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ABSTRACT

In this paper we present the results from a "corruption game" (a dictator game modified so that the second player can accept a side payment that reduces the overall size of the pie). Dictators (silently) treated to have the possibility of taking a larger proportion of the recipient's tokens, take more of them. They were also more likely to report believing that the recipient would accept a low price in exchange for a side payment; and selected larger numbers as their best guess of the likely proportion of recipients acting "unfairly". The results favor the hypothesis that people avoid altruistic actions by distorting beliefs about others.

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"He who wants to kill his dog, accuses it of rabies"[1]

I. Introduction

Beliefs are central in many economic models. To provide just one example, consider the seminal paper of Piketty (1995) in political economy, which showed that economic systems can heavily depend on the beliefs that people hold concerning labor market parameters (such as whether effort pays or not) or agent moral types (such as whether the rich are corrupt).[2] This literature uses the finding that individual beliefs are a strong predictor of a person's demand for redistribution (even more than income and education; see, for example, Fong, 2001, Corneo and Gruner, 2002 and Alesina and La Ferrara, 2002). Of particular interest are papers where people who believe others misbehave (e.g., by being corrupt) also want to tax them. Aghion, *et al* (2010), for example, document that government regulation has a strong negative correlation with measures of trust in a cross section of countries, which is consistent with people taxing those they do not trust. Given their potential importance, a natural question involves identifying the factors that affect the formation of beliefs.

Standard economics emphasizes the possibility that beliefs reflect reality following a (perhaps incomplete) learning process.[3] Previous work, however, has emphasized the fact that a lot of variation in beliefs remains to be explained and have explored the possibility that beliefs may be affected by other factors. A classic example is Lerner (1982), who discusses how people tend to believe in a just world, even in the presence of contradictory evidence. Benabou and Tirole (2006) observe that such distortion in beliefs could be a useful strategy to compensate for incomplete will power.[4] While these authors focus on the motivational value of beliefs (in

[1] French proverb: "Qui veut noyer son chien l'accuse de la rage", famously appearing in Moliere's play, *Les Femmes Savants*.

[2] He focused on how differences in beliefs about the role of luck vs effort in generating income could give rise to two different political equilibria, one with low taxes and widespread belief that effort pays (called American equilibrium) and another with higher taxes and a prevailing belief in the importance of luck. See also Denzau and North (1994); see Alesina and Glaeser (2004) for a review.

[3] As in Piketty (1995) and Buera, *et al,* (2010). For related evidence, see Giuliano and Spilimbergo, (2010). For the role on cultural factors in preserving differences in beliefs even in similar environments see, for example, Bisin and Verdier, (2000) and Giuliano (2007).

[4] And that voting could shape economic systems in a way that reinforces the value of such motivated beliefs. Part of the interest for us of Benabou and Tirole (2006) is that they focus on the type of beliefs that appear crucial in models of political economy (namely, whether "the poor are lazy or they are unlucky"). A related

this case leading people to work harder), others have pointed out the possibility of self-serving beliefs (see Hastorf and Cantril, 1954; see Babcock and Loewenstein, 1997, for an interesting discussion).[5] In this paper we emphasize a particular form of self-serving beliefs, namely beliefs that facilitate adopting a course of action that would be unpopular under normal beliefs (like killing a dog that does not have rabies). In particular, we test the hypothesis that people who can take advantage of a particular situation, will tend to believe that others also take advantage of those situations. Thus, our paper is particularly close to Rabin (1995), who emphasizes the possibility of distorting beliefs by selectively gathering evidence so as to relax internal moral constraints, or reduce cognitive dissonance, and to the work of Konow (2000) on self-serving views about what is fair and what is not.[6]

Our Study

Our approach involves studying beliefs in a modified "dictator game" (Forsythe *et al*., 1994) which we call a "corruption game". After completing a set of tasks (which give agents an equal number of tokens), agents were randomly assigned to the role of dictator or recipient, with the main modification consisting in having the recipient simultaneously decide on the value at which the tokens would be "sold" to the experimenter and hence determine the payoffs to each side. Recipients chose the selling price for the tokens from a list that included two prices. One was simply a high price. The second alternative was the combination of a low price for the tokens with a monetary transfer to themselves (no transfer was given to the dictator). Thus, the modification allowed the recipient the possibility of affecting (lowering) the value of the payoffs to both players, in exchange for a side payment (just to themselves). It mirrors the classic corruption mechanism of under-

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class of models has focused on the direct consumption value of overoptimistic beliefs (such anticipatory feelings –see Caplin and Leahy, 2001- are studied for example in Brunnermeier and Parker, 2005).

5 A striking example is Babcock et al. (1996), who report that teacher contract negotiators in the US select "comparable" districts in a biased fashion and that this is correlated with strike activity. A key finding is that the bias has real consequences (it causes bargaining impasse) and that the bias results from selective evaluation of information (see Babcock and Loewenstein, 1997). On the other hand, the survey of tithing practices amongst Mormons studied in Dahl and Ransom (1999) finds little evidence of the use of self-serving definitions of what constitutes income for tithing purposes.

