expression is strictly negative. From $f(P) \approx const.$ for $P \geq 3$ it the follows that cost dispersion increases the provision of the good.

We prove property (c) and (d). Property (c) directly follows from (1) and the assumption that $f(1) < f(3)$, and property (d) follows from (1) and the assumption that $f(3) \approx f(6) \approx f(40)$.

We prove property (e). From the implicit function we get

$$\frac{dx}{db} = \frac{(1-\rho)^{-1}0.5(1-\alpha)\pi_r^{\rho-1}(1 - (1-\rho)bx\pi_r^{-1}}{\alpha a^2 \pi_d^{\rho-2} + 0.5(1-\alpha)b^2\pi_r^{\rho-2} + (f(P) - \alpha - 0.5(1-\alpha))c^2\pi_p^{\rho-2}}.$$

Since $\rho < 1$, this expression is strictly positive. Hence, the optimal action in each game increases in b.

The critical feature of utility function U is that it captures distributional preferences in small and large groups. All important behavioral motivations that we usually observe in distribution games, selfishness, efficiency and concerns for the least well-off individual, can be active in U independent of group size. However, if we assume that the weight on the payers's payoff converges to a fixed value, i.e., $\lim_{P\to\infty} f(P) = f < \infty$, then large groups receive the same weight as small groups. Consequently, large costs that are dispersed among many individuals have relatively little influence on behavior. In the next section, we discuss the economic implications of our preference model on social behavior, medical decision making and charity donations.

5 Economic Implications

Moral ambiguity. Our utility function U suggests that both pro- and asocial acts can be optimal at the same time for the average decider. Take, for example, donations $x \geq 0$ to a clearly specified, needy receiver and tax evasion $z \geq 0$. The decider maximizes utility from both activities. A donation is a transfer of x from the decider to the receiver. The monetary gain of tax evasion for the decider is z and the cost of tax evasion per (tax-)payer is $\frac{z}{P}$. Let π_d, π_r and π_p be the initial (positive) endowments of the decider, receiver and each payer, respectively. The decider will donate a positive amount to the receiver if

$$\frac{\partial}{\partial x}\left[\frac{\alpha}{f(P)}\pi_d^{\rho}\right] + \frac{\partial}{\partial x}\left[\frac{0.5(1-\alpha)}{f(P)}\pi_r^{\rho}\right] > 0,$$

which is the case when

$$-\alpha\pi_d^{\rho-1} + 0.5(1-\alpha)\pi_r^{\rho-1} > 0.$$

This equality holds for $\alpha < 1$ if the receiver is sufficiently poor relative to the decider. However, the decider will also evade taxes if

$$\frac{\partial}{\partial z}\left[\frac{\alpha}{f(P)}\pi_d^{\rho}\right] + \frac{\partial}{\partial z}\left[\left(1 - \frac{\alpha}{f(P)} - \frac{0.5(1-\alpha)}{f(P)}\right)\pi_p^{\rho}\right] > 0.$$

Since $f(P)$ is a monotone function, this inequality is implied by

$$\alpha\pi_d^{\rho-1} + \frac{1}{P}\left(f - \alpha - 0.5(1-\alpha)\right)\pi_p^{\rho-1} > 0.$$

The second term on the left-hand side vanishes for $P \to \infty$. Given that $0 < \alpha$, the decider chooses to hide a positive amount of her income if the costs of tax evasion are dispersed among sufficiently many payers. So the optimal levels of donations and tax evasion can be strictly positive at the same time. The similar case can be made for corruption or the provision of local public goods. For economic theory this means that in domains with concentrated benefits and dispersed costs, the assumption of selfishness is a good approximation of the average decider's utilitarian preferences.

Concerns for the patient, not the insurance company. The idea that physicians have concerns for the patient is well-established in the health economics literature (see McGuire 2000 for a review). There is, however, no consensus how to model them. Several papers assume that physicians' utility function is given by $U(\pi_d, \pi_r)$, where π_d is their own income and π_r the patient's welfare. There are no concerns for the welfare of insurance payers.

Physicians' distributional preferences matter a lot for efficiency in the health care sector. Chandra and Skinner (2012) show in a model of patient demand and health-care supply behavior that the availability of treatments that are *on average* relatively ineffective create rapid cost growth when patients are fully insured. The key assumption in their analysis is that physicians "want to do everything in their power to cure their patient." Our social preference model qualifies this assumption and shows that it is in line with the experimental evidence on distributional preferences. The average decider takes the welfare of all parties into account and has concerns for efficiency, but ignores costs that are dispersed among many individuals.

