Cover-ups
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Abstract
Lengthy cover-ups are a repeated feature of the organizational landscape. This paper studies executives’ optimal cover-up strategies given the penalties and the evolving beliefs of strategic outside parties who investigate malfeasance. The analysis shows that organizational self-policing and external investigation are strategic substitutes in any given period. Over time, successful cover-ups increase the incentive to cover up, and changes in the environment, such as an increased awareness of the harmful effects of the employee’s actions, can result in a reduction in cover-ups in the short term but an increase in the long term. We consider different prosecutorial regimes, with long lived and short-lived prosecutors, prosecutors who can commit to a policy, and prosecutors who observe or not the outcome of past investigations.

Keywords: cover-ups, organizational behavior, employee malfeasance
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1 Introduction
Lengthy cover-ups are a continual feature of corporate and organizational landscapes. University athletic directors cover-up sexual abuse by coaches and team doctors for years.¹ Leaders of the Catholic Church hide priests’ pedophilia and repeatedly reassign clergy to new parishes.² Automobile executives take successive steps to conceal software that beats emissions tests.³ Why do executives persist in their cover-up efforts? This paper formally studies executive decisions to cover-up employee malfeasance over time even while facing legal or other external investigations.

The model captures the main features of cover-up scandals. In the first instance, a valuable employee commits an illegal or unethical act. The act harms third parties, but the organization derives benefits from hiding the crime and continuing to employ the perpetrator. Executives who learn of the act decide how to proceed, and outside parties, such as legal authorities or the press, who see signs of malfeasance decide whether or not to investigate. Beyond preventing further malfeasance, these outside parties have


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personal gains (e.g., career advancement) from uncovering the cover-up. The crime is repeated and decisions to cover up and decisions to investigate are made multiple times. In the cases cited above, the crime(s) and cover-up(s) were eventually discovered, and the organization’s executives were punished.

The analysis of our model with rational executives and prosecutors sheds light on the dynamics of cover-ups and investigations. First, in any given period, organizational self-policing and external investigation are strategic substitutes; the greater the probability an executive reveals the crime, the lower is prosecutorial effort. Second, over time an executive who covers up and whose cover-up is not discovered faces less skeptical prosecutors in the future. These prosecutors investigate at a lower rate. Hence, successful cover-ups beget future cover-up incentives. Third, increased public approbation for turning a blind eye to abuse (such as #MeToo) leads to greater organizational self-policing. However, this tendency is attenuated by lower rates of current and future prosecutorial investigation (since self-policing and investigation are strategic substitutes). The same intertemporal substitution applies to an increased punishment for a cover-up; the executive’s greater disincentive to cover-up leads to a disincentive for both current and future investigations.

We then analyze several alternative prosecutorial regimes and the effect on the equilibrium cover-ups and investigations. In the baseline case, short-lived prosecutors in each period act independently from one another and cannot commit to their investigation policies. We find that when these independent short-lived prosecutors each can commit to an investigation policy, they each choose a lower rate of investigation than otherwise. Without commitment, a prosecutor only weighs the current investigation costs against the likelihood of discovering a cover-up. With commitment, the prosecutor faces a trade-off; while a higher investigation rates increase the likelihood of catching an executive, the higher rate also deters the executive from covering-up in the first place. A single long-lived prosecutor has similar incentives; a lower investigation rate in the beginning of the interaction raises the probability the executive will cover-up, which in turn increases the prosecutor’s personal expected payoffs from discovering this cover-up in a later period.

We further consider how information about previous investigations changes prosecutors’ incentives and the equilibrium cover-up path. Returning to the base case—when prosecutors are short-lived and cannot commit—we find that executives can have greater incentive to cover-up when a prosecutor does not know whether a previous investigation has taken place. For the the executive, there is a possible benefit from a commonly-known failed investigation, since future would-be investigators have lower belief that the executive is covering up a crime. But this benefit does not translate into lower likelihood of future investigation when investigation costs are more likely to be high, as when, say, victims are children.
In this case, executives are “effectively risk-averse,” preferring ignorant future prosecutors who cannot refine their beliefs based on whether or not a previous investigation took place.

The paper relates to several literatures. The paper contributes to the study of agency problems in organizations. In much work, an agent can take an action which harms the firm, and the principal constructs a contract to better align the agent’s interests, possibly considering supervisor-agent collusion (see, e.g., Laffont and Martimort (2002) and Bolton & Dewatripont (2005) for reviews). In the present paper, the agent is a valuable employee whose action harms a third party.

Second, the model relates to theories of whistleblowing and of self-regulatory organizations (SRO’s). A whistleblowing employee faces retaliation from peers or supervisors for revealing malfeasance to outside authorities (e.g., Friebel and Guriev (2012), Felli and Hortala-Vallve (2017)). An SRO signals to consumers its vigilance in monitoring member firms (Nunez (2007)). In the present paper, the firm’s principal decides whether to reveal malfeasance and gains from hiding the evidence. In the Conclusion, we discuss such overarching industry organizations for the cover-up case.

Finally, the paper contributes to several strands of the law and economics literature and inspection. The literature on self-reporting (Kaplow and Shavell (1994) and Innes (1999)) emphasizes the positive role of self-reporting to reduce enforcement costs and the risk of criminal behavior, in particular in environmental economics. The optimal enforcement policy involves reducing the fee for agents who self-report criminal behavior. Models of law enforcement with repeat offenders (Polinsky and Rubinfeld (1991), Polinsky and Shavell (1997)) show that, contrary to most sentencing guidelines, optimal fees do not increase with the number of offences. The optimal fees could even be declining (Burnovski and Safra (1994) and Emons (2003)). Rubinstein (1979) and Chu et al. (2000), Dana (2001) and Miceli (2005), among others, propose different mechanisms to solve this “escalating fines puzzle” including the possibility of irrationally optimistic criminals. The enforcement probability is exogenous, and in many papers, criminal opportunities are drawn independently every period. In the present paper, in contrast, the executive and prosecutors are rational and strategic; the enforcement probability is endogenous and all beliefs evolve according to Bayes’ rule. After a successful cover-up, future prosecutors are less likely to investigate and, absent increasing penalties, a rational executive has greater incentive to cover-up. Increasing fines over time puts brakes on these incentives. The present paper’s setting is also distinct from “inspection games,” where a principal and an inspector play a discrete, simultaneous move stage game (violation/no violation, inspection/no inspection) with no dynamic evolution of beliefs (See Avenhaus, von Stengel and Shmuel Zamir (2002)).

The paper proceeds as follows: Section 2 models executive-prosecutor interaction, analyzes the equi-
librium dynamics of the two-period baseline model, and studies the equilibrium effects of changes in the environment. Section 3 studies commitment by prosecutors and different prosecutorial regimes. Section 4 considers the equilibrium of a multiple-period infinite horizon game, which demonstrates the main drivers of cover-up incentives over time. (The Appendix provides a generalization of the finite period model). The Conclusion outlines future research directions.

2 A Model of Cover-ups

This section builds our model of cover-ups, specifying the interaction between an executive of an organization and external investigators over time.

2.1 Cover-up Model

Consider an executive in an organization. The executive supervises an employee who is possibly a perpetrator, i.e., a person who commits abuse, falsifies regulatory tests, or otherwise continually harms third parties. The employee is a perpetrator with exogenous probability \( \gamma_0 \).

To focus on cover-ups, we begin with the event that the executive verifiably observes that the employee is a perpetrator. We specify the following per-period interaction. In each period, the executive decides whether to fire the employee or to cover-up the perpetrator’s crimes(s). If the employee is not fired, in each period there is a prosecutor (e.g., law enforcement, news reporter) who decides whether to investigate the organization. Each prosecutor’s decision is based on the current realized cost of investigating and the current beliefs as to whether there is a perpetrator in the organization. If the prosecutor investigates and does not reveal a perpetrator, the interaction continues next period with the executive’s next decision to fire the employee or to cover-up.

As a baseline, we consider two periods of interaction. (The Appendix contains a generalization of this model to multiple periods, and Section 4 considers interaction with an infinite horizon.) The executive’s payoff is the discounted sum of the payoffs obtained in both periods with a fixed discount factor \( \delta \in (0, 1) \).