6 For pioneering work on cognitive dissonance, see Festinger, (1957) and Akerlof and Dickens, (1982). Piketty (1995) and others in the political economy literature referenced above involves a channel going from taxation to beliefs, whereas in this paper we study the effect of the capacity to tax to beliefs.

invoicing a sale (as when a privatized company is sold for less than the market value in exchange for a bribe to the official in charge).[7]

After dictators made their choice, but before finding out their payments, they were asked a) the likelihood that recipients choose the low price in exchange for a side payment; and b) the proportion of the population of recipients that accepted the side payments. One advantage of b) is that dictators guessing the right answered received a substantial monetary reward. Two treatments were used. In one (the high stakes treatment) dictators could transfer a large proportion of tokens from the recipient's pile (8 out of 10). In the other (the low stakes treatment), dictators could transfer only a few tokens (2 out of 10). The dictators (i.e., allocators) in one treatment were not aware of the existence of the other treatment. Recipients (i.e., sellers) were not aware of the existence of either of the two treatments. The study does not include direct deception, although it might be argued that a more "honest" approach would have involved informing players of all the potentially relevant information.

Our main hypothesis is that individuals who have the possibility of taking more in dictator games will cause themselves to believe that recipients were selfishly accepting a low price for all players in exchange for side payment to themselves. In other words, the paper's main hypothesis is that people can avoid altruistic actions by distorting beliefs about others.

<u>Related Literature</u>

A large experimental literature has studied games that demonstrate how people fail to maximize their material payoffs. In a classic study of the dictator game, for example, Forsythe *et al.,* (1994) find that approximately 20 percent of proposers offered even splits. Significant sharing occurs even when full anonymity is ensured (see Hoffman *et al*, 1994 and Bolton, *et al*, 1998). The usual interpretation is that people have preferences that include the well-being of others, as in Kahneman, *et al*., (1986).[8] One important finding in this literature is that decisions in dictator games are heavily influenced by the player's perceived "rights" to

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[7] The other classic mechanism is over-invoicing purchases. Obviously the words "corruption" or "bribe" do not enter our actual instructions. There is a small experimental literature on corruption that studies different aspects of the problem. A prominent example is the work of Abink, *et al,* (2002) using variations of the trust game (see Berg, *et al,* 1995). See Dusek, *et al,* (2004) for a review.

[8] A vast literature studied different aspects of these preferences, including Rabin, (1993), Fehr and Schmidt, (1999), Bolton and Ockenfels, (2000), *inter alia*. Robustness across cultures is studied in Heinrich, *et al* (2001).

whatever sum is being distributed. In a classic demonstration of this effect, Hoffman and Spitzer (1985) and Hoffman *et al*, (1994) show that the distribution of payoffs is heavily affected by having players earn their roles. Similarly, Ruffle (1998), Cherry *et al,* (2002) and Oxoby and Spraggon (2008) find that players with legitimate property rights (having earned their positions by some means that is accepted by the other party) end up with larger shares. Beliefs also play an explicit role in theories of reciprocal altruism, where agents form a belief about other player's altruism so as to respond like with like (see Levine, 1998 and Rotemberg, 2005, 2008; see also the evidence in Ben-Ner, *et al,* 2004).[9]

Given the material cost of altruism, it is (perhaps) unsurprising that people sometimes develop strategies to avoid the material cost of altruism.[10] For example, Dana, *et al,* (2007) present an experiment where people chose to remain ignorant of the consequences of their actions, even when this was costless, and went on to reduce other-regarding behavior (for work where candidates for dictator prefer to opt out for a fixed fee that is lower than the dictator endowment see Dana, *et al,* 2006 and also Oberholzer-Gee and Eichenberger, 2008). In a similar spirit, Hamman, *et al,* (2009), present results from sharing experiments where recipients receive significantly less when allocation decisions are made by agents rather than the principals themselves.[11] Our paper discusses another strategy for relaxing the fairness constraint on behavior: changing the beliefs about the recipient, a strategy that responds to incentives in the direction predicted by self-interest. Our approach is similar to that in Dana *et al,* (2007) in the use of ambiguity. A key difference of that paper from usual dictator experiments in that it obfuscates the one to one mapping from dictator actions into outcomes (Dana, *et al,* call this lack of "transparency"). In our setting, we introduce a similar obfuscation but concerning the recipient's actions, although given the passive role of

[9] A related result appears in the experimental study of the effect of democracy of Dal Bo *et al* (2010), who find that changing payoffs from those in a prisoner's dilemma game to those in a coordination game has a greater impact on behavior when the modification was implemented democratically than when it was imposed randomly.

[10] The effectiveness of these strategies will obviously depend on the context and, in particular, the nature and ambiguity of the information available. The literature in psychology which has studied communication has showed how motivated reasoning is constrained by the extent to which reasonable justifications can be invoked (see, for example, Kunda, 1991), while work on elastic justification by Hsee (1996) showed that unjustifiable factors influenced decisions more when justifiable factors were more elastic. Schweitzer and Hsee (2002) present evidence suggesting that the reason private information constrains motivated communication is that people will eventually face excessive costs justifying (to themselves) extreme claims about inelastic information.

[11] These findings emphasize some advantages of considering the expectation of fair behavior as a constraint on behavior (rather than a part of preferences), as in Rabin (1995) and Bolton, *et al* (1998).

recipients in dictator game we had to produce a modified dictator game. Thus, we no longer have a one to one mapping between recipient's actions and outcomes (which could be termed as lack of "recipient-transparency" to distinguish it from the "moral wiggle room" scenario).