One consequence of this is that insurance protection changes the physician's behavior. Consider a physician who decides whether a treatment should take place ($x = 1$) or not ($x = 0$). Her distributional preferences are given by our utility function U. The treatment benefits the patient, but it is not essential for her recovery. The patient has no information about the benefits of treatment and relies on the physician's recommendations. Let the physician's remuneration be ax, the patient's net benefit (in monetary terms) bx, and the costs are cx, where a, b, c are positive. Initial endowments are again given by π_d, π_r and π_p (we assume that $\pi_r, \pi_p > c$). Either the patient or her insurance company pay for the costs of treatment. Suppose that the treatment is inefficient in the sense that $a + b << c$. Will the physician perform the treatment or not?

Assume first that the physician is motivated only by economic self-interest. She will then perform the treatment, regardless of whether the patient or an insurance company pays for it. Insurance protection creates no additional costs. On the contrary, if the physician takes the welfare of all parties into account in the way suggested by our social preference model, she will not perform the treatment in the case of no insurance protection if

$$\alpha \left[(\pi_d + a)^\rho - \pi_d^\rho\right] < 0.5(1 - \alpha) \left[\pi_r^\rho - (\pi_r + b - c)^\rho\right],$$

which again holds for positive α if the patient is sufficiently poor relative to the physician. In the case of full insurance, the physician will perform the treatment if

$$\alpha \left[(\pi_d + a)^\rho - \pi_d^\rho\right] + 0.5(1 - \alpha) \left[(\pi_r + d)^\rho - \pi_r^\rho\right] > (f(P) - \alpha - 0.5(1 - \alpha)) \left[\pi_p^\rho - \left(\pi_p - \frac{c}{P}\right)^\rho\right].$$

Since $f(P)$ converges to f, the right-hand side converges to 0 as P becomes large. So the physician will perform the treatment if the costs are dispersed among sufficiently many customers of the insurance company. Insurance protection therefore decreases welfare by $c - a - b >> 0$.

The empirical evidence on physician choices suggests that insured patients (or patients with better insurance coverage) are more likely to receive high-cost treatments than those without insurance (or less extensive coverage), controlling for other factors that influence physiciansï£¡ decisions. An early study by Mort et al. (1996) is based on a large number of hypothetical treatment decisions elicited in a nationally representative survey of physicians. McKinlay et al. (1996) use a videotape study to analyze the influence of several socio-economic variables on physicians' decisions. They find that in the subsample of old patients insured ones were more likely to get a cardiac diagnosis for chest pain, which creates greater subsequent costs than the gastrointestinal or psychogenic alternatives.

There is also more recent evidence along these lines from administrative data on actual treatment decisions: U.S. data show that Caesarian sections are more likely performed on privately insured mothers than on those without insurance (Movsas et al. 2012), and brand-name drugs are less often substituted for with generic drugs for patients with more lower co-payments for branded drugs in Switzerland (Rischatsch et al. 2013). An implication of these studies is that physicians show more concern for an individual patient's financial situation than for the cost borne by an insurance firm or the tax-payer. To the extent that many Cesarians are not necessary from a purely medical point of view, and that generics and brand-name drugs provide comparable health benefits (even though they might provide higher utility to the patient), these empirical observations imply that the existence of health insurance leads to a welfare loss. At the core of the problem are physicians who do not fully take into account treatment costs borne by the health insurance system, i.e., who have the type of preference that we are concerned with in this paper.

Congestible altruism. Our social preference theory predicts that charity donations to a single individual will exceed those to a large group of individuals. For the decider, making a donation to a single recipient is rational as long as

$$-\alpha \pi_d^{\rho-1} + 0.5(1-\alpha)\pi_r^{\rho-1} \geq 0,$$

while making a donation of x/P to P recipients is only rational as long as

$$-\alpha \pi_d^{\rho-1} + \frac{1}{P}\left(f(P) - \alpha - 0.5(1-\alpha)\right)\pi_r^{\rho-1} \geq 0.$$

Hence, for given α the decider will give nothing if P is sufficiently large. This implies that it may be important for charity organizations to highlight the fate of one specific recipient that depends on the giver's benevolence.

There is some experimental evidence that altruism depends on the number of recipients. Kogut and Ritov (2005) find that contributions for a single victim exceed those for a group of eight victims when these two situations are judged separately. Andreoni (2007) studies how donations depend on the number of receivers. He finds partial congestion: when the number of receivers doubles (and each receiver gets a constant amount per unit provided), the value of a donation to the giver increases by a factor less than two. Specifically, he estimates that one person receiving x is equivalent to P persons receiving x/P^{β} where $\beta = 0.68$. This means that if we keep constant the marginal effect of a donation on a single recipient, donations increase in P, but at a decreasing rate.