In any period in which the employee remains in the organization, the executive receives revenue \( \tilde{\omega}_t - \Omega_t \), where \( \tilde{\omega}_t \) is a random variable and \( \Omega_t \) is a shift parameter. The random variable \( \tilde{\omega}_t \) represents the direct benefits that accrue to the executive from retaining the employee and covering up the crimes, such as the continued services of the employee. We assume that \( \tilde{\omega}_t \) is distributed over \( (-\infty, +\infty) \) according to the continuously differentiable cumulative distribution \( R \) which is common knowledge. The realization

\(^4\)We do not consider the employee’s incentives to commit abuse. The employee either commits abuses or not, and hence the employee has a fixed type.
ωₜ is the executive’s private information. The parameter Ωₜ captures costs that the executive bears from retaining the employee and is common knowledge. This cost could be the extent to which the executive cares about the harm to the employee’s victims (capturing, say, the organization’s culture or values) or the extent to which the executive is even cognizant of the harm to the victims (capturing say, the power or the voice of victims to articulate the harm).

In each period t, the executive sees the realization ωₜ and decides whether or not to cover-up the employee actions. A cover-up yields the executive ωₜ − Ωₜ; if the executive does not cover-up, the interaction ends, and the executive suffers a penalty fᵣ. The superscript a denotes “amnesty,” and these penalties are assumed to be smaller than those incurred if the cover-up is revealed by the period t prosecutor, which we denote by fᵣ; that is, we assume that fᵣ ≥ fᵣ and the difference fᵣ − fᵣ measures the additional penalty imposed on the executive for covering up the crime. The penalties depend on the time t since t corresponds to the number of acts of malfeasance of the perpetrator and the number of times the executive has covered up those crimes. We assume fᵣ ≤ fᵣ so that the executive faces higher overall penalties the greater number of periods the executive has kept the employee in the organization.

We consider two short lived prosecutors, period 1 and period 2 prosecutors, who can investigate if the employee remains in the organization in their respective time period t. The prosecutors each base their decision to investigate on their individual costs and benefits, and they do not coordinate their actions. Each period t prosecutor earns a payoff normalized to 1 if she conducts an investigation that uncovers a perpetrator and earns zero otherwise. This specification captures prosecutors who are “career-oriented” or otherwise care only about their individual success rather than overall welfare or prevention of harm. The effects analyzed below would hold as long as the prosecutor earns some personal gain from uncovering a cover-up. Prosecutor t’s cost to investigate is a random variable κₜ ∈ [0, 1] with continuously differentiable distribution H which is common knowledge of the prosecutor and the executive. The realization κₜ is private information of prosecutor t. This cost variable captures the quality of the information that the period t prosecutor receives from victims or witnesses or leaks from within the organization that would help with the investigation. An investigation reveals a perpetrator with probability σ.

Each prosecutor decides whether or not to investigate based on her expected payoffs, which incorporate her belief that the organization harbors a perpetrator. Prosecutors have the initial prior γ₀. If the executive does not reveal any crime, the period 1 prosecutor forms an updated belief γ₁. In period 2, in forming her beliefs, the period 2 prosecutor might or might now know whether a previous investigation occurred in period 1. Let ι ∈ {I, N} be an indicator variable with ι = I indicating an investigation occurred in period 1 and ι = N otherwise. In the baseline case, we suppose that the period 2 prosecutor
knows whether an investigation has occurred and conditions her strategy on $\iota$. Prosecutor 2 begins her tenure with belief $\gamma_1$ which is based on her prior $\gamma_0$ and the events that have occurred to date. Her updated belief upon seeing the employee remaining in the organization in period 2 is denoted $\gamma'_2$.

With this notation in hand, Figure 1 summarizes the interaction between the executive and the two prosecutors in period 1 and 2.

### 2.2 Cover-up Equilibrium

The analysis of this two period model yields the main forces of cover-up equilibria. We consider perfect Bayesian equilibria of the game, so that the executive’s and prosecutors’ strategies are credible and all beliefs are consistent with strategies.

We solve by backward induction, first characterizing equilibrium behavior of the prosecutor and executive in period 2. If the executive has not fired the employee, at the end of the period prosecutor 2 makes a decision to investigate or not. Prosecutor 2 has belief $\gamma'_2$ that the employee is a perpetrator. Since an investigation succeeds with probability $\sigma$, prosecutor 2 investigates if and if $\kappa_2 \leq \sigma \gamma'_2$, resulting in the threshold value of the investigation cost:

$$k_2 \equiv \gamma'_2 \sigma \quad (1)$$

below which she investigates. The probability prosecutor 2 investigates is then $H(k_2)$.

Working backwards, the executive compares the following payoffs when deciding to cover-up or not in period 2. By reporting the employee, the executive obtains a period 2 payoff of $-f_2^a$. By covering up, the executive obtains $\omega_2 - \Omega_2$ and faces an investigation with probability $H(k_2)$. Since the investigation reveals the cover-up with probability $\sigma$, in which case the executive suffers the penalty $f_2$, the executive’s expected payoffs from covering up in period 2 are

$$\Pi^C_2 = \omega_2 - \Omega_2 - \sigma H(k'_2) f_2. \quad (2)$$

The executive will cover-up in period 2 if and only if the benefit of retaining the employee, $\omega_2$, is sufficiently high. These threshold benefits are

$$w_2 \equiv -f_2^a + \Omega_2 + \sigma H(k'_2) f_2, \quad (3)$$

and the probability the executive covers up is $[1 - R(w_2)]$. 

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Figure 1: The Two-Period Cover-up Game
The belief of the prosecutor 2, $\gamma_2'$, must be consistent with the executive’s strategy. With prosecutor 2’s initial belief $\gamma_1$, using Bayes’ rule, we have

$$\gamma_2' = \frac{\gamma_1[1 - R(w_2)]}{1 - \gamma_1 R(w_2)}.$$  (4)

Using equations (1), (3), and (4), we solve for the best replies and the equilibrium values of $k_2$ and $w_2$. Substituting the consistent beliefs (4) in the prosecutor’s cutoff (1), yields prosecutor 2’s best reply to the executive’s decision:

$$k_2(w_2) = \frac{\sigma \gamma_1[1 - R(w_2)]}{1 - \gamma_1 R(w_2)}.$$  (5)

This best reply gives the first strategic force in the equilibrium of this cover-up game. The cut-off $k_2$ under which the prosecutor investigates is a decreasing function of the cut-off $w_2$ over which the executive covers up the employee. The higher $w_2$—the more an executive reveals the perpetrator and “self-polices”—the less incentive prosecutor 2 has to investigate. For the executive’s best reply, we replace $\sigma \gamma_2'$ with $k_2$ to obtain

$$w_2(k_2) = -f_2^a + \Omega_2 + \sigma H(k_2)f_2.$$  (6)

This best reply gives our second strategic force; the executive’s cut-off $w_2$ is increasing in the prosecutor’s cut-off $k_2$. The higher $k_2$—the more a prosecutor investigates—the lower is the executive’s cover-up incentive. The executive reveals the perpetrator even at higher realizations of $\omega_2$, reducing the probability of a cover-up $[1 - R(w_2)]$.

Figure 2 illustrates the best responses of the prosecutor and the executive in the period 2 game. With continuous best replies, one increasing and one decreasing, under appropriate boundary conditions, there exists a unique equilibrium in period 2, $(w_2^*, k_2^*)$, which we show formally below.

Turning to the first period, working backwards we first write the executive’s continuation payoffs upon reaching the end of period 1. These continuation payoffs, denoted $V_1$, are given by the unique equilibrium in period 2 and depend on $\gamma_1$, the belief at the end of period 1 that the employee is a perpetrator:

$$V_1(\gamma_1) = \int_{-\infty}^{w_2^*(\gamma_1)} -f_2^adR(\omega) + \int_{w_2^*(\gamma_1)}^{\infty} [\omega - \Omega_2 - H(k_2^*(\gamma_1))\sigma f_2]dR(\omega).$$  (7)

The beliefs $\gamma_1$ depend on whether or not an investigation took place in period 1. If no investigation took place ($t = N$), $\gamma_1 = \gamma_1'$. If an investigation did take place ($t = I$), using Bayes’ rule:
Figure 2: Best Replies in Period 2

\[ \gamma_1 = \frac{\gamma'_1 (1 - \sigma)}{1 - \sigma \gamma'_1}. \]  
\[ k_1 \equiv \gamma'_1 \sigma. \]  

Turning to the last decision in period 1: The period 1 prosecutor investigates if and only if the investigation cost \( \kappa_1 \) is below the expected gains from investigating given his belief \( \gamma'_1 \). Hence, the investigation cut-off cut is

\[ k_1 \equiv \gamma'_1 \sigma, \]

and the probability of an investigation in period 1 is \( H(k_1) \). Since an investigation succeeds with proba-
bility $\sigma$, the executive’s period 1 payoffs from covering up are

$$\Pi_1^C = \omega_1 - \Omega_1 - \sigma H(k_1) f_1 + (1 - H(k_1)) \delta V(\gamma_1') + (1 - \sigma) H(k_1) V \left( \frac{\gamma_1(1 - \sigma)}{1 - \sigma \gamma_1'} \right). \quad (11)$$