Closer to our experiment in terms of the focus on self-serving is the work of Konow (2000), who shows that players can interpret fairness ideals in self-serving ways when entitlements are heterogeneous. He employs a clever double dictator setting, where dictators who are observed to make a certain favorable material allocation (and hence employ one fairness criterion) are observed to later use the same fairness criterion when asked to make an allocation decision in a similar setting where he is not involved (and where his material utility plays no role). This findings suggest that people are consistent in the criterion of justice they adopt when they are and when they are not involved. Our approach follows Konow (2000) in its focus on self-serving beliefs to reduce cognitive dissonance.[12] One difference from Konow (2000) is that the focus on beliefs about other player's actions (instead of fairness ideals) allows us to define an objective standard (a proportion) and reward an action (an accurate guess of that proportion).[13] Indeed, in our setting we focus on beliefs concerning an action (instead of a fairness ideal) making it straightforward to obtain a measure of belief bias by rewarding dictators for the most accurate guess concerning the proportion of recipients who accept side payments in the population. Although still imperfect as a measure of true beliefs, it introduces a negative consequence for reporting biased beliefs (consistent with the strategy in Babcock, *et al*, 1996).

Section II introduces our experimental design in detail, while section III presents the results.

[12] When two cognitions (e.g. beliefs) are inconsistent, they are said to be "dissonant." In the case of the dictator game, the dissonant cognitions are the desire to keep the entire pie and the desire to split it fairly. People are naturally motivated to reduce dissonance and, according to social psychologists, often do so by distorting beliefs. In many settings people reduce dissonance by changing the way they learn. For example, in the studies of overconfidence of Köszegi (2006) and Benoit and Dubra (2009), agents stop collecting information, which contrasts to the approach we use where the learning channel is closed.

[13] The approach is to elicit fairness ideals by having a proposer that is not a stake-holder, and therefore not susceptible to self-serving bias (see Konow, 2003). It should be noted that Cappelen *et al* (2010) present similar findings (involving the preponderance of the liberal egalitarian principle) in a study that studies the role of other fairness ideals and puts special attention on framing.

II. Experimental Design

Our conjecture is that people who can gain from taxing others will distort their belief in the direction of believing others are undeserving. This section presents a simple lab experiment designed to test this hypothesis. Intuitively, we will present a modified dictator game in which one player can take resources from the second player in a manner that is evocative of the practice of taxation. The key modification is that the second player can take an action that reduces the size of the overall pie in exchange for a side payment, in a manner evocative of the practice of hiding economic activity from the tax authorities in the shadow/underground economy (see, for example, Frey and Schneider, 2000). The first player is uncertain about which action was selected by the second player (i.e. if he was "corrupt" or not; obviously this terminology is used in the description in this paper but not in the experiment; the word corrupt does not appear anywhere in the experiment), which will make room for motivated beliefs (a strategic "offense" motive).

A Simple Model

We begin the model without motivated beliefs. There are two players: the "allocator" and the "seller" (denoted by subscripts 1 and 2). Their endowments are denoted x_i, and their consumptions c_i. The allocator can transfer an amount t from the seller, although $(1-\rho)\,t$ gets lost in the transference, where $\rho \in [0,1]$ represents the efficiency of the redistribution. This is one possible way of capturing differences in K (which is admittedly quite crude). "Intrinsic" utility from consumption is given by the function $U(c_1)$, with the standard properties $U'(\cdot) > 0$ and $U''(\cdot) < 0$. The allocator also cares about the utility of the seller. The argument that follows does not depend upon the kind of fairness or altruistic concerns that we assume. Next we are going to introduce a specification for fairness concerns in line with the theories on reciprocal altruism (e.g., Levine, 1998; Rotemberg, 2005). In the Appendix we provide a specification where fairness concerns are a function of outcomes (e.g. Fehr and Schmidt, 1999).

The total utility of the allocator is a weighted average of his own intrinsic utility and the intrinsic utility of the seller: $U_1 + \lambda(\lambda_2) \cdot U_2$. The weight $\lambda(\lambda_2)$ is a function of the altruistic concerns of the seller, λ_2.[14] We assume $\lambda'(\cdot) > 0$, so the sentiments of the allocator are reciprocal to those of the seller. Also, assume that $\lambda(\cdot)$ is positive and concave. The problem of the allocator is then:

$$\max_{t \in [0, x_2]} U(x_1 + \rho t) + \lambda(\lambda_2) U(x_2 - t)$$

The comparative statics are straightforward. If the allocator believe that the seller is more altruistic (i.e. greater λ_2) then he will take less. A marginal increase in efficiency, ρ, will always increase the net amount transferred from the seller, ρt, but it may lead to an increase or a decrease in t.

We can now introduce motivated beliefs. The allocator knows that the seller was randomly chosen from a population of sellers of two types: $\lambda_2 \in \{\lambda_2^L, \lambda_2^H\}$. The actual proportion of sellers of the low type (i.e. the least altruistic) is given by $p_0 \in [0,1]$. The allocator's belief about that proportion is given by $p \in [0,1]$. The allocator may hold a biased belief about p, but for that he has to pay a cognitive dissonance cost that is increasing in the size of the bias: $\mu \cdot C(p - p_0)$, with $\mu > 0$, and $C(\cdot)$ strictly convex and strictly increasing in $|p - p_0|$. If we let the parameter $\mu \to \infty$, that limiting case would represent the absence of motivated beliefs. There are many costs bundled in the last term. Firstly, the more distorted the view that the individual holds, the more likely it is to find counterfactual evidence, which makes him uncomfortable. Secondly, in order to generate biases people have to systematically ignore information, which takes effort and time, and may eventually lead to sub-optimal choices in other aspects of life. The more someone wants to "deviate" from his prior belief (e.g. the truth), the higher the psychological cost that he will have to pay.

