Team production benefits from a permanent fear of exclusion

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ABSTRACT

One acclaimed role of managers is to monitor workers in team production processes and discipline them through the threat of terminating them from the team. We extend a standard weakest link experiment with a manager who can decide to replace some workers at a cost. We address two main questions: (i) Does the fear of exclusion need to be a permanent element of contractual agreements? (ii) Are the results robust to the introduction of noise in workers' productivity? We find that the fear of exclusion strongly encourages co-operation among workers, but it does not generate the trust needed for cooperation once the fear of exclusion is lifted. That is, once some workers receive a permanent contract, effort levels steadily decrease. The results are robust to the introduction of noise in the link between effort and productivity.

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1. Introduction

In practice many team-production processes have weakest link characteristics. Examples include the construction of a new building, an operation performed by a surgical team and the preparation of an airplane for take-off. In the latter case, the plane cannot take off before the baggage is loaded, the catering has replenished the pantry, the crew has arrived, all passengers are seated and the plane is refueled and checked. The slowest component of these will determine when the plane is ready to take off. The teams engaging in a task with weakest-link aspects are usually quite successful in real life. Buildings rarely collapse, patients who are operated usually do not die and most planes are ready for take-off according to schedule. This picture contrasts sharply with the results from minimum-effort games that are used to model team production with weakest link characteristics in the laboratory. In the experiments, team-production typically fails unless the team consists of very few members.[1] In contrast to the minimum-effort experiments where the fear of exclusion is absent, team members in the field face the fear of being fired if their performance slackens. We think that the fear of exclusion is key in explaining (part of) the difference in team performance in the laboratory and the field.[2]

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[1] Van Huyck et al. (1990) first studied the minimum-effort game and showed that high effort levels were only sustainable with a fixed group of 2, but not with random pairs, and neither with groups of 14–16 members. Subsequent research confirmed these earlier findings and showed that groups converged to the worst equilibrium unless they consisted of only 2 or 3 members (e.g. Knez and Camerer, 1994; Chaudhuri et al., 2009; Weber, 2006). Devetag and Ortmann (2007) provide a survey.

[2] Alchian and Demsetz (1972) argue that an important reason for why firms need managers is that efficient team production is facilitated if someone specializes in monitoring workers and excludes those whose performance falls behind (See also Jensen and Meckling, 1976).

In this paper, we design a series of experiments in which we vary the role of a manager with discretionary power. The experiments allow us to pursue two main goals. First, and most importantly, we investigate if the fear of exclusion needs to be permanently maintained in labor relations. In some contracts workers are effectively protected from firing after they have survived a probation phase. The fear of exclusion may encourage workers to perform well in their probation phase. In fact, it may even facilitate coordination on the efficient equilibrium in the minimum-effort game. It is not clear though whether the fear of exclusion is effective in creating the trust that is needed for continued cooperation after the fear of exclusion is lifted. An open question that we address is if workers continue to perform well after the probation phase has ended in a setting where maintaining high effort levels is in everybody's best interest.[3]

A second goal is to investigate if the results are robust to the introduction of noise in the link between effort and productivity. In practice, workers' performances will be affected by luck. This feature may erode a potential positive effect of the possibility to exclude team members. One effect of noisy performance may be that cooperative equilibria are no longer supported in an equilibrium of the stage game. In the noisy minimum effort game that we study, deviating down from any symmetric profile is a best response in the stage game. Another behavioral possibility is that with noise there is a danger that managers judge workers too quickly, and do not sufficiently account for the possibility that a worker's performance is affected by bad luck. More generally, Alchian and Demsetz (1972, p. 786) conjecture that "…the cost of managing team inputs increases if the productivity of a team member is difficult to correlate with his behavior". Our treatment variation in noise allows us to explore the possibility that the added value of having a monitoring manager decreases when performance is noisy. Thus, the introduction of noise may make it harder for managers to motivate the workers. To the best of our knowledge, we are the first to address the fear of exclusion in the presence of noisy performance.