We assume that the executive prefers not to be investigated by the prosecutor, so that the expected payoff of the executive is decreasing in $H(k_1)$:

$$\sigma f_1 + (1 - \sigma) \delta V \left( \frac{\gamma_1(1 - \sigma)}{1 - \sigma \gamma_1'} \right) \geq \delta V(\gamma_1'), \quad (12)$$

and we rewrite the executive’s cutoff as

$$w_1 \equiv -f_1^a + \Omega_1 + \sigma H(k_1) f_1 - (1 - H(k_1)) \delta V(\gamma_1') - (1 - \sigma) H(k_1) V \left( \frac{\gamma_1(1 - \sigma)}{1 - \sigma \gamma_1'} \right). \quad (13)$$

The prosecutor’s belief $\gamma_1'$ must be consistent with the executive’s strategy in period 1. By Bayes’ rule

$$\gamma_1' = \frac{\gamma_0 [1 - R(w_1)]}{1 - \gamma_0 R(w_1)}. \quad (14)$$

Following the same steps as in the analysis of period 2, we solve for the period 1 best replies. For prosecutor 1, we have

$$k_1(w_1) = \frac{\sigma \gamma_0 [1 - R(w_1)]}{1 - \gamma_0 H(w_1)}, \quad (15)$$

and for the executive in period 1 we have

$$w_1(k_1) = -f_1^a + \Omega_1 + \sigma H(k_1) f_1 - (1 - H(k_1)) \delta V \left( \frac{k_1}{\sigma} \right) - (1 - \sigma) H(k_1) V \left( \frac{k_1(1 - \sigma)}{\sigma(1 - k_1)} \right). \quad (16)$$

If $V_1(\gamma_1)$ is decreasing (which we show below) and inequality (12) holds, these best replies exhibit the same pattern as those in period 2. The best reply of prosecutor 1 is always decreasing, the best reply of the executive is always increasing, and the unique period 1 equilibrium $(w_1^*, k_1^*)$ lies at the intersection. Within period 1, we see the same forces as within period 2: (a) the more the executive self-policies, the lower the likelihood of an investigation, and (b) the more the prosecutor investigates, the lower the likelihood of a cover-up.

Our first result formally shows the existence of a unique equilibrium in the two-period game. A key is to show that $V_1(\gamma_1)$ is decreasing in $\gamma_1$. We also use the derivations in the proof to study the intertemporal
dynamics of the equilibrium and to conduct equilibrium comparative statics below.

**Theorem 1** If $\sigma f_1 + \delta V_1(\gamma_1) \geq (1 - \sigma)\delta V_1(\gamma_1)$ for all $\gamma_1 \in [0, \gamma_0]$, there exists a unique equilibrium of the two-period cover-up game.

**Proof of Theorem 1.** Consider period 2. We show simultaneously that there exists a unique equilibrium $(k_2^*, w_2^*)$ for any $\gamma_1$ and that the continuation value $V_1(\gamma_1)$ is decreasing in $\gamma_1$.

Substituting equation (6) into equation (5), an equilibrium of the period 2 game is a fixed point of the function

$$
\phi_2(k_2) = \frac{\sigma \gamma_1 [1 - R(H(k_2))\sigma f_2 - f_2^a + \Omega_2]}{\gamma_1 [1 - R(H(k_2))\sigma f_2 - f_2^a + \Omega_2] + (1 - \gamma_1)}
$$

defined on $[0, 1]$.

We show that the function $\phi$ defined over $[0, 1]$ has a unique fixed point $k_2^*$. To see this, let

$$
\Phi_2(k_2) \triangleq \phi_2(k_2) - k_2.
$$

Note that $\Phi_2(0) > 0$ and $\Phi_2(\gamma_1) < 0$ where the first inequality follows from the assumption that $\tilde{\omega}_2$ is distributed over $[-\infty, +\infty]$ according to the continuously differentiable cumulative distribution $R$ (so $R(w) > 0$ for all $w$), and the second inequality follows from Bayes’ rule. Furthermore, since the cumulative distribution functions $R$ and $H$ are continuously differentiable on $(-\infty, \infty)$ and $(0, 1)$,

$$
\Phi_2'(k_2) = -\frac{\gamma_1 \sigma^2 f_2 R'([H(k_2)]H'(k_2))(1 - \gamma_1)}{(\gamma_1 [1 - R(H(k_2))\sigma f_2 - f_2^a + \Omega_2] + (1 - \gamma_1))^2} < 0,
$$

so that $\Phi_2(k_2)$ is strictly decreasing in $k_2$.

Hence, there exists a unique $k_2^* \in (0, \gamma_1)$ such that $\Phi_2(k_2^*) = 0$. Furthermore, by implicit differentiation we find that $k_2^*$ is increasing in $\gamma_1$:

$$
\frac{\partial k_2^*}{\partial \gamma_1} = -\frac{[1 - R(H(k_2))\sigma f_2 - f_2^a + \Omega_2]}{\Phi'(k_2)(\gamma_1 [1 - R(H(k_2))\sigma f_2 - f_2^a + \Omega_2] + (1 - \gamma_1))^2},
$$

and since $\Phi'(k_2) < 0$, $\frac{\partial k_2^*}{\partial \gamma_1} > 0$.

These calculations also determine the unique cut-off $w_2^*$ for the executive as the solution to one of the equations:

$$
\begin{align*}
  k_2^* &= \frac{\gamma_1 (1 - R(w_2^*))}{\gamma_1 (1 - R(w_2^*)) + (1 - \gamma_1)} \\
  w_2^* &= H(k_2^*)\sigma f_2 - f_2^a + \Omega_2.
\end{align*}
$$
We show next that $V_1$ is decreasing in $\gamma_1$

\[
\frac{\partial V_1}{\partial \gamma_1} = -R'(w_2^*) \frac{\partial w_2^*}{\partial \gamma_1} f_2^* - \int_{w_2^*}^{\infty} H'(k_2^*) \frac{\partial k_2^*}{\partial \gamma_1} \sigma f_2 dR - (w_2^* - \Omega_2 - H(k_2^*) \sigma f_2) R'(w_2^*) \frac{\partial w_2^*}{\partial \gamma_1}.
\]

Because $-f_2^* = -\Omega_2 + w_2^* - H(k_2^*) \sigma f_2$,

\[
\frac{\partial V_1}{\partial \gamma_1} = - \int_{w_2^*}^{\infty} H'(k_2^*) \frac{\partial k_2^*}{\partial \gamma_1} \sigma f_2 dR,
\]

\[
= -[1 - R(w_2^*)] H'(k_2^*) \frac{\partial k_2^*}{\partial \gamma_1} \sigma f_2.
\]

Since $k_2^*$ is increasing in $\gamma_1$, the conclusion follows.

Next consider period 1. Define the function

\[
\Phi_1(k_1) \equiv \frac{\sigma \gamma_0 (1 - R(w_1(k_1)))}{1 - \gamma_0 R(w_1(k_1))} - k_1,
\]

where

\[
w_1(k_1) = -f_1^a + \Omega_1 + H(k_1)[\sigma f_1 - (1 - \sigma) \delta V_1 \left( \frac{k_1 (1 - \sigma)}{\sigma (1 - k_1)} \right) - (1 - H(k_1)) \delta V_1 \left( \frac{k_1}{\sigma} \right)
\]

We observe that

\[
w_1'(k_1) = H'(k_1) [\sigma f_1 - (1 - \sigma) \delta V_1 \left( \frac{k_1 (1 - \sigma)}{\sigma (1 - k_1)} \right) + \delta V_1 \left( \frac{k_1}{\sigma} \right)]
\]

\[
- (1 - \sigma) \delta \frac{\partial V_1}{\partial \gamma_1} \left( \frac{k_1 (1 - \sigma)}{\sigma (1 - k_1)} \right) \frac{1 - \sigma}{\sigma}
\]

\[
- (1 - H(k_1)) \delta \frac{\partial V_1}{\partial \gamma_1} \left( \frac{k_1}{\sigma} \right) \frac{1}{\sigma}
\]

\[
> 0
\]

where the inequality is obtained using both the assumption that

\[
\sigma f_1 - (1 - \sigma) \delta V_1 \left( \frac{k_1 (1 - \sigma)}{\sigma (1 - k_1)} \right) + \delta V_1 \left( \frac{k_1}{\sigma} \right) > 0,
\]

and the fact that $\frac{\partial V_1}{\partial \gamma_1} < 0$.