In our social preference model, if $\lim_{P\to\infty} f(P) = f < \infty$, altruism is a fully congestible good. Since large groups receive the same weight as small groups, increasing the number of receivers (while keeping fixed the marginal effect per receiver) will not increase donations. So in our case, the parameter β would be rather close to 0 for $P \geq 3$. We conjecture that this effect occurs in our experiment, because the group size is not made salient to subjects. In contrast, subjects make decisions for varying group-sizes in Andreoni's (2007) experiment. In their desire to behave consistently, subjects may increase donations in response to an increasing number of receivers.

6 Conclusion

In this paper, we study distribution games with concentrated benefits and dispersed costs. We find that the average decider takes into account the payoff of all parties, but large groups receive the same weight in her preferences as small groups. Hence, if the costs of a good are dispersed among sufficiently many individuals, she will provide it even if this substantially reduces the group payoff. This result holds regardless of whether the decider benefits from the provision of the good or not. A preference model that explain average behavior in our experiment implies pro-social actions in small groups as well as welfare-damaging behavior in situations with concentrated benefits and dispersed costs. As a consequence, the assumption of purely self-interested agents in models of corruption or tax evasion is a good approximation of actual utilitarian preferences and does not contradict the evidence on other-regarding motivations.

References

ANDREONI, JAMES, AND LISE VESTERLUND (2001): "Which is the Fair Sex? Gender Differences in Altruism," *Quarterly Journal of Economics*, 116(1), 293-312.

ANDREONI, JAMES, AND JOHN MILLER (2002): "Giving According to GARP: An Experimental Test of the Consistency of Preferences for Altruism," *Econometrica*, 70(2), 737-753.

ANDREONI, JAMES (2007): "Giving Gifts to Groups: How Altruism Depends on the Number of Recipients," *Journal of Public Economics*, 91(9), 1731-1749.

BANDIERA, ORIANA, IWAN BARANKAY, AND IMRAN RASUL (2005): "Social Preferences and the Response to Incentives: Evidence from Personnel Data," *Quarterly Journal of Economics*, 120(3), 917-962.

CAMERER, COLIN (2003): "Behavioral Game Theory." Princeton University Press, Princeton, NJ.

CHARNESS, GARRY, AND MATTHEW RABIN (2002): "Understanding Social Preferences with Simple Tests," *Quarterly Journal of Economics*, 117(3), 817-869.

DellaVigna, Stefano, John List, and Ulrike Malmendier (2012): "Testing for Altruism and Social Pressure in Charitable Giving," *Quarterly Journal of Economics*, 127(1), 1-56.

Engelmann, Dirk, and Martin Strobel (2004): "Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments," *American Economic Review*, 94(4), 857-869.

Fehr, Ernst, Michael Naef, and Klaus Schmidt (2006): "Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments: Comment," *American Economic Review*, 96(5), 1912-1917.

Fehr, Ernst, and Klaus Schmidt (2006): "The Economics of Fairness, Reciprocity and Altruism - Experimental Evidence and New Theories," In: Serge-Christophe Kolm, Jean Mercier Ythier (Eds.): Handbook on the Economics of Giving, Reciprocity and Altruism, Elsevier, Amsterdam.

Fisman, Raymong, Shachar Kariv, and Daniel Markovits (2007): "Individual Preferences for Giving," *American Economic Review*, 97(5), 1858-1877.

Greiner, Ben (2004): "An Online Recruitment System for Economic Experiments." In: Kurt Kremer, Volker Macho (Eds.): Forschung und wissenschaftliches Rechnen 2003. GWDG Bericht 63, Goettingen: Ges. fuer Wiss. Datenverarbeitung, 79-93, 2004.

Kogut, Tehila, and Ilana Ritov (2005): "The Singularity Effect of Identified Victims in Separate and Joint Evaluations," *Organizational Behavior and Human Decision Processes*, 97(2), 106-116.

Levitt, Steven, and John List (2007): "What Do Laboratory Experiments Measuring Social Preferences Reveal About the Real World," *Journal of Economic Perspectives*, 21(2), 153-174.

McGuire, Thomas (2000): "Physician Agency." In: Anthony Cuyler, Joseph Newhouse (Eds.): Handbook of Health Economics, Vol. 1A, Amsterdam, North-Holland.

McKinlay, John, Deborah Potter, and Henry Feldman (1996): "Non-Medical Influences on Medical Decision-Making," *Social Science and Medicine*, 42(5), 769-776.

Menacker, Fay, and Brady Hamilton (2010): "Recent 'Trends in Cesarean Delivery in the United States," *NCHS Data Brief*, 35.