The problem of the allocator becomes:

$$\max_{t \in [0, x_2], p \in [0,1]} U(x_1 + \rho t) + \lambda\left(\lambda_2^L + p\left(\lambda_2^H - \lambda_2^L\right)\right) U(x_2 - t) - \mu \cdot C(p - p_0)$$

[14] Given the dictator setting, an asymmetric formulation is sufficient to capture the relevant effects. In more general settings, reciprocal altruism involves $\lambda_i(\lambda_j)$ for $i=1,2$. (see, Levine 1998 and Rotemberg, 2005).

Proposition 1: If the solution is interior and $\mu < \infty$, then an increase in ρ changes p^* and t^* in opposite directions.

Proof: take the FOC w.r.t. p for the interior solution:
$\left(\lambda_2^H - \lambda_2^L\right)\lambda'\left(\lambda_2^L + p^*\left(\lambda_2^H - \lambda_2^L\right)\right)U\left(x_2 - t^*\right) - \mu \cdot C'\left(p^* - p_0\right) = 0$. And then differentiate w.r.t. ρ:

$$\frac{dp^*}{d\rho} = \frac{\left(\lambda_2^H - \lambda_2^L\right)\lambda'\left(\lambda_2^L + p^*\left(\lambda_2^H - \lambda_2^L\right)\right)U'\left(x_2 - t^*\right)}{\left(\lambda_2^H - \lambda_2^L\right)^2 \lambda''\left(\lambda_2^L + p^*\left(\lambda_2^H - \lambda_2^L\right)\right)U\left(x_2 - t^*\right) - \mu \cdot C''\left(p^* - p_0\right)} \frac{dt^*}{d\rho},$$

where the ratio in the LHS is positive given the assumptions.

If the allocator decided to increase t^* after a reduction in ρ, then he must have also increased p^*. Intuitively, given that the allocator is taking more resources, he is willing to pay a cognitive dissonance cost to have more negative beliefs about the seller and therefore alleviate the moral cost from taking the extra resources.

Implementation

At the very beginning of the game each subject is asked to complete 5 tasks. Each task consists in finding a sequence of binary numbers in a larger sequence, as shown in Figure I. The average time to complete each task was around 1 minute. After completing the 5 tasks, each player is told that he has earned 10 tokens, and only then is allowed to continue with the rest of the experiment. The fact that subjects are made to earn their endowments, and that all enter the game with the same number of tokens, ensures that there is some similarity in entitlements (this stage is not crucial for our purposes).

After working for the tokens, the subjects go through detailed instructions about how the game works and then face a set of questions about it that ensures that they have understood them, as well as the implications (for example, concerning anonymity). Roles ("allocator" and "seller") are randomly assigned and each allocator is matched with a seller. Each pair of players has 20 tokens total. The allocator has to decide how to split the 20 tokens between him and the corresponding seller. The seller has to "sell" the tokens to the experimenter. If the seller chooses "Option A" then the price is \$2 (so both the seller and the allocator are paid \$2 per token). If he chooses "Option B" then the price of the tokens is \$1, but the seller gets an additional payment of \$10 only for him. The game is simultaneous, so the seller does not know how the allocator split the 20 tokens when choosing A or B. And the allocator does not know whether the seller chose A or B when splitting the tokens. Note that a purely selfish seller without fairness concerns would always choose Option B, and a purely selfish allocator would always choose to take the 20 tokens for him.

We took many precautions to ensure that the subjects understood the rules of the game clearly. The subjects must complete a true-false questionnaire about the rules of the game. In order to give them incentives to pay close attention to the rules, they are told in advance that the questionnaire will pay extra money for each correct answer. There are four questions. In the first two, subjects were given hypothetical decisions for both allocator and seller, and they had to calculate the resulting payments for both players. In the first hypothetical situation the allocator keeps 10 tokens for himself and the seller chooses B. In the second situation the allocator keeps 19 tokens for himself and the seller chooses A. The answers of the subjects were correct over 70% of the time. The last two questions of the questionnaire were: i. The other players or the experimenter will be able to identify your decisions in the game; ii. Even though they do not know your name, the seller (allocator) knows how you split the tokens (whether you chose A or B) at the time of choosing A or B (splitting the tokens). The correct answer is False in both cases. The subjects were right 90% of the time. After answering the questionnaire, the subjects are shown the right answers with explanations, even if they entered the right answer, clearly indicating whether they got each question right or wrong. Finally, the allocator is shown a screen with all the instructions of the seller, which contains no information about how the tokens are split.

After they finished with the questionnaire, allocators reach the stage where they have to split the 20 tokens. It is a screen with 20 circular yellow tokens, 10 on each side, as shown in Figure II. The allocator can transfer tokens among the two players with a click-drag-and-drop of the mouse. We introduced the efficiency of redistribution (i.e. ρ) as a step-function: when transferring a token from one player to another it conserves its entire value ($\rho = 1$), but a given allocator cannot move the first K tokens of each player (colored in green), which in practice is equivalent to $\rho = 0$. We randomized two treatments: $K \in \{2,8\}$.

Recall a key aspect of our design: nobody knows about differences in *K*. In the case of allocators, those treated with *K=2* are of course aware that *K=2* exists (they can move/take up to eight tokens), but do not know that there is a second treatment, and they do not know that in that other group *K=8*. In the case of sellers, they are not aware of the existence of any treatment, so as far as they are concerned, *K=0* for all allocators.