Given that $\frac{\partial w_1}{\partial k_1} > 0$, we immediately obtain that $\Phi_1'(k_1) < 0$. As $\Phi_1(0) > 0$ and $\Phi_1(\gamma_0) < 0$, there exists a unique equilibrium cut-off for the prosecutor $k_1^*$, and hence a unique equilibrium cut-off for the executive $w_1^*$, which can either be computed using the prosecutor or the executive’s best reply function.
This completes the proof of the Theorem.

Theorem 1 shows that, under a natural condition on the parameters guaranteeing that the executive prefers not to be investigated, the two-period game has a unique equilibrium, denoted \((k_1^*, k_2^*, w_1^*, w_2^*)\).

The unique two period equilibrium shows the intertemporal dynamics of the cover-up path. First, the probability of an investigation always declines over time. Prosecutor 2 knows that the executive did not fire the employee and any investigation conducted by prosecutor 1 failed. The prosecutor’s belief that the organization harbors a perpetrator is then falling, \(\gamma_1 < \gamma_0\), and \(\gamma_2' < \gamma_1'\), which implies \(k_2^* = \sigma \gamma_2' < \sigma \gamma_1' = k_1^*\).

Second, prosecutor 2’s lower likelihood to investigate leads to higher cover-up incentives for executive in the second period relative to the first period. That is, a successful cover-up in the first period leads to stronger cover-up incentives in the second period. Pulling in the opposite direction, however, in the second period the executive no longer enjoys a continuation value of keeping the perpetrator in the organization. The second period fine could also be much larger than the first period fine. In a stationary setting where \(\Omega_t = \Omega\), \(f_t = f\), \(f^a_t = f^a\) for all \(t\), and absent such a deadline effect (as in an infinite horizon setting shown below), the probabilities of cover-ups are continually increasing over time.

We next study how the equilibrium differs for different environmental factors, such as shifts in \(\Omega_t\) and the prior \(\gamma_0\) and for higher or lower penalties \(f^a\) and \(f\).

### 2.3 Equilibrium Effects of Costs, Penalties, and Initial Beliefs

This section considers comparative statics of the cover-up equilibrium. Changes in the costs and penalties in period \(t\) directly affect equilibrium cover-up and investigation rates in period \(t\), and they affect the previous (or following) cover-up and investigation through the changes in beliefs. We first consider the effect of a change in the initial belief of the prosecutor, \(\gamma_0\), which directly impacts the best-response of the prosecutor in period 1. We then analyze changes in the other parameters of the model—the cost of cover-ups \(\Omega_t\) and the fees \(f^a_t\) and \(f_t\)—which directly impact the best-response of the executive in period \(t\).

Consider the effect of an increase in \(\gamma_0\) from, say, a leak from someone else (unmodeled) in the organization. This shock shifts up prosecutor 1’s best reply (15) but does not affect the executive’s best reply. Hence, in period 1, the prosecutor is more likely to investigate and the executive less likely to cover-up. Prosecutor 2 will also be more suspicious and investigate more often, prompting the executive to also cover-up less in the future.
Proposition 1  An increase in $\gamma_0$ increases $k^*_1, k^*_2, w^*_1,$ and $w^*_2$.

Proof of Proposition 1. We consider the function $\Phi_1(k_1)$ characterizing the equilibrium cut-off of the prosecutor in period 1. By implicit differentiation we have

$$\frac{\partial k_1}{\partial \gamma_0} = -\frac{\frac{\partial \Phi_1}{\partial \gamma_0}}{\frac{\partial \Phi_1}{\partial k_1}}.$$  

We know that $\frac{\partial \Phi_1}{\partial k_1} < 0$ and

$$\frac{\partial \Phi_1}{\partial \gamma_0} = \frac{\sigma(1 - R(w_1))}{(1 - \gamma_0 R(w_1))^2} > 0,$$

so that $\frac{\partial k_1}{\partial \gamma_0} > 0$. Using the executive’s best reply function in period 1 (which is independent of $\gamma_0$), we conclude that $w^*_1$ is also increasing in $\gamma_0$. Next observe that as $k_1$ is increasing in $\gamma_0$, $\gamma_1$, and hence $\gamma_1$ are increasing in $\gamma_0$. Repeating the same argument, we observe that $k^*_2$ is increasing in $\gamma_1$ and hence in $\gamma_0$ and, using the executive best reply function in period 2, $w^*_2$ is increasing in $\gamma_0$, completing the proof of the Proposition. ■

Next consider changes in the environment that affect only the executive’s best reply in period 1, such as an increase in $\Omega_1$ representing, for example, the #MeToo movement which diminishes an organization’s reputation or profits from harboring a perpetrator (irrespective of the direct profits generated from employing the perpetrator). This increase shifts down the executive’s best reply (16) with no change in the prosecutor’s best reply, resulting in an increase in $w^*_1$ and a decrease in $k^*_1$. The change to $\Omega_1$ further affects the cover-up path through the belief $\gamma_1$. With a decrease in $k_1$, $\gamma_1$ falls, resulting in decrease in $\gamma_1'$, leading to a decrease in $k^*_2$ and $w^*_2$.

Hence, there is an intertemporal substitution in the executive’s cover-up decision. The increase in $\Omega_1$ decreases cover-up incentives in period 1, but increases cover-up incentives in period 2. Since the executive covers up less in period 1, prosecutor 2’s rational beliefs that the employee is a perpetrator falls. Prosecutor 2 is then less likely to investigate than otherwise, giving the executive a relatively higher incentive to cover-up in period 2.

Proposition 2 An increase in $\Omega_1$ results in a decrease in $k^*_1$, an increase in $w^*_1$, a decrease in $k^*_2$ and a decrease in $w^*_2$.

Proof of Proposition 2. By implicit differentiation,
\[ \frac{\partial k_1^*}{\partial \Omega_1} = - \frac{\partial \Phi_1}{\partial \Omega_1}. \]

We know that \( \frac{\partial \Phi_1}{\partial k_1} < 0 \) so that the sign of \( \frac{\partial k_1}{\partial \Omega_1} \) is the same as the sign of \( \frac{\partial \Phi_1}{\partial \Omega_1} \). Now,

\[ \frac{\partial \Phi_1}{\partial \Omega_1} = - \frac{\sigma \gamma_0 (1 - \gamma_0) R'(w_1) \partial w_1}{(1 - \gamma_0 R(w_1))^2} \frac{\partial k_1}{\partial \Omega_1}. \]

Using the best reply of the executive in period 1, \( \frac{\partial w_1}{\partial \Omega_1} > 0 \), and we conclude that an increase in the cost \( \Omega_1 \) induces a reduction in the equilibrium threshold \( k_1^* \).

Using the prosecutor’s best response function in period 1 (which is independent of \( \Omega_1 \)), we also obtain that \( w_1^* \) is decreasing in \( \Omega_1 \). In period 2, the increase in \( \Omega_1 \) only affects the behavior of the prosecutor and the executive through the change in the belief \( \gamma_1 \). As \( k_1 \) goes down, \( \gamma_1' \) and \( \gamma_1 \) are reduced, and hence, following the same argument as in the proof of Proposition 1, \( k_2^* \) and \( w_2^* \) are reduced.

The effects of changes in the amnesty fee and the penalty fee in the first period \( f_a^1 \) and \( f_1 \) can be analyzed in the same way as the \( \Omega_1 \) comparative statics. By the executive’s best reply (16), an increase in the penalty fee \( f_1 \) has the same effect as an increase in \( \Omega_1 \), and an increase in the amnesty fee \( f_a^1 \) has the same effect as a decrease in \( \Omega_1 \). Therefore, an increase in \( \Omega_1 \), an increase \( f_1 \), or a decrease in \( f_a^1 \), lead to an increase in the executive’s incentive to report in period 1, but if the executive reaches the second period, his incentive to report falls.