Mort, Elizabeth, Jennifer Edwards, David Emmons, Karen Convery, and David Blumenthal (1996): "Physician Response to Patient Insurance Status in

Ambulatory Care Clinical Decision-Making: Implications for Quality Care," *Medical Care*, 34(8), 783-797.

Movsas, Tammy, Eden Wells, Ann Mongoven, and Violanda Grigorescu (2012): "Does Medical Insurance Type (Private vs Public) Influence the Physician's Decision to Perform Caesarean Delivery?," *Journal of Medical Ethics*, 38(8), 470-473.

Rischatsch, Maurus, Maria Trottmann, and Peter Zweifel (2013): "Generic Substitution, Financial Interests, and Imperfect Agency," *International Journal of Health Care Finance and Economics*, 13(2), 115-138.

TABLE 1 - Payoff Parameters

		Payoff Parameters			Marginal Impact on Group Payoff
Game	Label	a	b	c	a+b-Pc
P1.1	Dictator	-1.0	2.0	0.0	1.0
P1.2	Dictator	-1.0	1.5	0.0	0.5
P1.3	Dictator	-1.0	0.9	0.0	-0.1
P1.4	Dictator	-1.0	0.5	0.0	-0.5
P1.5	Cost Dispersion	0.5	0.3	1.5	-0.7
P1.6	Cost Dispersion	0.5	0.1	1.5	-0.9
P1.7	Growing Inefficiency	1.0	0.8	1.0	0.8
P1.8	Growing Inefficiency	1.0	0.5	1.0	0.5
P1.9	Growing Inefficiency	1.0	0.3	1.0	0.3
P1.10	Growing Inefficiency	1.0	0.1	1.0	0.1
P1.11	Discrimination	0.0	1.0	1.0	0.0
P1.12	Discrimination	0.0	0.5	1.0	-0.5
P3.1	Dictator	-1.0	2.0	0.0	1.0
P3.2	Dictator	-1.0	1.5	0.0	0.5
P3.3	Dictator	-1.0	0.9	0.0	-0.1
P3.4	Dictator	-1.0	0.5	0.0	-0.5
P3.5	Cost Dispersion	0.5	0.3	0.5	-0.7
P3.6	Cost Dispersion	0.5	0.1	0.5	-0.9
P3.7	Growing Inefficiency	1.0	0.8	1.0	-1.2
P3.8	Growing Inefficiency	1.0	0.5	1.0	-1.5
P3.9	Growing Inefficiency	1.0	0.3	1.0	-1.7
P3.10	Growing Inefficiency	1.0	0.1	1.0	-1.9
P3.11	Discrimination	0.0	1.0	1.0	-2.0
P3.12	Discrimination	0.0	0.5	1.0	-2.5

TABLE 1 Continued - Payoff Parameters

		Payoff Parameters			Marginal Impact on Group Payoff
Game	Label	a	b	c	a+b-Pc
P6.1	Dictator	-1.0	2.0	0.0	1.0
P6.2	Dictator	-1.0	1.5	0.0	0.5
P6.3	Dictator	-1.0	0.9	0.0	-0.1
P6.4	Dictator	-1.0	0.5	0.0	-0.5
P6.5	Cost Dispersion	0.5	0.3	0.25	-0.7
P6.6	Cost Dispersion	0.5	0.1	0.25	-0.9
P6.7	Growing Inefficiency	1.0	0.8	1.0	-4.2
P6.8	Growing Inefficiency	1.0	0.5	1.0	-4.5
P6.9	Growing Inefficiency	1.0	0.3	1.0	-4.7
P6.10	Growing Inefficiency	1.0	0.1	1.0	-4.9
P6.11	Discrimination	0.0	1.0	1.0	-5.0
P6.12	Discrimination	0.0	0.5	1.0	-5.5
P40.1	Dictator	-1.0	2.0	0.0	1.0
P40.2	Dictator	-1.0	1.5	0.0	0.5
P40.3	Dictator	-1.0	0.9	0.0	-0.1
P40.4	Dictator	-1.0	0.5	0.0	-0.5
P40.5	Growing Inefficiency	1.0	1.0	1.0	-38.0
P40.6	Growing Inefficiency	1.0	1.0	0.8	-30.0
P40.7	Growing Inefficiency	1.0	1.0	0.6	-22.0
P40.8	Growing Inefficiency	1.0	1.0	0.4	-14.0
P40.9	Growing Inefficiency	1.0	1.0	0.2	-6.0
P40.10	Discrimination	0.0	1.0	1.0	-39.0
P40.11	Discrimination	0.0	1.0	0.5	-19.0
P40.12	Discrimination	0.0	1.0	0.1	-3.0