Exclusion may facilitate cooperation in team production through two mechanisms. First, the possibility of exclusion may simply boost performance because workers who consider to shirk refrain from doing so because they fear to be fired which is costly to them. This is an incentive effect. The other potential mechanism is that there is heterogeneity in workers' attitudes, and the possibility to exclude badly performing workers allows a manager to create a homogenous team that consists of members with a cooperative attitude. This would be the selection effect. Notice that a comparison of the performance of workers who survived a probation phase and workers who are subject to an ongoing threat of being fired allows us to identify the incentive effect. If a positive effect of exclusion is realized through selection only, performance should not differ between the two groups once the right type of workers is selected. A selection effect is revealed by a comparison of the performance of workers who survived probation and the performance of workers who never face a threat of exclusion.[4]

In agreement with the labor applications that motivate our research, we include a manager in our experimental minimum-effort game. The manager monitors a team of six workers and benefits from the production in the same way as workers do, but she does not participate herself in the production process. Instead, the manager has the possibility to replace some workers in her team (with the fired workers becoming unemployed). In the experiments we vary two aspects of the game: (i) The extent to which workers are protected by contracts, and (ii) how well the worker's productivity level reflects the worker's effort level. Regarding the latter dimension, a worker's productivity is either equal to her effort level, or it is equal to her effort level plus a noise term.

In real life, the extent to which workers are contractually protected varies from no commitment under spot contracting to full commitment in case of a tenured position. In intermediate cases workers are only partially protected by contracts. One particularly relevant in between case concerns probation contracts, where the relationship essentially moves from no commitment during the probation phase to full commitment after having obtained tenure. Another realistic in between case are short term contracts that do not last as long as the potential relationship. In our experiment we consider all four possibilities: workers can be fired either every round (Spot), every third round (Medium), only during their probation phase (Probation), or never (Longterm).

Compared to Spot, our Medium contract has more limited firing possibilities, yet it shares the important feature that workers are never secure. A priori one would thus expect that the Medium contract performs more similar to the Spot contract and will be more efficient than the Probation contract where firing possibilities are limited in another way. In fact, one might even conjecture that the Medium contract could improve on the Spot contract when productivity is noisy. In that case managers might judge workers too quickly under the Spot contract and take insufficient account of the effect of noise.[5] Attribution error (Reeder and Spores, 1983) can further aggravate this problem if managers downplay the possibility that a

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[3] Ichino and Riphahn (2005) provide empirical field evidence about the effect of probation on worker behavior. They measure absenteeism in a large Italian bank both during and after probation, and find significantly higher absence rates once workers are fully protected. To interpret their data they rely on a standard principal - single agent framework in which workers (ceteris paribus) benefit from exerting less effort. In our team production setting, workers benefit from higher output and coordinating their effort, so even if the fear of exclusion is vanished they may in principle still want to exert the same amount of effort.

[4] We do not disentangle the pure monetary effect of incentives and their symbolic effect. That is, in our experiment, we cannot determine if the incentive effect is a response to the monetary effect of losing one's job, or a response to an informal reprimand of the manager. In previous work on the voluntary contribution mechanism, (Masclet et al., 2003) find that informal sanctions can be effective in raising cooperation, although their effect in the longer term is not as large as what can be accomplished with monetary sanctions. Dugar (2010) finds that non-monetary disapproval is very effective in the minimum-effort game, while non-monetary approval does not increase effort. Riedl et al. (2016) have a treatment where exclusion is only symbolic in the sense that the exclusion does not affect the payoff of the person excluded. In that treatment, subjects coordinate on the highest effort level.

[5] Abreu et al. (1991) examined theoretically the effect of different interval lengths to act in games with imperfect monitoring. Bigoni et al. (2011) found experimental evidence that in a 2x2 Cournot game, collusion is harmed with high or low flexibility but not with intermediate flexibility. In the context