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When Words Speak Louder Without Actions

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Keywords
communication, corporate governance, intervention, managerial leadership

Disciplines
Finance and Financial Management

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When Words Speak Louder Without Actions*

Doron Levit†
Wharton
February 14, 2017

Abstract

This paper studies communication and intervention as mechanisms of corporate governance. I develop a model in which a privately informed principal can intervene in the decisions of the agent if the latter disobeys her instructions. The main result shows that intervention can prompt disobedience because it tempts the agent to challenge the principal to back her words with actions. This result provides a novel argument as to why a commitment not to intervene (and therefore, relying solely on communication) can be optimal. In this respect, words do speak louder without actions. The model is applied to managerial leadership, corporate boards, private equity, and shareholder activism.

Keywords: Communication, Corporate Governance, Delegation, Intervention
JEL Classification: D74, D82, D83, G34

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Introduction

There are different ways to manage and govern a corporation. For instance, visionary managers often share information with their subordinates to explain their strategy. Some managers rely on their ability to motivate their followers and adopt a hands-off approach, while others retain control and overrule their subordinates when their instructions are not followed. As another example, in many corporations, the board of directors not only monitors and supervises the CEO but also advises management on topics such as strategy, crisis management, and M&A. Some boards are “friendly” to their CEO who is given the final say, while others do not hesitate to confront and replace the CEO as needed. Related, investors such as private equity funds and activist hedge funds, who often share their ideas with their portfolio companies how to increase value, also have different styles of governance. While some investors are quick to exercise their control rights if their ideas are ignored, others are less confrontational and prefer working constructively with management. In all of these principal-agent situations, contracts only partially resolve the conflicts of interests, and as a result, communication (i.e., transmission of information, using words) and intervention (i.e., forcing one’s will, taking actions) become the primary mechanisms of governance.

The goal of this paper is to understand the interaction between communication and intervention, and study its implications for corporate governance. There is an obvious trade off between the two: while communication is effective only if it is persuasive, intervention is more confrontational and costly. For this reason, intervention is often used as a last resort (Simon (1947)), and the anticipation of intervention can in and of itself affect the ability to exert influence through communication. In principle, the two mechanisms can either complement or substitute one another. Which one it is? As the examples above suggest, the extent to which intervention (or the threat of) is used in practice varies considerably. What explains these different choices?

To study these questions, I develop a principal-agent model with incomplete contracts and a “top-down” information structure.\footnote{The main results continue to hold with two-sided information asymmetry. For details, see Section 3.5.} As one might expect, a credible threat of intervention

“Actions speak louder than words, but not nearly as often.” Mark Twain
can increase the incentives of the agent to follow the instructions of the principal, i.e., intervention reinforces compliance. In these cases, the two mechanisms complement one another since the best way to avoid the unpleasant consequences of intervention is to follow instructions. Surprisingly, however, the main result of the paper demonstrates that a credible threat of intervention can also decrease the incentives of the agent to follow the principal’s instructions. In those cases, intervention prompts disobedience, communication is less effective with intervention than without it, and the two mechanisms substitute one another. This result is new in the literature. The key insight is that intervention is counterproductive because it tempts the agent to challenge the principal to back her words with actions. Therefore, a commitment not to intervene (i.e., relying solely on communication) can be optimal. In this respect, words do speak louder than (and without) actions.

Building on this core idea, the analysis considers several variants of the baseline model and provides novel predictions. In the context of corporate leadership, the analysis suggests that hands-off management style is more suitable for specialist managers (rather than generalists) in opaque and complex organizations where employees’ compensation is related to firm performances. In the context of corporate boards, the model predicts that friendly boards are optimal when CEOs have less to lose from being monitored (i.e., enjoy high reputation in the CEO labor market or a generous severance package), their compensation is sensitive to performances, the number of directors is large, or directors are busy (e.g., hold other board seats). In the context of private equity and shareholder activism, I argue that sophisticated investors can have their voice heard more effectively when they have reputation for being non-confrontational, co-invest with other investors (e.g., LBOs’ club deals or VCs’ syndicates), have large number of portfolio companies, or have better exit options from their investment (i.e., selling their shares, finding a buyer). Specifically in the context of shareholder activism, the analysis highlights that the adoption of an easier proxy access or the facilitation of coordination among shareholders (e.g., through proxy advisory firms) have unintended consequences and can be counterproductive. Moreover, the ease at which activists can exit their positions (e.g., the liquidity of the stock) enhances their ability to influence management if and only if running a proxy fight (i.e., intervention) is sufficiently costly.