TABLE 2 - Variable Definitions

Variable	Range	Definition
a	{-1;0;0.5;1}	Cost/benefit (per unit x of the good) accruing to the decider
b	{0.1;0.3;0.5;0.9;1.5;2.0}	Benefit (per unit x of the good) accruing to the receiver
c	{0;0.1;0.2;0.25;0.4;0.6;0.8;1.0}	Cost (per unit x of the good) accruing to each of the payers
P1	{0;1}	Dummy indicating that subject was randomly assigned to a group of P=1 payers
P3	{0;1}	Dummy indicating that subject was randomly assigned to a group of P=3 payers
P6	{0;1}	Dummy indicating that subject was randomly assigned to a group of P=6 payers
P40	{0;1}	Dummy indicating that subject was randomly assigned to a group of P=40 payers
Male	{0;1}	Dummy indicating that respondent is male

TABLE 3 - Behavior in dictator games

Games 1-4, all treatments

Dependent variable: units provided	(1)	(2)	(3)
b	0.656***	0.648***	0.224*
	[0.117]	[0.231]	[0.121]
P3	-0.143	-0.234	0.185
	[0.278]	[0.409]	[0.398]
P6	-0.019	-0.097	0.173
	[0.309]	[0.440]	[0.400]
P42	-0.052	0.079	0.581
	[0.293]	[0.446]	[0.414]
Male	0.086	0.086	-0.470
	[0.211]	[0.211]	[0.455]
b*male			0.905***
			[0.234]
P3*male			-0.615
			[0.554]
P6*male			-0.289
			[0.630]
P40*male			-1.323**
			[0.577]
b*P3		0.075	
		[0.321]	
b*P6		0.064	
		[0.336]	
b*P40		-0.107	
		[0.331]	
Constant	1.245***	1.256***	1.481***
	[0.267]	[0.308]	[0.285]
Observations	1,532	1,532	1,532
R^2	0.021	0.021	0.039

Robust standard errors in parentheses, clustering of standard errors by respondent

*** p<0.01, ** p<0.05, * p<0.1

TABLE 4 - Behavior in cost dispersion games

Games 5-6, treatments P1, P3 and P6

Dependent variable: units provided	(1)	(2)	(3)
b	1.362**	0.663	2.670**
	[0.689]	[1.082]	[1.336]
P3	0.967*	0.581	0.565
	[0.526]	[0.647]	[0.637]
P6	1.359**	1.286*	1.280**
	[0.560]	[0.676]	[0.639]
b*P3		1.960	
		[1.628]	
b*P6		0.051	
		[1.676]	
Male		-0.430	
		[0.448]	
b*male			-2.670
			[2.287]
P3*male			0.752
			[0.842]
P6*male			0.002
			[0.986]
Constant	4.825***	5.193***	4.846***
	[0.418]	[0.495]	[0.416]
Observations	580	580	580
R^2	0.022	0.025	0.026

Robust standard errors in parentheses, clustered by respondent

*** p<0.01, ** p<0.05, * p<0.1

TABLE 5 - Behavior in growing inefficiencies games

Games 7-10, treatments P1, P3 and P6

Dependent variable: tokens provided	(1)	(2)	(3)
b	0.975***	0.980**	0.791***
	[0.201]	[0.388]	[0.267]
P3	-1.866***	-1.911***	-2.293***
	[0.433]	[0.519]	[0.565]
P6	-2.020***	-1.962***	-1.956***
	[0.489]	[0.565]	[0.607]
b*male			0.377
			[0.404]
P3*male			0.791
			[0.855]
P6*male			-0.243
			[1.007]
Male	-0.464	-0.464	-0.830
	[0.397]	[0.397]	[0.572]
b*P3		0.107	
		[0.513]	
b*P6		-0.135	
		[0.500]	
Constant	7.281***	7.279***	7.468***
	[0.348]	[0.384]	[0.383]
Observations	1,160	1,160	1,160
R^2	0.068	0.068	0.072

Robust standard errors in parentheses, clustered by respondent

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6 - Behavior in discrimination games

Games 11-12, treatments P1, P3 and P6

Dependent variable: tokens provided	(1)	(2)	(3)
b	0.807***	1.204*	0.770*
	[0.306]	[0.619]	[0.397]
P3	-1.562***	-1.149	-1.076**
	[0.346]	[0.744]	[0.536]
P6	-1.625***	-1.134	-1.040*
	[0.381]	[0.741]	[0.560]
b*male			0.075
			[0.616]
P3*male			-0.911
			[0.698]
P6*male			-1.257*
			[0.750]
Male	-0.878***	-0.878***	-0.232
	[0.302]	[0.303]	[0.723]
b*P3		-0.551	
		[0.800]	
b*P6		-0.655	
		[0.758]	
Constant	4.539***	4.242***	4.194***
	[0.406]	[0.604]	[0.512]
Observations	580	580	580
R^2	0.084	0.085	0.091