The effect of changes in the environment in period 2 are harder to analyze, since there are feedback effects to period 1 decisions. For example, an increase in \( \Omega_2 \) directly affects the incentives in period 2 and affects the decision of the executive in the first period through the continuation value \( V_1 \). A simple computation shows that

\[ \frac{\partial V_1}{\partial \Omega_2} = -R(w_2^*) - R'(w_2^*) \frac{\partial w_2^*}{\partial \Omega_2} [f_a^2 - (w_2^* - \Omega_2 - H(k_2^*) \sigma f_2)] - H'(k_2^*) \sigma f_2 \frac{\partial k_2^*}{\partial \Omega_2} [1 - R(w_2^*)]. \]

yielding

\[ \frac{\partial V_1}{\partial \Omega_2} = -R(w_2^*) - H'(k_2^*) \sigma f_2 \frac{\partial k_2^*}{\partial \Omega_2} [1 - R(w_2^*)]. \]

While the first term is always negative, the sign of the second term depends on the sign of \( \frac{\partial k_2^*}{\partial \Omega_2} \), which is not easy to compute; an increase in \( \Omega_2 \) affects the decisions of the prosecutor and executive in period 2 both directly and indirectly through the change in \( \gamma_1 \) due to the change in the executive’s action in
period 1. While the direct effect is clearly negative (an increase in $\Omega_2$ increases the executive’s incentive to report and hence lowers the prosecutor’s incentive to investigate), the sign of the indirect effect cannot be ascertained. Hence the effect of a change in $\Omega_2$ on the equilibrium values cannot be established.

The only second-period parameter for which clear comparative statics can be established is the second-period amnesty fee $f_{a2}$, because an increase in $f_{a2}$ simultaneously reduces the executive’s payoff in period 2 and increases the incentive to cover-up. As shown in the next Proposition, a reduction in $f_{a2}$ unambiguously reduces the continuation value $V_1$, so that the comparative static effects of the period 2 amnesty payoff on the equilibrium values can partially be signed. In particular, an increase in the amnesty penalty in period 2 increases cover-ups in period 2, but decreases cover-ups in period 1. The period 1 probability of investigation therefore also falls.

**Proposition 3** An increase in $f_{a2}$ results in a decrease in $k_1^*$, an increase in $w_1^*$ and a decrease in $w_2^*$.

**Proof of Proposition 3.** We first show that the continuation value $V_1$ must be decreasing in $f_{a2}$. Recall that

$$\frac{\partial V_1}{\partial f_{a2}} = -R(w_2^*) - H'(k_2^*)\sigma f_{a2} \frac{dk_2^*}{df_{a2}} [1 - R(w_2^*)]$$

and

$$\frac{dk_2^*}{df_{a2}} = \frac{\partial k_2^*}{\partial f_{a2}} + \frac{\partial k_2^*}{\partial \gamma_1} \frac{\partial \gamma_1}{\partial f_{a2}}.$$

Now,

$$\frac{\partial k_2^*}{\partial f_{a2}} = -\Phi'(k_2^*) (\gamma_1 (1 - \gamma_1)) - R'(w_2^*) \gamma_1 (1 - \gamma_1)$$

and since $\Phi'(k_2^*) < 0$, $\frac{\partial k_2^*}{\partial f_{a2}} > 0$. As similarly, $\frac{\partial k_2^*}{\partial \gamma_1} > 0$, if $\frac{\partial \gamma_1}{\partial f_{a2}} > 0$, we necessarily must have:

$$\frac{\partial \gamma_1}{\partial f_{a2}} < 0,$$

implying

$$\frac{\partial k_1^*}{\partial f_{a2}} < 0.$$

$^5$By contrast, an increase in $\Omega_2$ or in the fee $f_2$ result in a decrease in the payoff in the second period and a decrease in the incentive to cover-up, two effects with opposite directions on the continuation value $V_1$.  

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Next we compute

\[ \frac{\partial k_1^*}{\partial f_2^a} = - \frac{\partial \Phi_1}{\partial f_2^a}. \]

We know that \( \frac{\partial \Phi_1}{\partial k_1^*} < 0 \) so that the sign of \( \frac{\partial k_1^*}{\partial f_2^a} \) is the same as the sign of \( \frac{\partial \Phi_1}{\partial k_1^*} \). Now,

\[ \frac{\partial \Phi_1}{\partial f_2^a} = - \frac{\sigma \gamma_0 (1 - \gamma_0) R'(w_1)}{(1 - \gamma_0 R(w_1))^2} \frac{\partial w_1}{\partial f_2^a}. \]

Next note that

\[ \frac{\partial w_1}{\partial f_2^a} = \frac{\partial w_1}{\partial V_1} \frac{\partial V_1}{\partial f_2^a}. \]

Using the best reply of the executive in period 1 (16), \( \frac{\partial w_1}{\partial f_2^a} < 0 \), and by assumption \( \frac{\partial V_1}{\partial f_2^a} > 0 \). We conclude that

\[ \frac{\partial \Phi_1}{\partial f_2^a} > 0, \]

a contradiction to inequality (19), which shows that \( \frac{\partial V_1}{\partial f_2^a} < 0 \).

As \( \frac{\partial \gamma_1}{\partial f_2^a} < 0 \), an increase in \( f_2^a \) results in a decrease in \( k_1^* \). Using the prosecutor’s best response function in period 1, we also obtain that \( w_1^* \) is increasing in \( f_2^a \).

Next note that

\[ \frac{\partial w_2^*}{\partial f_2^a} = \frac{\partial w_2^*}{\partial f_2^a} + \frac{\partial w_2^*}{\partial \gamma_1} \frac{\partial \gamma_1}{\partial f_2^a}. \]

Using the best response of the prosecutor in period 2 (which is independent of \( f_2^a \)), the sign of \( \frac{\partial w_2^*}{\partial f_2^a} \) is the opposite of the sign of \( \frac{\partial k_2^*}{\partial f_2^a} \), hence negative.

By an argument similar to the argument of Proposition 1, \( \frac{\partial w_2^*}{\partial \gamma_1} > 0 \). Furthermore as \( \frac{\partial k_2^*}{\partial f_2^a} > 0 \) and \( \frac{\partial \gamma_1}{\partial f_2^a} > 0 \), \( \frac{\partial \gamma_1}{\partial f_2^a} < 0 \). Hence, the second term is also negative, establishing that an increase in \( f_2^a \) results in a decrease in \( w_2^* \).

Proposition 3 gives a partial result on the effect of changes in the second period parameters on the equilibrium values in the second period of the game. In particular, a change in \( f_2^a \) affects the equilibrium values \( k_2^* \) and \( w_2^* \) through two channels: a direct effect, linked to a decrease in the incentive to report in the second period, and an indirect effect linked to a change in the belief \( \gamma_1 \). The direct effect leads the executive to report less often, and hence the prosecutor to investigate more often. But, as the continuation
value $V_1$ is reduced, the executive is also more likely to report in the first period, so that the prosecutor’s belief at the beginning of the second period is reduced. The indirect effect thus leads the prosecutor to investigate less often and the executive to report less often. The direct and indirect effects thus work in the same direction on the executive’s incentives (an increase in $f_2$ lowers the executive’s incentives to report), but in opposite directions on prosecutor 2’s incentive to investigate.

3 Prosecutorial Regimes

In this section we consider how different institutional structures would shape prosecutors’ incentives and, thereby, the cover-up equilibrium. The base case above considers two short-lived independent prosecutors and prosecutor 2 knows whether or not an investigation took place in period 1.

We first study commitment on the part of these period 1 and period 2 prosecutors. This commitment would represent, for example, elected district attorneys who institute guidelines to pursue investigations whenever complaints are sufficiently precise and credible, which in the model would be a particular cut-off investigation cost below which the prosecutor conducts an investigation.

We then study a long-lived prosecutor, which would represent legal authorities who have a longer tenure or who internalize the effects of their actions on their successors. We consider a long-lived prosecutor, who, for full contrast with the base case, does not have ability to commit to investigation guidelines.

Our main insight from studying commitment is that individual prosecutors who are career-minded (as we model them), would prefer to commit to lower probabilities of investigation. This lower investigation rate gives the executive a higher incentive to cover-up in that period, which gives the prosecutor an increased likelihood of conducting a successful investigation. On balance, the committed investigation rates are not too high as to deter the executive and not too low as to obviate the investigations which yield the prosecutor payoffs.

A long-lived prosecutor similarly manipulates the investigation rate to increase the likelihood of a successful investigation. When the probability that the employee is perpetrator is low, the prosecutor lowers his investigation rate in the first period, which induces more cover-up. The prosecutor sets this investigation rate anticipating a further opportunity to catch the executive in the second period.

We then study how the information structure can alter the equilibrium outcome. We compare the base case to the situation where the period-2 prosecutor does not know whether an investigation took place in period 1. The latter represents, for example, the perpetrator moving to a new location as part of the cover-up. The two cases present different, related gambles to the executive, since the beliefs of an
ignorant prosecutor in period 2 are a convex combination of those of an informed period 2 prosecutor. We find an executive who is effectively “risk averse” prefers to face an ignorant investigator. An executive would have this preference when investigation costs are likely to be high.