To gain further insight about how intervention prompts disobedience, which is the common theme behind the implications above, consider the following example. Suppose an agent (“he”)
can take one of two actions, \( L \) and \( R \). There are three states with a uniform prior. Payoffs are given by

<table>
<thead>
<tr>
<th>Principal ( a )</th>
<th>( \theta_L )</th>
<th>( \theta_M )</th>
<th>( \theta_R )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( a = L )</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>( a = R )</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agent ( a )</th>
<th>( \theta_L )</th>
<th>( \theta_M )</th>
<th>( \theta_R )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( a = L )</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>( a = R )</td>
<td>( \beta )</td>
<td>( \beta )</td>
<td>( 2 + \beta ),</td>
</tr>
</tbody>
</table>

where \( \beta \in (1, 2) \). Both players prefer action \( R \) in state \( \theta_R \) and action \( L \) in state \( \theta_L \), but since the agent receives an additional private benefit \( \beta \) from action \( R \), they disagree in state \( \theta_M \). The principal ("she"), who is privately informed of the state, sends the agent a message which can be interpreted as instructions, a recommendation, or a nonbinding demand. Since the agent is biased toward action \( R \), the challenge is convincing him to choose action \( L \). Communication is modeled as cheap talk (i.e., strategic transmission of information à la Crawford and Sobel (1982)). Without the possibility of intervention, an informative equilibrium has the following properties: (i) the principal sends message \( m_R \) in state \( \theta_R \) and message \( m_L \) otherwise, and (ii) the agent takes action \( R \) (\( L \)) if message \( m_R \) (\( m_L \)) is sent. In this equilibrium, which exists if and only if \( \beta < \frac{3}{2} \), the principal gets her preferred action in each state. Notice that because of their conflict of interests, the principal never fully reveals her private information in equilibrium. The agent would like to deviate to action \( R \) in state \( \theta_M \) but not in state \( \theta_L \); because \( \theta_M \) is pooled with \( \theta_L \) by the principal’s message, such a deviation is not possible. In a sense, the principal deliberately conceals information the agent is likely to abuse.

The novel feature of the model is the possibility of intervention. Suppose that after the agent acts the principal can pay a cost \( c > 0 \) and reverse the agent’s action. Intuitively, the principal can overrule the agent and perform the task on her own, force the agent to repeat the work, monitor the agent closely, or find a replacement. The cost of intervention is the principal’s alternative use of resources, effort, time, and attention, or her aversion to confrontation. If \( c \geq 2 \) (\( c \leq 1 \)) then the cost is too large (small), and if the agent deviates to action \( R \) after message \( m_L \) then the principal never (always) intervenes. In those cases, the possibility of intervention has no effect on the outcome. But if \( 1 < c < 2 \) then the above equilibrium breaks down: the agent knows that if he deviates to action \( R \) after message \( m_L \), the principal will intervene if and only if the state is \( \theta_L \), which results in precisely the outcome

\[ \text{Since } 2 + \beta > 0, \text{ the agent always chooses action } R \text{ after message } m_R. \text{ Conditional on message } m_L, \text{ the agent’s expected utility from action } L \text{ and } R \text{ is } \frac{2+1}{2} = \frac{3}{2} \text{ and } \beta, \text{ respectively. Therefore, the agent chooses action } L \text{ after message } m_L \text{ if and only if } \frac{3}{2} < \beta. \]
that the agent wants. By contrast, although intervention is optional, the principal is worse off with the possibility of intervention, she now has to pay $c$ to implement action $L$ in state $\theta_L$.

Intuitively, by disobeying the principal, the agent forces her to make a decision that inevitably reveals information she was trying to conceal. Indeed, if the agent ignores the principal’s instructions, the principal must decide whether to intervene. Since intervention is an informed but costly decision, the principal intervenes if and only if she believes that the agent’s decision is detrimental, i.e., the state is $\theta_L$. Therefore, if the principal does not intervene, she effectively “confirms” the decision of the agent to disobey her instructions. Since the agent “called her bluff”, he can now consume his private benefits in state $\theta_M$. On the other hand, if the principal intervenes, she “corrects” the agent’s initial decision. This correction benefits the agent since it reverses course exactly when the consequences of his actions are detrimental. Either way, similar to the winner’s curse in common value auctions and pivotal considerations in strategic voting, the agent can condition on the information that would be reflected by the decision of the principal to intervene. Altogether, the possibility of intervention creates additional tension by providing the agent with opportunity to challenge the principal to back her words with actions. Through this novel channel intervention prompts disobedience.