Robust standard errors in brackets, clustered by respondent

*** p<0.01, ** p<0.05, * p<0.1

TABLE 7 - Average behavior of selfish, maximin and efficiency types

	All		Selfish		Maximin		Efficiency	
Game	av	sd	av	sd	av	sd	av	sd
	n=98		n = 58 (59,8%)		n = 31 (32,0%)		n = 8 (8,2%)	
P1.1	2.43	2.96	0.79	1.50	3.90	2.04	8.88	2.23
P1.2	2.63	3.05	0.72	1.20	4.19	1.80	9.50	0.93
P1.3	1.61	2.11	0.45	0.94	3.90	1.30	1.38	3.50
P1.4	1.70	2.39	0.43	1.09	4.35	2.21	0.88	1.64
P1.5	5.16	3.97	6.41	4.10	3.71	2.73	1.13	2.23
P1.6	5.03	4.07	6.41	4.15	3.29	2.70	1.13	2.80
P1.7	7.62	2.78	8.17	2.80	6.00	2.31	9.63	1.06
P1.8	7.82	2.70	8.52	2.55	6.13	2.50	9.00	1.41
P1.9	7.42	2.95	8.19	2.72	5.45	2.66	9.13	1.81
P1.10	6.94	3.52	7.78	3.13	5.06	3.60	7.75	3.58
P1.11	4.98	2.30	4.88	2.45	5.00	1.79	5.63	3.20
P1.12	4.38	3.11	4.36	3.41	4.81	2.15	3.38	3.89
	n=101		n = 62 (62,0%)		n = 29 (29,0%)		n = 9 (9,0%)	
P3.1	2.36	2.91	0.74	1.27	3.93	1.83	8.67	2.69
P3.2	2.46	2.86	0.74	1.24	4.07	1.36	8.22	2.68
P3.3	1.54	2.07	0.48	1.00	4.34	1.26	0.00	0.00
P3.4	1.46	2.26	0.42	0.95	4.17	2.35	0.00	0.00
P3.5	0.33	3.55	7.23	3.41	5.86	2.66	1.22	2.44
P3.6	5.80	3.93	6.87	3.74	5.07	3.54	1.44	2.40
P3.7	5.92	3.55	7.26	3.27	4.38	2.44	2.33	3.74
P3.8	5.80	3.93	7.23	3.13	4.00	2.63	2.44	3.47
P3.9	5.38	3.62	6.85	3.33	3.66	2.74	1.33	1.80
P3.10	5.21	3.90	6.84	3.56	3.03	2.77	1.56	3.32
P3.11	3.27	2.91	3.52	2.98	3.69	2.65	0.56	1.67
P3.12	2.94	2.96	2.98	3.11	3.66	2.58	0.67	2.00

TABLE 7 - Average behavior of selfish, maximin and efficiency types

	All		Selfish		Maximin		Efficiency	
Game	av	sd	av	sd	av	sd	av	sd
	n=91		n = 56 (62,2%)		n = 26 (28,9%)		n = 8 (8,9%)	
P6.1	2.54	3.01	0.86	1.15	3.88	2.21	9.63	1.06
P6.2	2.43	2.86	0.71	1.16	3.92	1.09	9.25	2.12
P6.3	1.69	2.36	0.25	0.55	4.69	1.23	2.25	3.65
P6.4	1.59	2.53	0.27	0.70	4.73	2.57	0.88	1.81
P6.5	6.53	3.93	7.11	3.65	6.42	3.73	3.63	5.01
P6.6	6.38	4.12	7.41	3.60	5.85	4.22	1.75	3.62
P6.7	5.84	3.91	6.96	3.73	4.62	3.10	2.63	4.57
P6.8	5.46	3.97	6.73	3.92	3.96	2.76	2.13	4.02
P6.9	5.52	4.14	6.93	3.90	3.81	3.37	1.88	3.72
P6.10	5.18	4.24	6.52	4.09	3.46	3.49	2.00	3.85
P6.11	3.32	3.01	3.32	3.10	4.42	2.55	0.13	0.35
P6.12	3.04	3.20	2.79	3.13	4.65	3.02	0.00	0.00
	n=93		n = 53 (58,2%)		n = 33 (36,3%)		n = 5 (5,5%)	
P40.1	2.41	2.88	0.81	1.37	3.61	2.15	9.8.	0.45
P40.2	2.35	2.64	0.79	1.34	3.88	1.78	9.00	1.73
P40.3	1.60	2.24	0.15	0.46	4.12	1.80	1.00	2.24
P40.4	1.77	2.66	0.17	0.51	4.61	2.62	0.20	0.45
P40.5	5.69	3.32	6.49	3.59	4.70	2.31	3.60	4.16
P40.6	5.97	3.17	6.79	3.35	4.91	2.38	4.60	4.45
P40.7	6.33	3.35	7.47	3.24	5.09	2.69	3.00	4.24
P40.8	7.22	3.15	8.26	2.78	5.82	2.88	5.40	5.08
P40.9	8.12	2.85	8.75	2.52	7.15	2.98	7.40	4.34
P40.10	3.40	3.02	2.94	3.23	4.61	2.32	1.60	2.61
P40.11	3.91	3.28	3.47	3.41	4.97	2.90	3.20	2.95
P40.12	6.30	4.01	5.91	4.08	7.30	3.64	5.40	5.08

