



Conditional cooperation with negative externalities – An experiment



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ABSTRACT

Empirically, the commons are not as tragic as standard theory predicts. The predominant explanation for this finding is conditional cooperation. Yet many real life situations involve insiders, who are directly affected by a dilemma, and outsiders, who may be harmed if the insiders overcome the dilemma. The quintessential illustration is oligopoly. If insiders overcome their dilemma and collude, this inflicts harm on the opposite market side. In our experiment, harm on outsiders significantly reduces conditional cooperation of insiders. We can exclude that this result is driven by inequity aversion, reciprocity or efficiency seeking. Only guilt aversion can rationalize our findings, with guilt being most pronounced if the active insiders not only inflict harm on the outsider, but increase their own payoff at the expense of the outsider.

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1. Introduction

Many economic and social situations can be modeled as problems of cooperation. The quintessential cooperation problem is a prisoner's dilemma. Already Rapoport and Chammah (1965) refute the textbook prediction and demonstrate that many people are willing to cooperate in a prisoner's dilemma. This finding has been supported by a wide range of economic studies using laboratory experiments (e.g. Poundstone, 1992; Andreoni and Miller, 1993) and field studies (e.g. Ostrom, 1999; Ostrom et al., 2002). The predominant explanation for this behavior is conditional cooperation (Keser and van Winden, 2000; Fischbacher et al., 2001; Kocher et al., 2008; Fischbacher and Gächter, 2010). Conditionally cooperative individuals cooperate if they know, experience, or believe that others are unlikely to exploit them. Under these conditions, they are willing to forego the possibility to exploit others.

Now, many dilemmas of life are more complex than a two-person prisoner's dilemma. Specifically, co-operation problems are frequently embedded in a wider social context. If insiders successfully overcome the dilemma, some outsiders suffer. In

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such a situation, the moral balance becomes complicated. Insiders must decide whether to let down each other in order to avoid harming outsiders, or to accept harm on outsiders in the interest of being loyal to their in-group fellows.

In the field, this conflict between kindness at the interior and meanness at the exterior is not uncommon. Sometimes, being mean is the very purpose of cooperation, as in a military coalition or in a trade union. At other instances, the harm is more a side-effect which is deliberately taken into account. Those closer to the source of a river build a dam, knowing that this deprives those closer to the estuary of the benefits of the river. A municipality builds a landfill to keep garbage off its streets, knowing that this puts the groundwater of neighboring municipalities at risk.

The most obvious motivation of our paper, however, is oligopoly. Viewed from inside the supply side of the market, competition may be interpreted as a prisoner's dilemma. In this perspective, collusion is the equivalent of cooperation, competitive behavior is defection. Individually, each supplier is best off if the other suppliers are faithful to the cartel, and she undercuts the collusive price or, for that matter, surpasses her quota. Yet if they cooperate, suppliers impose a distributional loss on the demand side, and they generate a deadweight loss, to the detriment of society.

Harm to an outsider may affect cooperation in two ways: insiders may generally become less willing to cooperate, and they may become less sensitive to the experienced or expected level of cooperation among insiders. Harm to an outsider might thus reduce unconditional and conditional cooperation. To test whether this is the case, we experimentally investigate a dilemma with a passive outsider. We deliberately use a very simple setting. A simultaneous symmetric one-shot two-person prisoner's dilemma with binary action space serves as our *Baseline*. In three treatments we add a passive third participant. Whenever at least one of the active players chooses to cooperate, the passive participant suffers harm. The three treatments differ in the severity of the harm.

We find that harm to a passive outsider affects unconditional and conditional cooperation. We find significant main effects: participants cooperate less if cooperation inflicts harm on an outsider, and they cooperate the more, the more they are optimistic about the cooperativeness of other active participants. Yet we find a significant negative interaction between the level of harm and subjects' expectations about the choices of other active participants. If cooperation inflicts harm on a passive outsider, optimism about the cooperativeness of other active participants is less likely to tilt the balance in favor of cooperation, compared with the *Baseline*.

This is not only an interesting finding in and of itself. It also helps us better understand what motivates conditional cooperation. None of the standard explanations for conditional cooperation predicts this negative interaction effect: inequity aversion, reciprocity, or an efficiency motive; nor does the intuitive aversion against inflicting harm on passive outsiders. The only way to rationalize the robust interaction effect requires a utility function with guilt aversion, and guilt most pronounced if the two active players take advantage of the passive outsider. The more they are optimistic that their active counterpart cooperates, the more it becomes likely that this happens. This result suggests that guilt aversion is the most plausible motive driving conditional cooperation, even if there is no outsider.¹

The remainder of the paper is organized as follows: Section 2 relates the paper to the existing literature. Section 3 introduces the design. Section 4 makes theoretical predictions. Section 5 presents and discusses results. Section 6 concludes.

2. Related literature

The effects of externalities on passive outsiders have only rarely been studied. To the best of our knowledge, they have not been tested in a standard prisoner's dilemma. Most related is a paper by one of us with another co-author. Engel and Rockenbach (2011) study a standard repeated four-person linear public good game with three passive outsiders. They vary the direction of the externality and the endowment of the outsiders. Insiders do not cooperate more if this has the additional advantage of making outsiders better off, and they do not cooperate less if this has the additional disadvantage of making outsiders worse off. Rather results are in line with insiders trying to increase the payoff gap between themselves and outsiders. We build on this design, but focus on the most interesting effect, the apparent absence of reticence to impose harm on passive outsiders. Our design differs in the following respects: we implement a one-shot game. This excludes the shadow of the future as a potential confounding factor. We use two-person games. This excludes expectations and experiences about heterogeneity as a possible explanation. We use various levels of harm. This way we do not only see whether any level of harm categorically influences choices, but can investigate whether more pronounced harm has a more pronounced effect. Finally, and most importantly, we elicit beliefs. That way we can disentangle cognitive and motivational effects of imposing harm on passive outsiders.

Other relevant studies are for example Güth and van Damme (1998). They present an ultimatum game with an externality on an inactive third player. The proposer decides how to divide the pie between three players. The division is executed if and only if the responder accepts. Otherwise, all three players receive nothing. In this game, the outsider receives very little. If the responder only learns the fraction the proposer wants to give the outsider, proposers keep almost everything for themselves. In anticipation, responders are very likely to reject the (mostly unknown) offer. Bolton and Ockenfels (2010) study lottery choice tasks in which the actor's choice also influences the payoff of a non-acting second player. This induces participants to take larger risks, provided the safe option yields unequal payoffs. Abbink (2005) plays a two-person bribery game in which

¹ Note that, when looking at negative externalities from a different perspective, other explanations for behavioral changes caused by externalities may matter (e.g., Gneezy et al., 2004).

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