This core idea holds more generally. Specifically, the example above abstracts from the direct costs borne by the agent when the principal intervenes (e.g., loss of compensation, damaged reputation, or embarrassment). When considering whether to ignore the principal’s instructions, the agent trades off these costs against the benefit from “eliciting” additional information. The relative cost of intervention, that is, the ratio between the cost borne by the principal and the cost that intervention inflicted on the agent, plays a key role in the analysis.

In Section 2, I show that the likelihood that the agent follows the principal’s instructions in equilibrium has a U-shape as a function of this ratio. When the relative cost of intervention is small, the punishment effect dominates and intervention reinforces compliance; but when the ratio is large, the informational benefits from challenging the principal dominate and intervention prompts disobedience.\(^3\) Furthermore, with more than two actions, I show that when intervention prompts disobedience (reinforces compliance), the agent chooses more (less) ex-

\(^3\)While other studies argued that intervention can reinforce compliance (e.g., Matthews (1989), Shimizu (2008), Marino, Matsusaka, and Zábojník (2010), Van den Steen (2010), and Levit (2014)), this paper is the first to show that intervention prompts disobedience. The key differences are: (i) here, intervention changes the agent’s decision; and (ii) in this model the agent cares to learn about the principal’s private information.
treme actions which are more difficult (easier) to reverse, and consequently, the amount of information that is revealed by the principal in equilibrium is lower (higher).

A commitment not to intervene in the agent’s decision benefits the principal only if intervention prompts disobedience. Therefore, a commitment is optimal when the relative cost of intervention is sufficiently high. In those cases, the principal is better off by solely relying on her ability to communicate with the agent and persuade him to follow her instructions. Moreover, I show that such commitment is more valuable when the conflict of interests with the agent is small. This result is not obvious since as the conflict of interests decreases, communication becomes more effective both with intervention and without it. Overall, the model provides novel predictions about the circumstances under which intervention is counterproductive.

The ability of the principal to commit not to intervene in the agent’s decision, the benefit from such commitment, as well as the channel through which a commitment can be obtained, depend on the context and the application of the model. In Section 4, I discuss in details the application of the model to managerial leadership, corporate boards, private equity, and shareholder activism. These applications share the main elements of the model.

To shed more light on these applications, I extend the baseline model and study situations in which (i) the principal is a group of individuals who are subject to coordination problems such as free-riding (e.g., a board of directors); (ii) the principal cannot observe the agent’s action before deciding whether to intervene (e.g., an opaque organization/firm); (iii) the quality of the principal’s private information is imperfect (e.g., specialist vs. generalist managers, investors with expertise in a specific industry); (iv) the agent is also privately informed. Interestingly, when an informed agent disobeys the principal, the principal cannot tell for sure if it is because the agent’s private information contradicts her own information or because of their conflict of interests. This force deters the principal from intervening and emboldens the agent. Therefore, with two-sided information asymmetry, intervention is even more likely to prompt disobedience and less information is communicated by the principal in equilibrium.

This paper contributes to the literature in several ways. Starting with Dessein (2002), a number of papers studied the trade off between delegation and strategic communication in organizations, and its applications to optimal board structure (Adams and Ferreira (2007), Chakraborty and Yilmaz (2016), Harris and Raviv (2008)) and shareholder control (Harris and

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4For example, see Agastya, Bag, and Chakraborty (2014), Alonso and Matouschek (2007), Grenadier, Malenko and Malenko (2017), Mylovanov (2008), and Harris and Raviv (2005).
Raviv (2010)). In those models, delegation is beneficial because it avoids the distortion of the agent’s private information when he communicates. By contrast, in my model a commitment not to intervene in the agent’s decision, which can be viewed as a form of delegation, is optimal even if the agent is uninformed (but even more so if he is informed). In this respect, my paper offers a novel motive for delegation, which has new implications for corporate governance as I discuss in Section 4. In addition, several papers argue that intervention and monitoring are undesirable because they weaken the agent’s incentives to collect information (Aghion and Tirole (1997)), undertake managerial initiatives (Burkart, Gromb, and Panunzi (1997)), or cooperate with the board (Adams and Ferreira (2007)). In my paper there are no hold-up problems, and therefore, the benefit from a commitment not to intervene in the agent’s decision arises under different circumstances: intervention is less (more) effective as a governance tool especially when the consequences for the agent from intervention/monitoring are mild (dire). 

