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# Should the Timing of Inspections be Predictable?

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Inspections are frequently conducted to reveal information about agents' otherwise unobserved actions. Some inspections occur at pre-announced times; others are surprises. We show how the productive role of the inspected agent determines whether predictable or random inspections are optimal. If the agent's main task is achieving a breakthrough—think of an entrepreneur investing in an innovative industry—then predictable inspections are optimal. If the main task is avoiding a breakdown—think of a financial institution managing its risk in order to avoid default—then random inspections are optimal.

In our model, a principal hires an agent to work on a project that culminates in a successful breakthrough or a catastrophic breakdown. The principal commits to the timing of costly inspections. At each time, the agent privately works or shirks. Work increases the arrival rate of breakthroughs and decreases the arrival rate of breakdowns. If an inspection reveals that the agent has previously shirked, he is fired.

Consider the special case of perfect inspections where each inspection perfectly reveals whether the agent has previously shirked. The form of the optimal inspection policy is driven by the agent's endogenous risk attitude over the timing of punishments. Planned inspections are carried out only if the project has not yet ended in a breakthrough or breakdown. When the agent considers the impact of future inspections, his effective discount factor reflects the probability that the inspection time is reached before the project ends. This probability depends on his planned actions. The agent's effective discount factor is more convex if he expects the project to end sooner, making him effectively more impatient.

If the agent's main task is achieving a breakthrough—work speeds up breakthroughs by more than it delays breakdowns—then it is optimal to inspect periodically. The time between consecutive inspections is constant. In this case, shirking prolongs the project by reducing breakthroughs. If the agent deviates and shirks, then he becomes effectively more patient, making his effective discount factor as a function of time *less convex* than that of the principal who expects the agent to work. Among inspection policies that are equally costly for the principal on-path, for the agent planning to shirk, the expected loss from termination after a failed inspection is greatest when inspection times are deterministic.

Conversely, if the agent's main task is avoiding a breakdown—work delays breakdowns by more than it speeds up breakthroughs—then it is optimal to conduct inspections randomly. Inspections are conducted with a constant hazard rate. Shirking shortens the project by generating breakdowns. If the agent deviates and shirks, then he is effectively more impatient, making his effective discount factor as a function of time *more convex* than the principal's. Among inspection policies that are equally costly for the principal on-path, the agent's loss from shirking is greatest if inspections are random.

We extend our results to the general case of imperfect inspections where shirking by the agent does not always leave behind a paper trail.

A full version of this paper can be found at <https://arxiv.org/abs/2304.01385>

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