

# Gradualism in a principal-agent interaction

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This paper theoretically and experimentally analyzes a repeated principal-agent game with varying relative stakes. We study an environment with asymmetric information. The principal hires an informed agent to observe the state and take action accordingly. There is a high probability that the principal and the agent have misaligned preferences. Repeated play becomes valuable in such a setting by improving the equilibrium payoff of the principal. The agent has reputation incentives that motivate her to take action matching the true state in the initial periods rather than maximize her own period payoff. As Morris (2001) calls, the "discipline effect" of the reputation incentives benefits the principal. We show it is optimal for the principal to start the interaction small and increase the stakes gradually. The agent's reputation incentives are managed so that the reputation evolves slowly. We test these predictions in four treatments via online experiments. Each period receives an equal stake in one treatment. In the other three treatments, the interaction starts small, and the stakes increase at different speeds. We show that the smaller the interaction starts, the higher the reputation incentives of the agent. More importantly, we show that the principal earns a higher payoff in starting-small (gradualism) treatments than the equal-stakes treatment. We contribute to the literature on gradualism by showing it is a valuable tool to improve equilibrium payoffs in the particular principal-agent framework with asymmetric information.

We frequently participate in interactions that last longer than a single period. In environments with asymmetric information, repeated play becomes valuable. Reputation incentives arise, and the players can obtain higher equilibrium payoffs via updating beliefs in each other. Furthermore, repeated play enhances cooperation in prisoners' dilemma-like settings where it is hard to reach cooperation in one-time interactions.

This paper theoretically and experimentally analyzes a repeated principal-agent interaction. The principal decides whether to delegate a job to the agent whose preferences are unknown. We focus on the setting where there is a sufficiently small probability of the agent being a good type. If the interaction is one-shot, the principal does not hire the agent with such a low reputation level. However, in a repeated play, the principal can monitor the agent's behavior and act accordingly. The principal hires the agent in the first period and continues hiring as long as the agent displays

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the desired behavior. The principal's hiring behavior creates reputational incentives for the agent to act according to the principal's expectations.

The extent of the reputational incentives depends on how the stakes are allocated across the interaction periods. In the classical studies of repeated communications, each period receives an equal weight. In this paper, we vary the allocation of stakes to find the principal-optimal one. For instance, the agent does not have reputational incentives if the interaction starts with sufficiently high stakes. In other words, if the future communication is not adequately important compared to the current play, then the agent aims to maximize today's payoff rather than focusing on the reputation. It may be the desired behavior in specific environments. However, the principal does not hire the agent in the absence of reputational incentives if her initial reputation is low. The principal-optimal allocation involves starting small and increasing the stakes gradually.

This paper analyzes a three-period repeated principal-agent game. The agent is either a good or a bad type, and the principal does not know the agent's type. The principal hires the informed agent to observe the state and take action accordingly. The good agent shares the same preferences with the principal and prefers to take action that matches the state. The bad agent, on the other hand, prefers a particular action irrespective of the state. Consider, for example, a state official hiring a private firm for a public project that will last up to three years. At the beginning of each year, the official decides to hire the agent or not. If the agent is hired, she implements the project. At the end of the year, the official observes both the firm's action and whether the execution was adequate. Next, he makes the hiring decision for the next year.

It is optimal for the principal to start the interaction small in such a setting. Starting small leads to reputation incentives that benefit the principal. In the initial periods, the bad agent does not want to reveal her type and displays the principal's desired behavior. Morris (2001) names this as the "discipline effect" of reputation incentives. Following the example above, the government official may have the freedom to choose the project's relative size each year. He can dynamically decide which proportion of the remaining project to implement in each period. This way, he can control the reputational incentives of the agent. Alternatively, a third party may allocate the stakes across the periods. The optimal allocation of stakes is such that the bad agent is indifferent between investing in reputation or not in each period.

In the experiment performed in this paper, we test the predictions of the theory with four treatments. Each treatment involves a particular allocation of the stakes. In one treatment, each period gets an equal stake. There are three treatments of starting small. Stakes grow at a different speed in each treatment. We show that the smaller the interaction starts, the higher the reputation incentives are. The reputation incentives of the agent benefit the principal. The payoff of the principal is higher in the starting small treatments compared to the equal-stakes treatment. Hence, we can conclude the subjects understand the reputation incentives well in the lab environment. If managed, these incentives can improve the equilibrium payoff of the principal. Reputation incentives become more valuable in a setting as presented in this

paper in which there is a high risk of hiring the agent.