### 3.1 Short-Lived Prosecutors with Commitment

We first study commitment on the part of two short-lived prosecutors. In the game without commitment, the equilibrium within each period is given by the solution to the following system of equations, suppressing the time period notation. These two equations are the best response of the executive and the best response of that period’s prosecutor, respectively.

\[ w = \Omega + \sigma f H(k) - f^a \]  
(20)

\[ k = \frac{\sigma \gamma (1 - R(w))}{1 - \gamma R(w)} \]  
(21)

Suppose that a prosecutor can commit to a cut-off level \( k^C \). Formally, the prosecutor chooses \( k^C \) at the beginning of the period, the executive observes \( k^C \) and chooses whether or not to cover-up. The prosecutor then investigates or not depending on whether the cost realization is below \( k^C \). The prosecutor determines the optimal commitment level anticipating how the executive would respond choosing \( w(k) \) as in equation (20). The payoffs of the prosecutor are then given by:

\[ \Pi = \int_0^k \frac{\sigma \gamma [1 - R(w(k))]}{1 - \gamma R(w(k))} - \kappa h(\kappa) d\kappa. \]

We compare the optimal commitment cut-off costs, denoted \( k_1^C \) and \( k_2^C \) and the executive’s equilibrium responses denoted \( w_1^C \) and \( w_2^C \) with the equilibrium in the game without commitment, \( (k_1^*, w_1^*, k_2^*, w_2^*) \).

As we show below, each prosecutor commits to investigate at a lower rate than otherwise in order to inflate the cover-up in their period. For period 1, there then more cover-ups and less investigation than in the case without commitment. In period 2, however, there are two forces at work. Prosecutor 2 has an incentive to commit to a lower level of investigation. But, due to the depressed investigation rate in period 1, prosecutor 2 also has a higher belief that the employee is a perpetrator. Hence, overall the period 2 comparison to the non-commitment case is ambiguous.\(^6\)

\^6Another comparison is between a career-minded prosecutor and a benevolent prosecutor, who obtains a payoff of 1 regardless of whether the perpetrator is revealed by the investigation or turned in by the executive. The benevolent prosecutor chooses a higher threshold \( k \), investigating more often. The executive then covers up less when facing a benevolent prosecutor than a career-minded prosecutor.
Proposition 4  Short-lived prosecutors with commitment power would choose lower investigation rates than prosecutors that cannot commit. In period 1, $k_1^c < k_1^*$ and $w_1^C < w_1^*$. 

Proof of Proposition 4. 

Differentiating with respect to $k$ gives the optimal cut off investigation cost:

$$h(k) \left( \frac{\sigma \gamma [1 - R(w(k))]}{1 - \gamma R(w(k))} - k \right) - H(k) R'(w(k)) w'(k) \frac{\sigma \gamma (1 - \gamma)}{(1 - \gamma R(w(k)))^2} = 0. \quad (22)$$

The commitment adds the second term. Since $w'(k) > 0$, the optimal cut off investigation cost $k^C$ is lower than non-commitment equilibrium level $k^*$ given by (21). Since $w'(k) > 0$, $w_1^c < w_1^*$; The executive covers up more often in period 1. ■

3.2 Long-Lived Prosecutor

Now, instead of two short-lived prosecutors, suppose there is a single prosecutor who interacts with the executive in both periods. This prosecutor has a discount factor of $\delta$ and earns a payoff of 1 for a successful investigation in either period 1 or period 2. We suppose the prosecutor cannot commit to cut off investigation costs in any given period. However, the prosecutor does anticipate how his investigatory strategy in period 1 sets the stage for period 2.

We solve backwards for the perfect Bayesian equilibrium. In the second period, without the ability to commit, the long-lived prosecutor in period 2 has the same best reply to the executive as the short-lived prosecutor 2, which we write in this case as

$$k_2^{LL}(w_2) = \frac{\sigma \gamma_1 [1 - R(w_2)]}{1 - \gamma_1 R(w_2)}. \quad (23)$$

In the first period, the long-lived prosecutor who observes $\kappa_1$ compares what is obtained by investigating,

$$\Pi^I = -\kappa_1 + \gamma_1' \sigma + (1 - \gamma_1' \sigma) \delta \Pi_1 \left( \frac{\gamma_1' (1 - \sigma)}{1 - \gamma_1' \sigma} \right), \quad (24)$$

with his payoffs if he does not investigate,

$$\Pi^N = \delta \Pi_1(\gamma_1' ), \quad (25)$$

where $\Pi_1$, the continuation value of the prosecutor, is given by
\[ \Pi_1(\gamma_1) = \int_0^{k_1^{LL}} \frac{1 - R(w_2)}{1 - \gamma_1 R(w_2)} - \kappa h(\kappa) d\kappa. \] (26)

The long lived prosecutor’s cut off \( k_1^{LL} \) is then

\[ k_1^{LL} \equiv \gamma'_1 \sigma + (1 - \gamma'_1 \sigma) \delta \Pi_1 \left( \frac{\gamma'_1 (1 - \sigma)}{1 - \gamma'_1 \sigma} \right) - \delta \Pi_1 (\gamma'_1). \] (27)

Whether the cut off \( k_1^{LL} \) is higher or lower then the cut off \( k_1 \equiv \gamma'_1 \sigma \) depends on whether \( \Pi_1 \) is increasing or decreasing in \( \gamma_1 \), which in turn depends on the elasticity of the executive’s cover-up strategy in period 2.

**Proposition 5** *The continuation value of the long-lived prosecutor, \( \Pi_1 \), is decreasing in \( \gamma_1 \) when the elasticity of executive’s cover-up strategy is sufficiently small. Hence, in this case, a long-lived prosecutor chooses to investigate less in period 1 than a short-lived prosecutor.*

**Proof of Proposition 5.** Computing \( \frac{\partial \Pi_1}{\partial \gamma_1} \), we have:

\[
\frac{\partial \Pi_1}{\partial \gamma_1} = \left[ \gamma_1 \frac{1 - R(w_2)}{1 - \gamma_1 R(w_2)} - k_2 \right] k'_2(\gamma_1) \\
+ H(k_2) \left[ \frac{1 - R(w_2)}{1 - \gamma_1 R(w_2)} + \gamma_1 \left( \frac{1 - R(w_2) R'(w_2) w'_2(\gamma_1)}{(1 - \gamma_1 R(w_2))^2} - \frac{(1 - \gamma_1) R'(w_2) w'_2(\gamma_1)}{(1 - \gamma_1 R(w_2))^2} \right) \right]
\]

By the Envelope Theorem, \( \gamma_1 \frac{1 - R(w_2)}{1 - \gamma_1 R(w_2)} - k_2 = 0 \). So the sign of \( \frac{\partial \Pi_1}{\partial \gamma_1} \) is the same as the sign of the second term. Simplifying the numerator, \( \frac{\partial \Pi_1}{\partial \gamma_1} > 0 \) if and only if

\[ 1 - R(w_2(\gamma_1)) > \gamma_1 (1 - \gamma_1) R'(w_2) w'_2(\gamma_1), \] (28)

which can be written as

\[ \frac{1}{1 - \gamma_1} > \gamma_1 \frac{R'(w_2) w'_2(\gamma_1)}{1 - \gamma_1 R(w_2)} \] (29)

where the right-hand side is the elasticity of the probability of a cover-up with respect to \( \gamma_1 \). ■

### 3.3 Knowledge of Previous Investigation

Returning to the case of two short-lived prosecutors, we ask how the equilibrium changes when prosecutor 2 is ignorant of past investigations. In the baseline model, prosecutor 2 has beliefs \( \gamma_1^N = \gamma'_1 \) if no
investigation occurred and $\gamma_1^f = \gamma_1^f \frac{1 - \sigma}{1 - \sigma \gamma_1^f}$ if an unsuccessful investigation occurred. Adding notation to the equilibrium derived above, for each realization of $\iota$ let $w_2^*(N)$ and $w_2^*(I)$ denote the respective cover-up levels. In the case that prosecutor 2 is uninformed, prosecutor 2 holds the belief, denoted $\tilde{\gamma}_1$, which is a convex combination of $\gamma_1^N$ and $\gamma_1^f$,

$$\tilde{\gamma}_1 = \frac{1 - H(k_1)}{1 - \sigma H(k_1)} \gamma_1^N + \frac{(1 - \sigma)H(k_1)}{1 - \sigma H(k_1)} \gamma_1^f.$$  

The equilibrium in period 2 is then the simultaneous solution to the best replies (20) and (21), when the prosecutor 2 holds this belief. The equilibrium cover-up level in period 2 is then between $w_2^*(N)$ and $w_2^*(I)$, since the prosecutor 2’s investigation rate is based a belief which falls between $\gamma_1^N$ and $\gamma_1^f$. The executive in period 2 responds optimally to the prosecutor in either case.

