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Coordination with third-party externalities

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ABSTRACT

When agents face coordination problems their choices often impose externalities on third parties. If an agent cares about them or believes others do, they can affect equilibrium selection. We present evidence from lab experiments showing that changes in the size and the sign of third-party externalities have a significant impact on tacit coordination. Decision makers are more willing to incur a cost to try to avoid imposing a large negative externality on a third party, than they are to avoid a small negative externality or to generate a large positive externality. However, when decision-makers' incentives are at odds with the interests of third parties, many of them appear to ignore third-party externalities even if they are large in magnitude, and ignoring them implies substantial earning inequalities and reductions in group earnings. Individuals revealed to be other-regarding in a non-strategic allocation task often behave as-if selfish when trying to coordinate. We discuss explanations for our findings.

1. Introduction

In many instances when agents face coordination problems in daily life, the choices of the decision makers will not only affect their welfare, but also impose externalities on third parties. Such coordination problems are common in economics. A classic example is tacit collusion where firms try to coordinate actions to increase their profits, but in doing so reduce the surplus of consumers. Macroeconomic models with trade, production and search externalities often admit multiple equilibria, with agents' choices affecting the entire economy (Cooper and John, 1988). In microeconomics, contracting externalities between employees can lead to coordination failure and reduce the welfare of different third parties such as employers, co-workers, and the general public (e.g., Genicot and Ray, 2006; Segal, 2003).

Traditional economic models postulate that *all* agents act to maximize their utility without regard for the welfare of others. If this is common knowledge, the prediction is that decision makers will ignore the consequences their actions have on *non*-decision makers when facing coordination problems. When the interests of decision makers and third parties are at odds, outcomes can thus be inefficient. Evidence from lab experiments however indicates that many individuals are willing to incur a cost to alter the earnings of other decision makers (e.g., Andreoni et al., 2003; Engelmann and Strobel, 2004; Fisman et al., 2007) or third parties (e.g., Ellman and Pezanis-Christou, 2010; McDonald et al., 2013). Models of social

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preferences have been developed in reaction to this evidence assuming that individuals also care about the welfare of others (e.g., Bolton and Ockenfels, 2000; Charness and Rabin, 2002; Fehr and Schmidt, 1999).

The existence of socially-minded agents implies that third-party externalities can influence equilibrium selection. However, it remains an open question to what extent this happens in practice. The answer will partly depend on the decision-makers' preferences, and partly on their beliefs about the likelihood other decision-makers will act on the interest of third parties. If individuals believe that other decision makers are likely to act on the interest of third parties, even selfish decision-makers may decide to do the same and behave as-if other-regarding. If decision-makers believe that others are unlikely to act on it, then even socially-minded individuals may choose to behave as-if selfish when facing a coordination problem. It is therefore difficult to predict the impact of third-party externalities on equilibrium selection without empirical data.

This paper presents evidence from two lab experiments exploring how changes in the size and sign of third-party externalities affect tacit coordination. As a testing ground we consider a class of simple coordination games, which allows us to easily identify the impact of third-party externalities. Decision-makers' incentives are aligned and, if individuals ignore third-party externalities, the coordination problem is trivial: the equilibria are Pareto-ranked and there is no conflict between payoff and risk dominance. If the externalities are not ignored, on the other hand, concerns for equality or group welfare may also affect equilibrium selection. In other words, strategic uncertainty arises primarily from the uncertainty regarding how much the other decision-makers cares about the welfare of third parties. To assess the role of social preferences, we elicit participants' distributional preferences using a simple allocation task in both experiments.

Our findings indicate that third-party externalities can indeed affect tacit coordination. Overall, decision makers are more likely to try to coordinate on the equilibrium that avoids a negative third-party externality as the size of the latter increases. The *sign* of the externality also matters: decision makers are more likely to act to avoid a negative externality than to generate a same-sized positive externality for third parties. These findings are consistent with the predictions of the model by Charness and Rabin (2002) which assumes that individuals care for social welfare and the minimum payoff in one's reference group.

Although third-party externalities clearly affect coordination, when the decision-makers' private incentives are at odds with the interests of third parties, the externalities appear to be often ignored by decision makers, even if they are very large in magnitude. Subjects revealed to exhibit a concern for the welfare of third parties in the allocation task, more often than not, choose the action that maximizes their own earnings but imposes the negative externality on the third parties when they try to coordinate. In contrast, participants with a stronger preference for own-payoff maximization almost never chose the action that avoids the negative externality in the coordination game. That is, strategic uncertainty makes decision makers behave more selfishly in our experiment rather than more pro-socially. We discuss explanations for this finding and avenues for future research in the last section.

2. Related literature

Our study is the first to explore how concerns for the welfare of third-parties may affect equilibrium selection. There is considerable evidence suggesting that individuals care about the welfare of others (Cooper and Kagel, 2013). However, there is only one study to date focusing explicitly on how social preferences affect tacit coordination. Chmura et al. (2005) examine how concerns for social welfare and equality in the payoffs of *decision makers* affect choices in 2×2 coordination games. They find that both concerns are important determinants of decisions in their coordination game. Unlike in our experiment, actions in this study do not impose externalities on third parties. In many economic contexts, however, decision makers impose externalities also on third parties (e.g., environmental pollution, tacit collusion). Bigoni et al. (2013) and Cason and Mui (2007) investigate behavior in two-stage, three-player games, where a 2×2 coordination game is (sometimes) embedded in the second stage. The choices of the two decision makers determine the payoffs for all three players, but the "third" player is *not* inactive in these studies as they make a decision in the first stage of the game which determines the options/payoffs available to players in the second stage.

Recently, there has been a discussion about whether individuals care similarly for the welfare of other decision-makers and non-decision makers (a.k.a. third parties). The evidence so far from bargaining and social-dilemma experiments suggests that participants may care less about the welfare of inactive third parties than the welfare of other decision makers (e.g., Güth and van Damme, 1998; Kagel and Wolfe, 2001). Nevertheless, the existence of third parties has been shown to have a significant impact on behavior (e.g., Ellman and Pezanis-Christou, 2010; Engel and Zhurakhovska, 2015), especially when decision makers are in a worse monetary position than the third parties (Engel and Rockenbach, 2009; McDonald et al., 2013). Importantly, even if agents care less about third parties, the uncertainty decision makers face about the social preferences of others when trying to coordinate could serve as a "social multiplier", increasing the number of agents willing to act in the interest of the third party.