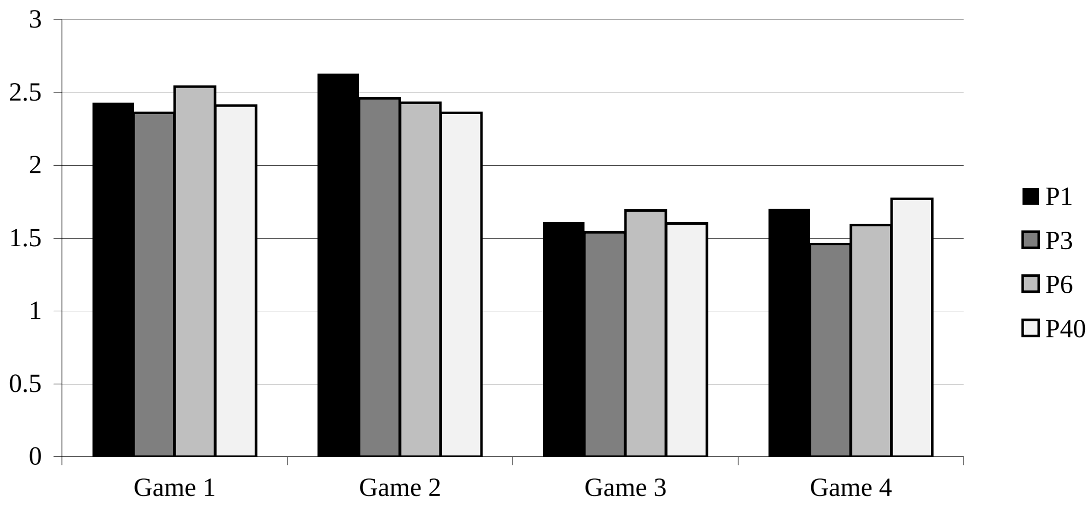

Figure 1: Average Provision in the Dictator Games

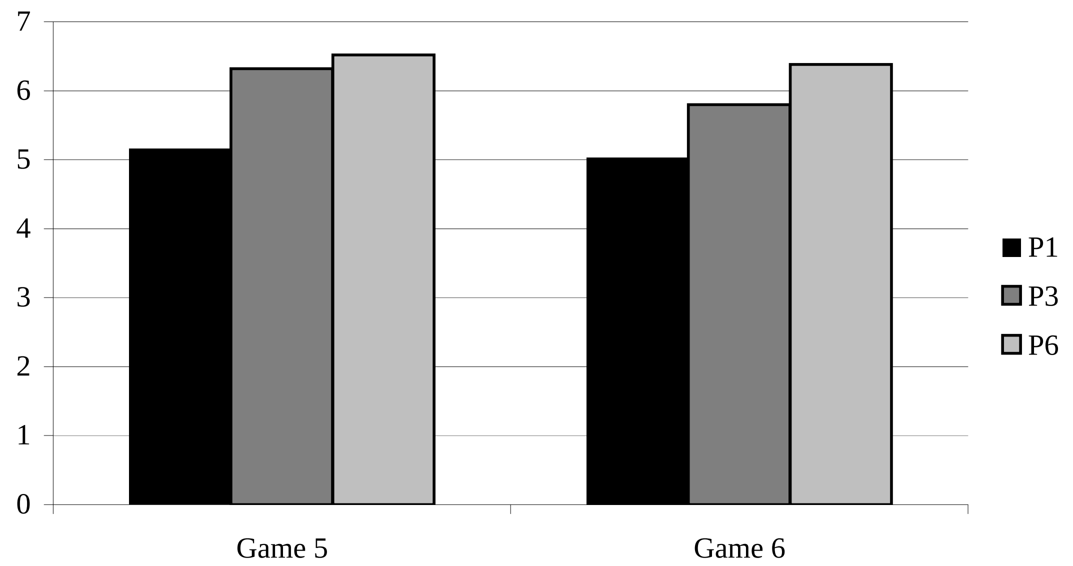

Figure 2: Average Provision in the Cost Dispersion Games