Turning to period 1, does the executive prefer to face an uninformed or an informed prosecutor in period 2? When prosecutor 2 is informed, the executive’s best outcome from period 1 is an unsuccessful investigation. Prosecutor 2’s beliefs are then the lowest possible at $\gamma_1^f$. If these beliefs do not lead to sufficiently lower probability of an investigation in $t = 2$, however, the executive could be better off with an ignorant prosecutor 2. The trade-off is expressed in the continuation value function $V_1(\gamma_1)$. If $V_1(\gamma_1)$ is convex (concave), the executive prefers that prosecutor 2 be informed (uninformed).

The shape of $V_1(\gamma_1)$ in turn depends on the shape of the distribution of investigation costs $H$. One interpretation of the shape of $H$ is witness credibility, which reduces investigation costs. If most witnesses or victims cannot credibly relay their experiences, as in the case of children, the probabilities of low investigation costs are low and $H$ is convex. An executive then prefers the prosecutor to not know of previous investigations ($V_1$ is concave). On the other hand, if most victims are credible, so the probability of low investigation costs is high, the executive prefers investigators know about previous investigations.

In the event the period 1 investigation is not successful so that prosecutor 2’s beliefs fall, the prosecutor is unlikely to face low enough costs to launch an investigation. The executive is then willing to “bet” on this outcome by covering up more in period 1.

**Proposition 6** Suppose $H$ is convex in $\kappa$ and in equilibrium $1 - 2\gamma_1 + \gamma_1 R(w_2) < 0$. Then the executive is effectively risk averse, preferring a prosecutor ignorant of past investigations.

**Proof of Proposition 6.** As before, differentiating $V_1(\gamma_1)$

$$\frac{\partial V_1}{\partial \gamma_1} = -R'(w_2^*) \frac{\partial w_2^*}{\partial \gamma_1} f_2^* - \int_{w_2^*}^{\infty} H'(k_2^*) \frac{\partial k_2^*}{\partial \gamma_1} \sigma f_2 dR - (w_2^* - \Omega_2 - H(k_2^*) \sigma f_2) R'(w_2^*) \frac{\partial w_2^*}{\partial \gamma_1}.$$
Since in period 2, the executive is acting optimally, \(-f_2^a = -\Omega_2 + w_2^* - H(k_2^*)f_2\), we have

\[ V_1'(\gamma_1) = -H'(k_2^*) \frac{\partial k_2^*}{\partial \gamma_1} f_2\sigma. \]

Differentiating again:

\[ V_1''(\gamma_1) = -H''(k_2^*) \frac{\partial k_2^*}{\partial \gamma_1} f_2\sigma - H'(k_2^*) \frac{\partial^2 k_2^*}{\partial \gamma_1^2} f_2\sigma. \]

The sign of \( V_1''(\gamma_1) \) depends on the sign of \( H''(\cdot) \) and \( \frac{\partial^2 k_2^*}{\partial \gamma_1^2} \). Straightforward computation shows that a sufficient condition for \( \frac{\partial^2 k_2^*}{\partial \gamma_1^2} > 0 \) is

\[ \frac{-R'(w_2)w_2'(k_2)(1 - 2\gamma_1 + \gamma_1 R(w_2))}{(1 - \gamma_1 R(w_2))^3} > 0, \]

which is satisfied whenever

\[ 1 - 2\gamma_1 + \gamma_1 R(w_2) < 0. \]

since \( R'(w_2) > 0 \) and \( w_2'(k_2) > 0. \]

4 Infinite Horizon Game

In this section, we analyze an infinite horizon model, revealing the fundamental driver of cover-ups over time. The updating of beliefs is at the heart of the cover-up path. After an executive retains an employee and an unsuccessful investigation in period \( t \), the prosecutor in period \( t + 1 \) believes it is less likely the organization is harboring a perpetrator; \( \gamma_t \) is a strictly decreasing sequence in \( t \). With time-invariant punishments, on the unique equilibrium path the executive covers up more over time and each prosecutor investigates less often than her predecessor.

Suppose \( T = \infty \) and all benefits and fines—\( \Omega_t, f_t^a \) and \( f_t \)—are independent of \( t \).

**Theorem 2** If \( f\sigma + \delta V(\gamma) - \delta(1 - \sigma)V(\gamma \frac{1 - \sigma}{1 - \sigma}) > 0 \) \( \forall \gamma \in [0, \gamma_0] \), there exists a unique equilibrium of the stationary infinite horizon game: \( w_1^* < w_{t-1}^* \) and \( k_t^* < k_{t-1}^* \) \( \forall t \).

**Proof of Theorem 2.** Under stationarity, \( V \) is independent of \( t \) except for \( \gamma_t \). We show first there exists a finite time \( S \) such that \( V'(\gamma_t) < 0 \) for all equilibrium belief paths starting at any \( t \geq S \).

Since (by Bayes’ Rule and \( \gamma_t \geq 0 \) \( \forall t \)) \( \gamma_t \) is a strictly decreasing bounded sequence in \( \mathbb{R} \), it converges to some limit \( \hat{\gamma} \) as \( t \to \infty \). \( V(\hat{\gamma}) \) is
\[ V(\hat{\gamma}) = \int_{-\infty}^{\hat{\omega}} -f^a dR(\omega) + \int_{\hat{\omega}}^{+\infty} [\omega + \Omega - H(\hat{k})\sigma f + (1 - H(\hat{k})\sigma)\delta V(\hat{\gamma})] dR(\omega). \] 

and the equilibrium cut-offs of the prosecutor and executive satisfy

\[ \hat{k} = \sigma \hat{\gamma} \]

and

\[ \hat{w} = -f^a + \Omega + H(\hat{k})\sigma f - (1 - H(\hat{k})\sigma)\delta V(\hat{\gamma}). \]

Taking the right-hand side derivative of equation (30) with respect to \( \hat{\gamma} \), we find

\[ V_+'(\hat{\gamma}) = -[1 - R(\hat{w})]\sigma^2 H'_+(\sigma \hat{\gamma})[-f - \delta V(\hat{\gamma})] + (1 - H(\hat{k})\sigma)\delta V_+(\hat{\gamma}). \]

Rearranging yields

\[ V_+'(\hat{\gamma}) - (1 - H(\hat{k})\sigma)\delta V_+'(\hat{\gamma}) = -[1 - R(\hat{w})]\sigma^2 H'_+(\sigma \hat{\gamma})[-f - \delta V(\hat{\gamma})] \]

\[ (1 - H(\hat{k})\sigma)\delta V_+'(\hat{\gamma}) = -[1 - R(\hat{w})]\sigma^2 H'_+(\sigma \hat{\gamma})[-f - \delta V(\hat{\gamma})]. \]

By assumption, \( f\sigma + \delta V(\gamma) - \delta(1 - \sigma)V(\gamma \frac{1 - \sigma}{1 - \sigma^2}) > 0 \ \forall \ \gamma, \) so \( f + \delta V(\hat{\gamma}) > 0. \) Also, since \( H(\cdot) \) is continuously differentiable, \( H'_+(\sigma \hat{\gamma}) > 0, \) guaranteeing \( V_+'(\hat{\gamma}) < 0. \)

Next, since \( H(\cdot) \) and \( R(\cdot) \) are continuously differentiable, \( w_t^* \) and \( k_t^* \) are continuously differentiable in \( \gamma_{t-1}, V(\cdot) \) is continuously differentiable in \( \gamma_t. \) This implies, as \( \lim_{t \to +\infty} \gamma_t = \hat{\gamma} \) and \( \lim_{\gamma \to \gamma_t} V'(\gamma) < 0, \) there exists an \( S \) such that, \( \forall \ t \geq S, \ V'(\gamma_t) < 0. \)

Now consider some \( t \geq S. \) We show (1) the dynamic game starting in \( t \) has a unique equilibrium and (2) \( V'(\gamma_{t-1}) < 0. \) Together these results establish, by induction, that the full dynamic game has a unique equilibrium.