Given this design, the "rational learning" hypothesis predicts that the subjects' beliefs (both those of allocators and those of sellers) concerning the proportion of sellers choosing B in exchange for a side payment, should not depend on *K*, particularly given that there is a monetary reward for a correct guess. On the contrary, if they engaged in self-serving biases we should observe that those with $K = 2$ think that the sellers are more likely to choose B. Intuitively, allocators with $K = 8$ can take at most a couple of tokens, so they do not have much incentives to hold negative beliefs about the sellers. But allocators with $K = 2$ have incentives to hold negative beliefs about the sellers so as to justify (at least from a "fairness" perspective), taking a greater share of the 20 tokens. Indeed, if sellers opted for B, then taking more tokens increases fairness (both in outcome based and intentions based models of fairness). This is exactly what the main Proposition of our schematic model predicts. And given that subjects are randomly assigned to the two treatments, we can perform this test by using a simple test of equality of means.

We retrieve two measures of the allocators' beliefs (about how the sellers behaved). First, before making the payment (an instance when the allocator finds out with certainty the seller's actions), we ask the allocator whether he thinks that the seller to which he was matched chose Option A or B. We denote this variable *Is Corrupt*. There is no monetary reward for guessing correctly. Immediately after, the allocator is asked to briefly explain his answer. By asking him to explain his choice we ensure that he has the opportunity to think in more detail about the topic and about the seller. In the following screen, the allocator is given a bonus question. The allocator is told that he will be awarded 5 dollars if his answer is correct, which helps ensure the allocators will have an incentive to declare what they actually believe. The amount is substantial (it is over 60% of the average payments actually received during this experiment). The question asks: "What percentage of sellers playing today in the lab chose Option B?". The possible answers are the ten categories: "0-10% (0.1); 10-20% (0.2); …; 90-100% (1)." We denote this variable *Are Corrupt*. We also obtain two measures of beliefs for sellers, although these play a smaller role in our analysis given that there are no changes in the incentives to distort them. We provide a reward of 2.5 dollars for each of the two (in case sellers guess the correct answer). One of the measures is again *Are Corrupt*. The other is a question asking sellers to guess the number of tokens that that the allocator left them.

III. Experimental Results

The experiment took place in Universidad de San Andres, a private university in Argentina. Participants were randomly drawn from a database of hundreds of college students who declared to be interested in participating in experiments. Students were not informed of the content or purpose of the experiment, only that the experiment took place in front of a computer, that the participants were asked to perform simple tasks, that the decisions in the experiment were anonymous, and that they could earn some money in return. Most of the students belong to families in the highest decile of the income distribution of Argentina. They are presumably to the center-right of the political spectrum in Argentina.

The subjects entered the laboratory in groups of 16. They were randomly assigned to the role of allocator and the role of seller, and matched in pairs. Before starting play, subjects had to read and sign a standard agreement. They were informed that the experimenters were not going to deceive them in any way, that their actions were anonymous, and that their decisions were actually going to affect their payments and those of their circumstantial partners. They were again reminded about these rules at the start of the experiment through a set of on-screen instructions. The subjects earned on average a little fewer than 10 dollars, and the time spent since they entered the laboratory until they left was around 30 minutes. The stakes were reasonable: e.g. with 10 dollars you can buy 3 lunches in the university cafeteria. All the subjects reported that they would like to be called for a future experiment, and most of them rated the experience as highest in a scale from 1 (unpleasant) to 5 (pleasant).

We employed a total of 64 subjects. Even though the sample size is modest, it proved to be large enough to statistically identify the effect of interest. Unfortunately, we had to discard two observations. At the end of the game the subjects were asked on the computer screen whether they understood the rules of the game, and one of the subjects declared not to have understood the rules. That is the first of the two observations discarded. As a confirmation, we note that this subject spent over 15 minutes solving the last of the five tasks (we recorded the time that each subject spent on each screen of the experiment). Therefore, we conclude that he did not understand the rules not because they were difficult to understand, but merely because he had to rush over the rest of the game to compensate for the time lost. We discarded the second observation because in the questionnaire he declared that he was not a student of the university. Including these two observations does not alter any of the results below. After finishing the game all the subjects were invited to participate in an on-screen paid survey. Every subject accepted to participate. In that survey we obtained information about some basic demographic and socio-economic characteristics, values and beliefs.

As explained, the choices made by the sellers (i.e., the recipients) are not directly relevant for the test that we are interested as sellers do not have incentives to distort beliefs (more precisely, whatever the incentive, it is the same for all sellers). We note that 75% of sellers choose Option B (low price + side payment) over Option A. Data definitions appear in Table A, and their corresponding descriptive statistics in Table B.

The allocators with $K = 2$ took on average 6 tokens from the sellers, and the allocators with $K = 8$ took on average 1.5 tokens. As a mild consistency check on the interpretations offered in this paper (based on the concept of fairness), after taking its decision, but prior to learning the decision of its partner, we asked each subject: "How morally satisfied are you with your choices in the experiment?" The possible answers range from very satisfied (1) to very unsatisfied (5). Consistent with the view of fairness concerns, taking more tokens is negatively correlated with declared moral satisfaction of the allocators, and choosing Option B over Option A is negatively correlated to the declared moral satisfaction of the sellers.[15]

We can now test the main Proposition. Under the null hypothesis of rational learning with no self-serving biases, the beliefs *Is Corrupt* and *Are Corrupt* should be independent from K. Plain mean difference tests reject those two null hypotheses with p-values of 0.019 and 0.078, respectively.[16] As predicted by the Proposition, the allocators with $K = 2$ have a value of *Is Corrupt* that is 0.4 (i.e., 40 percentage points) greater, and a value of *Are Corrupt* that is greater by 0.2 (which would be equivalent to 20 percentage points) than those for allocators with K=8.