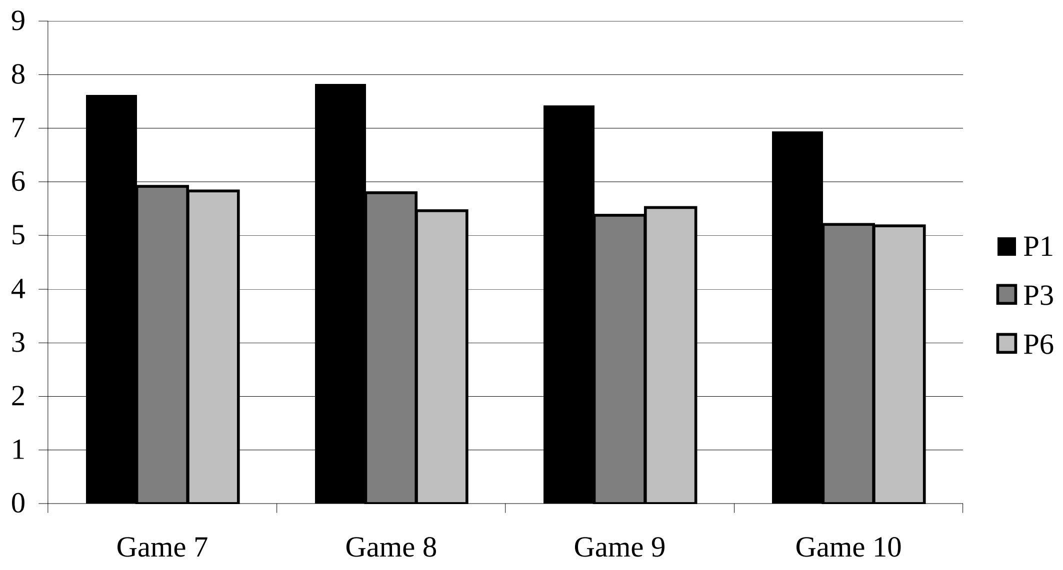

Figure 3: Average Provision in the Growing Inefficiency Games

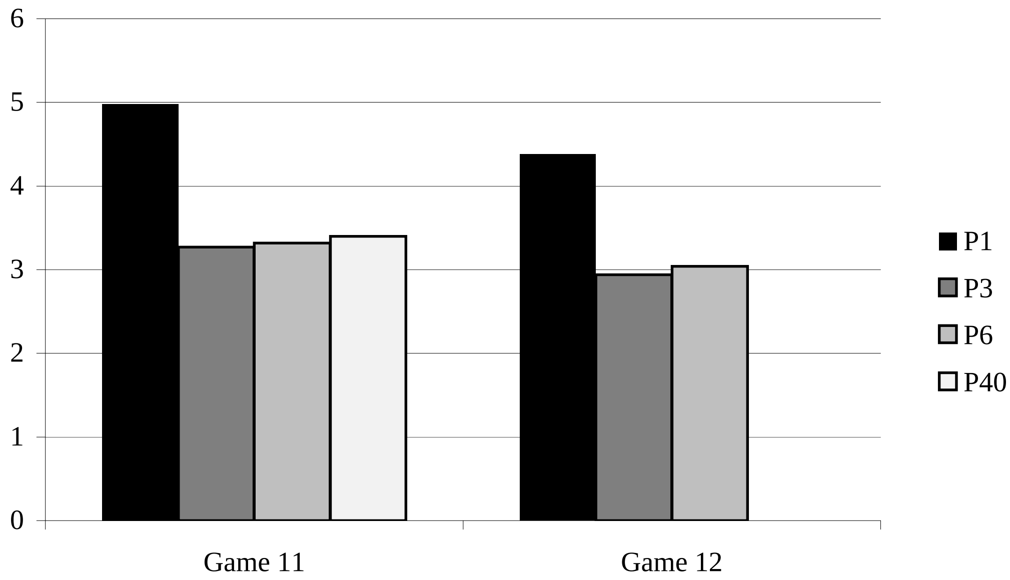

Figure 4: Average Provision in the Discrimination Games