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Optimal contracting with altruism and reciprocity

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ABSTRACT

Motivated by the recent experimental evidence on altruistic behavior, we study a simple principal–agent model where each player cares about other players' utility, and may reciprocate their attitude towards him. We show that, relative to the selfish benchmark, efficiency improves when players are altruistic. Nevertheless, in contrast to what may be expected, an increase in the degree of the agent's altruism as well as a more reciprocal behavior by players has ambiguous effects on efficiency. We also consider the effects of the presence of spiteful players and discuss how monetary transfers between players depend on their degrees of altruism and spitefulness.

1. Introduction

Standard economic theory assumes that agents are selfish and only care about their own monetary utility. In practice, however, elements such as fairness, altruism and reciprocity seem to play a crucial role in individual and collective decision making—see, e.g., Becker (1976), Kahneman et al. (1986), and Berg et al. (1995). The experimental evidence amply supports this view. For example, Thaler (1988) finds that, when playing the ultimatum game, proposers (who should make arbitrarily small offers in theory) typically offer equal divisions with responders, who frequently reject ungenerous offers. Similarly, Dawes and Thaler (1988) find that participants in public good contribution games typically make positive contributions, although (in theory) they should not.[1] This suggests that, in real life, individuals are altruistic (i.e., they care about each other's utility) and act reciprocally (i.e., they are good to other good people, and hurt those who hurt them).

Motivated by this evidence, we introduce behavioral elements in a simple principal–agent relationship where the agent is privately informed about his marginal cost of production in order to analyze the effects of altruistic and reciprocal motives in a standard adverse selection model à la Baron and Myerson (1982). We show that the presence of reciprocal and altruistic motives affects not only the enforcement of incentive contracts (as shown by Fehr et al., 1997), but also their design and efficiency properties. Specifically, we derive the optimal incentive compatible contract and show how the degrees of altruism and reciprocity affect the standard trade-off between efficiency and rent extraction. The predictions of the model apply to a wide range of standard contracting environment, such as employer–employee relationships, manufacturer–retailer deals, regulatory policies, etc., which are usually analyzed under the hypothesis that the contracting parties are selfish.

Following Levine (1998), we model altruism by introducing a positive weight assigned by a player to his opponents' monetary payoff, and we model reciprocity by assuming that this weight depends on how altruistic the opponents are.[2]

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[1] See also Kahneman et al. (1986), Fehr et al. (1997), and Fehr and List (2004).

[2] By contrast, in Rabin (1993), Segal and Sobel (1999), and Falk and Fischbacher (2006), a player's degree of altruism depends on his own utility (with respect to a "fair" utility level). In Battigalli and Dufwenberg (2009), instead, higher-order beliefs, beliefs of others, and plans of action influence motivation and behavioral concerns, so as to capture dynamic psychological effects (such as sequential reciprocity, psychological forward induction, and regret).

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Hence, we distinguish between a player's intrinsic altruistic attitude toward opponents, which is an innate characteristic, and his global attitude, which also depends on the interaction between the opponents' intrinsic attitude and the degree of reciprocity.

If the principal and the agent are globally altruistic, the inefficiency due to asymmetric information is lower than with selfish players. Moreover, the more altruistic is the principal, the closer the level of production is to the first-best outcome. The reason is that the principal's global altruism relaxes the trade-off between rents and efficiency and allows players to exploit production opportunities that, with selfish players, were ruled out by asymmetric information. Surprisingly, though, an increase in the agent's global altruism decreases efficiency (i.e., reduces output) because a relatively more altruistic agent is less responsive to monetary incentives, which makes it more costly for the principal to induce an efficient type not to mimic an inefficient one, thus worsening the standard 'distortion at the bottom' result and leading to higher distortions for the quantity produced by inefficient types. Therefore, although altruistic players trade more efficiently than selfish ones, more altruistic players do not necessarily trade more efficiently than less altruistic ones (in contrast to what may be expected).