We present the regression-equivalent of the mean difference tests in columns (1) and (3) of Table I, where we regress the beliefs about the sellers on a dummy variable that takes the value one if $K = 2$ and zero otherwise. For the belief *Is Corrupt* we use a probit model, and we report directly the marginal effects at the mean of the independent variables. For the dependent variable *Are Corrupt* we use OLS. In order to assess the robustness of the results, in columns (2) and (4) we add a basic set of control variables: gender, age, socio-economic class and father's education. The results are unaltered, which is also true if we use a different set of control variables.

Of course, there is an alternative (more direct) way to test the Proposition. If the solution is interior, we can take the FOC w.r.t. $\hat{p}$ and use the Implicit Function Theorem*:*

$$\frac{dp^*}{dt^*} = -\frac{\left(\lambda_2^H - \lambda_2^L\right)\lambda'\left(\lambda_2^L + p^*\left(\lambda_2^H - \lambda_2^L\right)\right)U'\left(x_2 - t^*\right)}{\left(\lambda_2^H - \lambda_2^L\right)^2 \lambda''\left(\lambda_2^L + p^*\left(\lambda_2^H - \lambda_2^L\right)\right)U\left(x_2 - t^*\right) - \mu \cdot C''\left(p^* - p_0\right)} = \delta$$

[15] See Konow (2010) who combines experimental outcomes with reports on emotions to tests theories of giving.
[16] As standard with experimental analysis, we repeated the mean difference test with many variables (e.g. male, gender, socio-economic class, values and beliefs) and we found no statistically significant correlation with K.

Where δ is zero if $\mu \to \infty$, and positive otherwise. Testing $\delta = 0$ would be a more direct test of the Proposition.[17] It is straightforward to implement this test, exploiting the exogenous variation in ρ that we generated in the experiment. We can recover δ by simply running a regression of the beliefs about the sellers on the number of tokens taken from the seller, and use the dummy $K = 2$ as instrumental variable. To see the intuition for why this is a more direct test of the theory, consider the possibility that K had no effect on the number of tokens taken by the allocator. Then the allocator would not need to justify further redistribution, and therefore we should not expect any effect of K on beliefs about the seller. In practice, K affected how many tokens most allocators took, but it did not affect the choice of some allocators: i.e. 20% of the group with $K = 2$ took two or less tokens. By using the IV regression we can improve the power of the test. The results are shown in columns (1) and (3) of Table II for the beliefs *Is Corrupt* and *Are Corrupt*, respectively. As expected, we reject the null hypothesis of $\delta = 0$ at the 1% and 10% levels of significance, respectively. In columns (2) and (4) we reproduce the regressions but adding control variables, and the results remain the same.

IV. Conclusions

A natural interpretation of positive offers in dictator games is that people have "fairness" concerns. This is reinforced by variations in sharing induced by having some players "earn" their roles (or their "property rights"). Recent work has identified circumstances in which agents try to avoid information that would allow them to know if they are being fair (Dana, *et al*, 2007) and distort their beliefs about what fairness ideals to apply (Konow, 2000). In this paper we introduce a "corruption game" which is just a modified dictator game where recipients take an action that can reduce the size of the overall pie in exchange for a side payment. We then use it to explore another strategy that would allow dictators to keep a higher share: increasing their belief that the recipient has accepted the side payment. Our

[17] Note that in the previous regressions, with K on the right hand side, the emphasis is on the effect of the opportunity to take tokens on beliefs, whereas in this regression we emphasize that the effect is really a result of actually taking that opportunity: beliefs change in players that actually take the tokens.

hypothesis is that such negative beliefs about recipients may lower the cost of acting unfairly (and keeping a larger share of the endowment).

Our set up is a standard anonymous dictator game with two small modifications. The first involved an initial stage where the two players performed a set of tasks until they reached the same number of correct answers, so as to each enter the sorting of roles (randomly into dictator and recipient) with the same number of tokens (10 each). The second modification was more important: simultaneously with (and blind to) the dictator's allocation decision, we allowed the recipient to set the unique "selling price" for the tokens which determines the players' payoff (together with whatever share they were allocated by the dictator). The key feature of this modification is that the recipient can choose a low price in exchange for significant side payment for himself, a feature that we designed with the hope of mirroring the action of "under invoicing" that is typical in many corruption settings. We obtain two measures of beliefs by asking dictators two questions after they make their allocations (but before finding out the payoff), namely if they think the recipient choose the low price (in exchange for the side payment) and what was their best guess of the proportion of the population of recipients that choose the low price. In the case of the second belief, we offered dictators a significant reward for accurate answers. A basic finding is that dictators that take a lot of tokens from the recipient report believing that recipients choose the low price (and accept side payments).

Of course, this correlation admits several interpretations. Thus, we introduced to two treatments. In one (the high stakes treatment), dictators could transfer a large proportion of tokens from the recipient's pile (8 out of 10). In the other (the low stakes treatment), dictators could transfer only a few tokens (2 out of 10). The dictators in one treatment were not aware of the existence of the other treatment. Recipients were not aware of the existence of either of the two treatments. Our main finding is that dictators in the high stakes scenario had significantly higher estimates of the proportion of recipients that would accept side payments.