(1) Consider prosecutor \( t \) with initial beliefs \( \gamma_{t-1} \) and assume \( f\sigma + \delta V(\gamma) - \delta(1 - \sigma)V(\gamma \frac{1 - \sigma}{1 - \sigma^2}) > 0 \ \forall \ \gamma \in [0, \gamma_0]. \) Substituting executive best reply into prosecutor best reply:

\[
k_t = \frac{\gamma_{t-1}[1 - R[H(k_t)]f\sigma - H(k_t)(1 - \sigma)\delta V_1(k_t(1 - \sigma)(\frac{f_t}{\sigma}) - (1 - H(k_t))\delta(\frac{f_t}{\sigma}) - f^a - \Omega)]}{1 - \gamma_{t-1}R[H(k_t)]f\sigma - H(k_t)(1 - \sigma)\delta V_1(k_t(1 - \sigma)(\frac{f_t}{\sigma}) - (1 - H(k_t))\delta(\frac{f_t}{\sigma}) - f^a - \Omega}).
\]

Hence, \( k_t^* \) solves

\[ \Psi(k_t) = 0, \]
where

$$\Psi(k_t) \triangleq \psi(k_t) - k_t,$$

where

$$\psi(k_t) \triangleq \gamma_t[1 - R]H(k_t) f \sigma - H(k_t)(1 - \sigma)\delta V\left(\frac{k_t(1 - \sigma)}{\sigma(1 - k_t)}\right) - (1 - H(k_t))\delta V\left(\frac{k_t}{\sigma}\right) - f^a - \Omega].$$

Now consider $\psi'(k_t)$. The sign of $\psi'(k_t)$ is the sign of

$$A = -H'(k_t) \left[ f \sigma - (1 - \sigma)\delta V\left(\frac{k_t(1 - \sigma)}{\sigma(1 - k_t)}\right) + \delta V\left(\frac{k_t}{\sigma}\right) \right]$$

$$+ (1 - \sigma)H(k_t)\delta V'\left(\frac{k_t(1 - \sigma)}{\sigma(1 - k_t)}\right) \cdot \frac{1 - \sigma}{\sigma(1 - k_t)^2} + (1 - H(k_t))\delta V'\left(\frac{k_t}{\sigma}\right) \cdot \frac{1}{\sigma}.$$

The first term is negative by assumption; the second term is negative because $V'(\gamma_t) < 0$. Hence, $\psi(\cdot)$ and $\Psi(\cdot)$ are strictly decreasing functions of $\gamma$. In addition

$$\Psi(0) > 0,$$

$$\Psi(\gamma_0) < 0,$$

so there exists a unique $k^*_t$ in $(0, \gamma_0)$ such that $\Psi(k^*_t) = 0$.

By implicit differentiation

$$\frac{\partial k^*_t}{\partial \gamma_{t-1}} = -\frac{\partial \psi}{\Psi'(k_t)} = -\frac{1 - R(w_t)}{\Psi'(k_t)(1 - \gamma_{t-1}R(w_t))^2} > 0.$$

The unique equilibrium threshold $w^*_t$ then solves either

$$k^*_t = \gamma_t \left[1 - R(w_t) \right] \left[1 - \gamma_{t-1}R(w_t) \right],$$

or

$$w_t = H(k^*_t)f \sigma - H(k^*_t)(1 - \sigma)\delta V\left(\frac{k^*_t(1 - \sigma)}{\sigma(1 - k^*_t)}\right) - (1 - H(k^*_t))\delta V\left(\frac{k^*_t}{\sigma}\right) - f^a - \Omega.$$
(2) Consider \( V'(\gamma_{t-1}) \). Using (7):

\[
V'(\gamma_{t-1}) = [1 - R(w_i^*)] \left[ -H'(k_t^*) \frac{\partial k_t^*}{\partial \gamma_{t-1}} \left[ \sigma f - (1 - \sigma)\delta V \left( \frac{k_t^*(1 - \sigma)}{\sigma(1 - k_t^*)} \right) + \delta V \left( \frac{k_t^*}{\sigma} \right) \right] \\
+ [1 - R(w_i^*)] \left[ \frac{\partial k_t^*}{\partial \gamma_{t-1}} (1 - \sigma)H(k_t^*)\delta V' \left( \frac{k_t^*(1 - \sigma)}{\sigma(1 - k_t^*)} \right) \frac{1 - \sigma}{\sigma(1 - k_t^*)^2} \right] \\
+ [1 - R(w_i^*)] \left[ (1 - H(k_t^*))\delta V' \left( \frac{k_t^*}{\sigma} \right) \frac{1}{\sigma} \right]
\]

Since \( \frac{\partial k_t^*}{\partial \gamma_{t-1}} > 0 \), and by supposition \( t \geq S \) so \( V'(\gamma_t) < 0 \), we conclude

\[
V'(\gamma_{t-1}) < 0.
\]

Finally, \( k_t^* = \sigma \gamma_t \) is strictly decreasing in \( t \) since \( \gamma_t \) is strictly decreasing in \( t \), and in the period-\( t \) equilibrium, using (9), if \( k_t^* > k_{t+1}^* \) then \( w_t^* = w_{t+1}^* \).

5 Conclusion

This paper builds a model of cover-ups where a rational executive decides—in the face of possible investigation—whether or not to retain a malfeasant employee. The analysis indicates that successful cover-ups lead to greater incentives for future cover-ups. The longer the employee malfeasance is not revealed or discovered, the less a future investigator believes that malfeasance has occurred. Thus, an executive is rationally “optimistic” after evading detection and covers up more and more as time passes.

The two-period model affords the study of different prosecutorial regimes and the study of environmental changes, such as heightened social condemnation of those who hide abuse and strengthened penalties for cover-ups. The analysis indicates intertemporal effects that can lessen the impact of such shifts. When an organization covers up less often, the investigator is also less likely to investigate in that period and investigate less in future periods due to rational updating of beliefs.

The institutional structure of outside investigators is critical to the rate of cover-ups and investigations. When prosecutors personally gain from catching malfeasance (as modeled), they will depress the investigation rate when they can commit to a investigation strategy or when they internalize the effect of their strategy on subsequent prosecutors. Cover-ups then ironically occur more often when prosecutors have commitment power. Cover up incentives also differ when prosecutors do or do not have knowledge of past investigation. When investigation costs are more likely to be high than low, executives can prefer an ignorant prosecutor, since they are less likely overall on average to face an investigation.
This paper is a jumping off point for further study of strategic cover-ups. Future research could consider, for example, the possibility that an overarching institution could commit to internal investigations of member organizations. The Pope, for example, proposed recently that the Church do more “self-policing” (Horowitz (2019)) (even as though it is not clear how this new effort would be enforced). With commitment, the umbrella institution becomes a first mover, and, as such, take into account the subsequent rational replies of executives of individual member organizations and of outside prosecutors. Other avenues for future study further involve multiple organizations that share a similar “culture” or governing bodies, such as universities or sports leagues. Prosecutors would then also consider the rules set by these bodies and update the probability of malfeasance by observing outcomes of investigations of any one member. Executives’ actions then have externalities on other members which could prompt governing bodies to adopt internally enforced rules or codes of ethics to coordinate behavior.

6 References


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7 Appendix

We present here the equilibrium for a finite, multiple period setting, where fines can increase over time. This model is a generalization of the period-two model presented in Section 2.1. The proof of equilibrium existence and uniqueness uses backward induction from \( T \) in a simple adaption of arguments for the infinite horizon case. In equilibrium, prosecutors’ beliefs fall over time and each prosecutor investigates less than her predecessor. However, the executive’s strategy \( w^*_t \) is not necessarily decreasing in \( t \) since penalties \( f_t \) and \( f^*_t \) are (weakly) increasing and, with finite horizon, the continuation value of the employee’s services falls over time.

**Proposition 7** If \( f_{\sigma} + \delta V(\gamma) - \delta (1 - \sigma) V(\gamma \frac{1 - \sigma}{1 - \sigma_{\gamma}}) > 0 \ \forall \ \gamma \in [0, \gamma_0] \), there exists a unique equilibrium of the non-stationary finite horizon game; \( k^*_t < k^*_{t-1} \ \forall t \).

The model and equilibrium shed light on why an organization’s leadership might rationally continue to cover-up malfeasance despite the likelihood of high levels of future punishment. In any given period \( t \), the executive prefers to escape prosecutor-\( t \)’s scrutiny rather than be investigated; \( \delta V_t(\gamma_t) \geq -f_t \). But there is no guarantee that continuation payoff \( V_t(k_t) \) is positive. Reporting the employee in period \( t \) is also an admission of past cover-up(s) for which the executive must pay the related fine. On net, then, the executive can be better off continuing to cover-up.