We also determine the impact of changes in players' intrinsic attitude on efficiency. While improvements in the principal's intrinsic altruism always increase efficiency, changes in the agent's intrinsic altruism generate efficiency gains only under specific conditions on the degree of reciprocity between players. If the level of reciprocity is high, the principal rewards a more altruistic agent by reducing output distortions. If reciprocity is low, the principal has a weaker incentive to limit distortions to reward the agent, and hence he reduces the output further. Moreover, the effect of increasing reciprocity between players depends on the difference between the agent's and the principal's intrinsic attitudes: if the agent has a more (resp. less) altruistic attitude than the principal, the principal rewards (resp. punishes) him by increasing (resp. decreasing) output and information rents. This non-monotone comparative statics stems from the opposite impact of players' global altruistic attitude on efficiency, and it offers a set of new testable implications on the link between optimal contracting, efficiency and behavioral concerns under asymmetric information.

Players' altruism also has interesting effects on the monetary transfer paid by the principal to the agent. When the agent is sufficiently altruistic, the transfer may be negative, so that the agent pays the principal in order to be able to produce. Moreover, contrary to what may be expected, a more altruistic principal may manage to induce the agent to produce a higher quantity (thus increasing total surplus) and, at the same time, obtain a lower transfer. In our model, this "paradox of gift" happens arises when the agent is sufficiently altruistic and inefficient.

Finally, if players are globally spiteful—i.e., they assign a negative weight to their opponent's monetary payoff—the inefficiency due to asymmetric information is higher than with selfish players because the principal always increases the output distortion to reduce the agent's rent. Contrary to the case of altruistic players, a reduction in the degree of global or intrinsic spitefulness always reduces this inefficiency. The reason is that a less spiteful principal cares less about reducing the agent's rent, while a less spiteful agent cares more about total surplus and less about the transfer. In both cases the incentive problem is relaxed, so that the principal needs to distort output relatively less. As with altruistic players, the effect of increasing reciprocity depends on the difference between the agent's and the principal's intrinsic attitudes.

Our findings contribute to the literature on optimal contracting with altruistic and motivated agents. Shchetinin (2009) analyzes optimal contracting in a principal–agent model where the agent is altruistic only if the principal is also altruistic and there is asymmetric information on the degree of altruism. By contrast, we allow both the principal and the agent to be altruistic and we assume that the asymmetric information is on the agent's production cost. Siciliani (2009), Chone and Ma (2004), and Jack (2004) analyze the role of altruism in designing physician's contracts, under the assumption that the physician displays intrinsic altruism toward the patient and is privately informed about his health conditions. Similarly, Delfgaauw and Dur (2008) study how the intrinsic motivation of privately informed workers affect efficiency in a perfectly competitive market, while Delfgaauw and Dur (2009) also consider the case of a monopolistic principal that is only interested in minimizing costs. Shchetinin (2010), Akerlof and Yellen (1990) and Dur (2009), instead, study the effect of employers' intrinsic altruism on workers' effort levels. All these models only consider altruism on one side of the contractual relationship and, differently from us, do not distinguish between altruistic and reciprocal behavior.

In moral hazard environments, Dufwenberg and Kirchsteiger (2000), Netzer and Schmutzler (2010) and Immordino and De Marco (2013) show that, when a selfish principal interacts with reciprocal agents, efficiency generally increases in symmetric equilibria. Similarly, Dur and Tichem (2012) show that the presence of altruistic players who induce good social relationships in the workplace improves the capacity of relational contracts to induce workers' high effort, while bad social relationships might undermine it. With adverse selection, however, we show that the beneficial effect of reciprocal and altruistic concerns may be outweighed by the effects of these concerns on information rents, even in a single principal–agent relationship.

The rest of the paper is structured as follows. In Section 2 we present the model. Section 3 develops two benchmarks: one where there is asymmetric information but players are selfish, the other where players have altruistic and reciprocal concerns but there is complete information. In Section 4 we characterize the optimal contract with altruistic and reciprocal behavior and perform the relevant comparative statics. Section 5 considers spiteful players. Section 6 concludes.

2. The model

Environment: Consider a principal–agent relationship under adverse selection—see, e.g., Baron and Myerson (1982) and Laffont and Martimort (2002). A risk-neutral principal (P) contracts with a risk-neutral agent (A) who produces output q at