One possible application of this finding is political economy. In some circumstances, beliefs about the rich are central to policy. For example, it is possible that during the 2009 financial crisis in the US many policy decisions were taken in response to deteriorating beliefs about the merits of the rich, particularly in the financial sector. Many of these policies involved taxing bankers perceived to have gotten rich without much merit and some practices that many regarded as morally questionable. A natural question is what might happen to that belief after the possibility of taxing bankers has been turned into a practice. Our paper suggests that, even if regulation is put into place so that morally questionable lending practices are eliminated, voters might become conveniently righteous (or conveniently upset). It is worth emphasizing that prediction is a rewarded task, so the conveniently righteous appear to be unaware of the fact that they are distorting beliefs for their taxing convenience.

Appendix: A Simple Model of Fairness over Outcomes

We start without motivated beliefs. The players are the allocator and the seller, just like before (denoted by subscripts 1 and 2). Their "actual" endowments, "deserved" endowments and consumptions are given by x_i, e_i and c_i, respectively. Intuitively, the "deserved" endowments are those that would arise in a perfectly fair world. The allocator can transfer an amount t from the seller, although $(1-\rho)t$ gets lost in the transference, where $\rho \in [0,1]$ represents the efficiency of the redistribution. The first component of the allocator's utility function is given by his consumption utility, $U(c_1)$, which we assume to be linear and whose coefficient we normalize to one: $U(c_1) = c_1$. The second component of the allocator's utility is given by his moral sentiments, $\Omega(c,e)$:

$$\Omega(c,e) = -\frac{\alpha}{2}\left((c_1 - e_1)^2 + (c_2 - e_2)^2\right)$$

We assume $\alpha > 0$. Note that the moral cost for the allocator is higher whenever someone consumes something different from what he deserves. A higher α would represent that the allocator is more concerned about justice. For the sake of simplicity we assume $x_1 = e_1$ and $x_2 = e_2$. If this was the whole story, the allocator would solve a trade-off between the marginal utility from consumption and the marginal moral cost from doing something unfair:

$$\max_{t \in [0, x_2]} x_1 + \rho t - \frac{\alpha}{2}\left(\rho^2 t^2 + t^2\right)$$

From the FOC we obtain the interior solution:

$$t^* = \frac{\rho}{\alpha(1+\rho^2)}$$

The comparative statics for α and ρ are very intuitive: i.e. if the individual cares more about justice then he will take less, $\frac{\partial t^*}{\partial \alpha} < 0$, and if redistribution is more efficient then he will take more, $\frac{\partial t^*}{\partial \rho} > 0$.

Now we can introduce motivated beliefs. In a first stage the seller has to choose whether to "betray" the allocator or not. However, the allocator does not know whether the seller betrayed him or not, at least not until after he chose t. A given allocator may be in one of two states of the world, denoted by superscripts 1 and 2, but he does not know in which state he is. In both states the allocator got what he deserved: $x_1^2 = e_1^2$. In the first state ("just world") the seller got exactly what he deserved, $c_2^1 = e_2^1$, and in the second state (is corrupt or "robber baron") he got more than he deserved: $x_2^2 - e_2^2 = \theta > 0$. The perceived probability of being in the latter (former) state is p $(1-p)$. The actual probability is $p_0 \in [0,1]$. The allocator can change his perception of that probability by incurring a "cognitive dissonance cost": $\mu \cdot (p - p_0)^2$, with $\mu > 0$.

In this new situation, apart from choosing how much to take (t) the allocator has to choose simultaneously how much to distort its perception of p:

$$\max_{t\in[0,x_2],\, p\in[0,1]} c_1 - \frac{\alpha}{2}\left((c_1 - e_1)^2 + (1-p)(c_2 - e_2^1)^2 + p(c_2 - e_2^2)^2\right) - \mu(p - p_0)^2$$

$$s.t. \quad c_1 = x_1 + \rho t \quad and \quad c_2 = x_2 - t$$

We are interested in the following comparative static:

Proposition 1a: If the solution is interior and $\mu < \infty$, then an increase in ρ changes p^* and t^* in the same direction.

<u>Proof</u>: take the FOC w.r.t. p *and differentiate w.r.t.* ρ: $\frac{dp^*}{d\rho} = \frac{\alpha\theta}{2\mu}\frac{dt^*}{d\rho}$, *where the relation between* $\frac{dp^*}{d\rho}$ *and* $\frac{dt^*}{d\rho}$ *follows directly.*

Imagine that the individual decided to increase t^* after a reduction in ρ. Then it must follow that the individual also increased p^*. To see the intuition, note that, given that the allocator is taking more resources, he is willing to pay a cognitive dissonance cost to have more negative beliefs about the seller, and therefore alleviate the moral cost from taking the extra resources.

