



## Altruism and fairness in experimental decisions

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### ABSTRACT

Experimental evidence from dictator games and simple choice situations indicates concerns for fairness and social welfare in human decision making. At the same time, models of inequality averse agents fail to explain the experimental data of individuals who reduce their payoff below a fair split in order to maximize social welfare. This paper presents a linear model of altruism and inequality aversion which reconciles inequality aversion with departures from distributional fairness if welfare is thereby gained. It also establishes a unique link between altruism and interest in social welfare in the proposed model.

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### 1. Introduction

For more than a decade, models of altruism, inequality aversion and reciprocity have provided distinct explanations of non-selfish behavior (e.g., Fehr and Schmidt, 2006) and competed for legitimate application (e.g., Cooper and Kagel, forthcoming; Camerer, 2003). Altruism, inequality aversion or reciprocity rationalize the sharing of a surplus as, for instance, observed in ultimatum game (UG) experiments while only inequality aversion or reciprocity are consistent with money rejection. Positive money transfers, observed in unilateral dictator games (DGs), are exclusively explained by altruism and inequality aversion.<sup>1</sup> Altruists enjoy their own as well as others' well-being, and substantially inequality averse agents object to unequal payoff allocations. As altruism and inequality aversion mitigate or reinforce each other, the unconditional unselfishness and distributional preferences appear confounded to the outside observer. To deconstruct the interplay of both other-regarding motives, I extend a linear model of inequality aversion (Fehr and Schmidt, 1999; FS) by altruism.<sup>2</sup> The trade-offs between altruism and inequality aversion explain how a more parsimonious model of inequality aversion,

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<sup>1</sup> In the two-stage ultimatum game, two players are allotted a fixed sum of money. In the first stage, the proposer offers a partition and, in the second stage, the responder accepts or rejects the offer. If it is rejected, both players receive nothing. In the shorter one-stage dictator game, the proposed partition is paid out and the game ends.

<sup>2</sup> Social preferences combine conditional forms of altruism and self-interest, usually not mentioned explicitly. Charness and Rabin (2002) combine reciprocity and welfare concern, Falk and Fischbacher (2006) reciprocity and inequality aversion in a formal model. Cox et al. (2007, 2008) combine fairness and altruism with reciprocity, respectively; Tan and Bolle (2006) altruism and quadratic inequality aversion.

in some contexts, can abstract from the other behavioral motive without failing to replicate observed behavior. Explicitly accounting for altruism organizes extant experimental results (e.g., Charness and Rabin, 2002; CR) that, so far, have contradicted the simpler inequality aversion theory. In a complimentary approach, Tan and Bolle (2006) combine altruism with quadratic inequality aversion (Bolton and Ockenfels, 2000) and estimate the relative strengths of altruism and fairness using the experimental data from distinct DGs. For four sets of games, they report significant estimates for altruism as well as quadratic inequality aversion. Unlike their estimation of the preference parameters for a representative agent, I investigate the interaction of altruistic, fair and self-interested individuals in the interactive UG and assess the model's predictive potential against reciprocity and welfare preferences.

The first part of the paper calibrates the model in the UG, in which social welfare is fixed or destroyed, and demonstrates how inequality aversion interferes with altruism. The second part revisits the study of CR designed to compare the predictive power of inequality aversion to reciprocity and welfare preferences. In the CR experiment, subjects were confronted with decisions in which social welfare can be increased solely in combination with an increase in inequality, or in which inequality reduction costs welfare. Therefore, pure inequality aversion models, by construction disregarding the conflict between distinct social objectives, fell short in explaining their data. In contrast, altruism and inequality aversion preferences, which unlike the social-welfare preferences of CR exclude reciprocity, achieve the highest consistency value, an upper predictive success bound, of 98 percent. CR's decision tasks were also constructed to trigger reciprocal action which prevents actual achievement of the almost perfect fit of the suggested altruism and inequality aversion model. Despite this natural difficulty of distributive preferences with this data, due to the reciprocity found, this paper shows that a substantial degree of the inappropriateness of pure inequality aversion on the CR data is also attributable to altruism rather than reciprocity.

Section 2 presents experimental evidence of welfare concern. It reviews a formal depiction of altruism and then links it to inequality aversion. In Section 3, the new preferences are calibrated in the UG. Section 4 confronts the model with CR's experimental data from simple decision games in which final welfare, in contrast to the UG, varies in a broad surplus range with the players' choices. Section 5 concludes.

## 2. Experimental evidence and a model of altruism and inequality aversion

### 2.1. Experimental evidence

The simplest structured game to show independent concerns for fairness and welfare is a dictator game in which a transfer is multiplied. Concern for welfare can be separated from inequality aversion by comparing transfers across DGs with different multipliers. If mean transfers increase disproportionately to total welfare with an increase of the multiplier, then the prospect of a higher overall welfare itself, due to the higher multiplier, has triggered the increased transfer. Behavior in DG experiments with multipliers varying from 1 to 3 or 4 was studied, for instance, by Andreoni and Miller (2002), Bolle and Kritikos (2001), Cox (2004), Tan (2006), Tan and Bolle (2006), who also considered multipliers of zero and infinity, and Güth et al. (2002). The last group of authors excepted, all these papers indicate a non-negligible fraction of players who were willing to give up a proportion of their own monetary payoff if thereby they could increase welfare. The more players could increase welfare, the higher was the proportion transferring. When the experimenter triples the proposed transfer, Cox (2004), for instance, finds that a fraction of 41 percent make welfare maximizing transfers such that they end up with less money than the receiver. Because disadvantageous inequality must be compensated for inequality averse players who share more than half of the final welfare, their behavior is strong evidence for welfare concern. In the DG without transfer multiplication, virtually no subjects transferred more than 50 percent of the total welfare but strongest evidence for inequality aversion in the DG is money burning. Tan and Bolle (2006) report that some subjects transfer their own money at multiplier zero. For these reasons, inter alia, altruism and inequality aversion seem independent yet related behavioral motives.

Other significant experimental evidence of welfare concern, also discriminating between the competing approaches of distributional and procedural fairness concerns, was established by CR. In one-stage decision problems, which can be interpreted as DGs with just two payoff situations, and two-stage games, they find that models of pure reciprocity or inequality aversion are inconsistent with a large fraction of the experimental choices. Welfare at stake was frequently maximized even when the allocator had to trade off a proportion of her own payoff and doing so increased inequality; i.e. when welfare maximization was costly: When subjects had to choose, for instance, between (400,400) and (375,750) on average 66 percent chose the latter welfare maximizing allocation.

The degree of unselfishness towards others outside the experimental context of the DG is questioned. For instance, Bardsley (2008) and List (2007) report behavior inconsistent with existing inequality aversion preferences if an option to take money is added. Their works point to a framing effect caused by factors other than distributional preferences which are not captured by models of altruism and inequality aversion either. The significant impact of framing the allocator's choice set on their overall behavior notwithstanding, a small but relatively constant fraction of subjects in the Bardsley (2008) experiment increases the inequality through their generous giving across treatments. List (2007) does not observe this direct evidence of some altruism in any of the take treatments but the emerging three types of behavior: *self-interested taking*, *no taking or giving*, *fair division of social welfare* are consistent with the idea of one prevailing incentive in a preference of self-interest, altruism and inequality aversion. Against the backdrop that the value of studying stand-alone variations of the DG in the development of theory is itself debated (Oechssler, 2010; Smith, 2010), I note the consistently observed

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