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Figure I: A sample task (one of five)

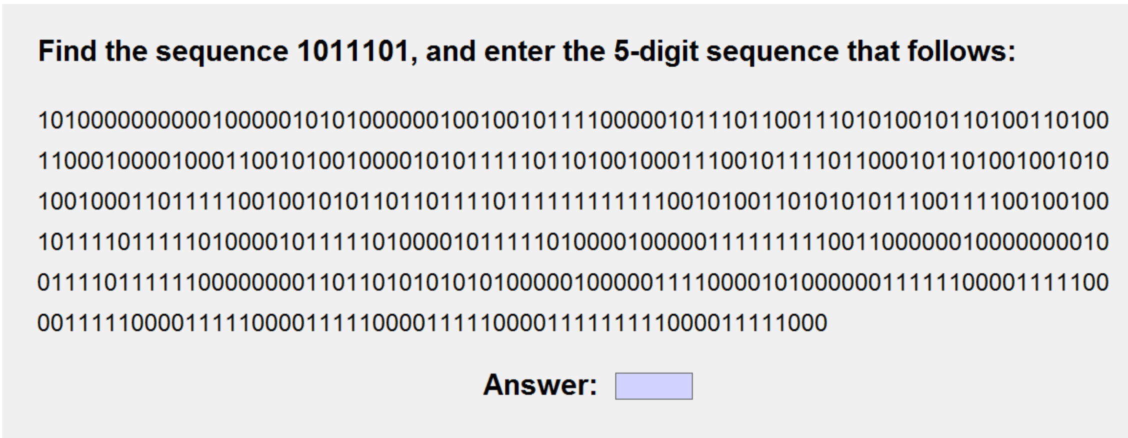

Figure II: Screen faced by an allocator when asked to decide on the split (for K=2)

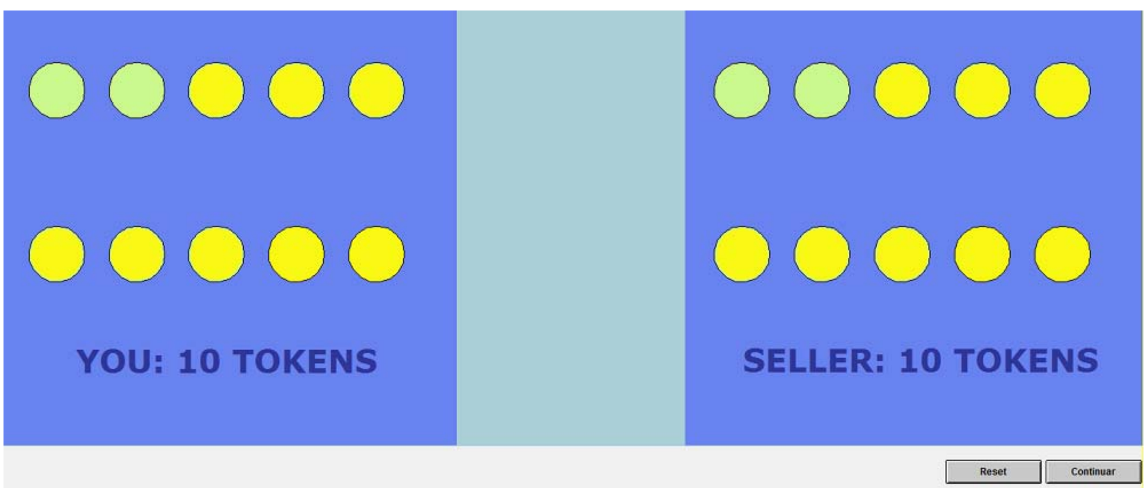

Table A: Data definitions (experiment)

Name	Definition
Is Corrupt	Dummy variable that takes value 1 if the allocator guesses that his corresponding seller chose Option B, and 0 if he thinks otherwise.
Are Corrupt	"What percentage of sellers playing today in the lab chose Option B? 0-10% (0.1); 10-20% (0.2); …; 90-100% (1)"
Block == 2	Dummy variable that takes value 1 if the individual faced 2 blocked tokens, and zero if he faced 8 blocked tokens.
Tokens Taken	Number of tokens taken from the seller by the allocator.
Socio-economic class	"What is the socio-economic class of your family? Lower class (1); Middle-lower class (2); Middle class (3); Middle-higher class (4); Higher class (5)"
Father's education	"What is the educational level of your father? Primary incomplete (1); Primary complete (2); Secondary incomplete (3); Secondary complete (4); Undergraduate incomplete (5); Undergraduate complete (6); Graduate (7)"

Table B: Summary Statistics (experiment)

Variable	Obs	Mean	Std. Dev.	Min	Max
Is Corrupt	30	0.67	0.48	0	1
Are Corrupt	30	0.69	0.31	0.1	1
Block == 2	30	0.50	0.51	0	1
Tokens Taken	30	3.77	3.05	0	8
Socio-economic class	30	3.50	0.63	2	5
Father's education	30	5.73	0.94	3	7

Notes: subset of observations corresponding to the allocators.

Table I: First test

	(1)	(2)	(3)	(4)
	Probit[1]		OLS	
Dep. Var.:	Is Corrupt		Are Corrupt	
Block == 2	0.400**	0.428***	0.200*	0.217*
	(0.159)	(0.156)	(0.110)	(0.121)
Controls[2]	no	yes	no	yes
Observations	30	30	30	30

Notes: Heteroskedastic-robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%; [1] We report the marginal effect at the mean independent variables instead of the raw coefficients; [2] The control variables are: gender, age, socio-economic class and father's education.

Table II: Second test

	(1)	(2)	(3)	(4)
	IV Probit[1]		2SLS	
Dep. Var.:	Is Corrupt		Are Corrupt	
Second Stage:				
Tokens Taken	0.586***	0.970**	0.045*	0.052*
	(0.200)	(0.480)	(0.024)	(0.028)
First Stage:				
Block == 2	4.467***	4.194***	4.467***	4.194***
	(0.742)	(0.530)	(0.755)	(0.627)
Controls[2]	no	yes	no	yes
Observations	30	30	30	30

Notes: Heteroskedastic-robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%; [1] We report the marginal effect at the mean independent variables instead of the raw coefficients; [2] The control variables are: gender, age, socio-economic class and father's education.