Finally, existing models in which corporate leaders have informational advantage focus on the leader’s role in coordinating the various activities of the firm (e.g., Hermalin (1998); Bolton, Brunnermeier and Veldkamp (2013)). My paper contributes to this literature by showing that the ease at which corporate leaders can exercise their power diminishes their ability to influence others to voluntarily follow their vision.

1 Setup

Consider a principal-agent environment in which payoffs depend on action $x \in \{L, R\}$ and a random variable $\tilde{\theta}$ that has a continuous probability density function $f$ with full support over $[\tilde{\theta}, \bar{\theta}]$. The principal’s payoff is given by $v(\tilde{\theta}, x) \geq 0$. In Section 3.4, I consider a version of the model with a continuum of actions. Let

$$\Delta(\tilde{\theta}) \equiv v(\tilde{\theta}, R) - v(\tilde{\theta}, L)$$

be a strictly increasing and continuous function with $\Delta(\theta) < 0 < \Delta(\bar{\theta})$. The first assumption implies that the relative benefit from action $R$ increases with $\tilde{\theta}$, and the second assumption

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5The idea that ex-post efficient intervention can be ex-ante counterproductive is also discussed by Crémer (1995). There, however, communication, disobedience, and the interplay with intervention are not studied.

6Rotemberg and Saloner (1993, 2000) also focus on the vision aspect of leadership, but without modeling a top-down communication. See Bolton, Brunnermeier, and Veldkamp (2010) for a related survey.
guarantees that the principal’s preferences are not trivial: she prefers action $R$ over $L$ if and only if $\Delta(\theta) > 0$. To ease the exposition, I use $\Delta$ for $\Delta(\theta)$ and $\Delta$ for $\Delta(\theta)$ whenever there is no risk of confusion.

The agent’s payoff is given by

$$\omega \cdot v(\tilde{\theta}, x) + \tilde{\beta} \cdot 1_{\{x=R\}},$$

where $\omega > 0$ is a scalar and $\tilde{\beta}$ is a random variable, privately known to the agent, independent of $\tilde{\theta}$, with a continuous probability density function $g$ and full support over $[0, \infty)$. Parameter $\omega$ is the relative weight the agent puts on $v(\tilde{\theta}, x)$. The agent prefers action $R$ over $L$ if and only if $\Delta > -\tilde{\beta}/\omega$. Thus, when $\tilde{\Delta} \in (-\tilde{\beta}/\omega, 0)$ the principal and the agent have different preferences over actions. Effectively, $\tilde{\beta}$ captures the intrinsic conflict of interests between the principal and the agent, where larger $\tilde{\beta}$ and smaller $\omega$ result in a larger bias toward action $R$. The assumption that $\tilde{\beta}$ is the agent’s private information is immaterial for the analysis; its main role is to ease the exposition of the main results as will become clear later.\(^7\)

Following Grossman and Hart (1986) and Hart and Moore (1990), I assume that contracts are incomplete. In particular, the agent and the principal cannot contract over actions or the communication protocol. Alternatively, $\tilde{\beta}$ can be interpreted as the residual conflict of interests between the principal and the agent. A residual conflict of interests is likely to arise even if writing a contract that balances between the agent’s incentives and the principal’s utility net of the agent’s compensation is allowed (for example, increasing $\omega$). Intuitively, eliminating entirely the private benefits of the agent is “too expansive” as it may require the principal to give all the pecuniary benefits from the project to the agent.\(^8\)

The model has four stages:

**Stage 1:** The first stage involves communication between the principal and the agent. While the agent is privately informed about $\tilde{\beta}$, the principal is privately informed about $\tilde{\theta}$. For simplicity, I assume that the principal perfectly observes $\tilde{\theta}$ while the agent is uninformed about $\tilde{\theta}$. The former assumption is relaxed in Section 3.3 and the latter assumption is relaxed in Section 2.2.

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\(^7\)Assuming $\Pr[\tilde{\beta} \leq 0] = 0$ is immaterial for the main results. In the Online Appendix I show that similar results hold when $\tilde{\beta}$ has full support over $(-\infty, \infty)$.\(^8\)For details on an interpretation of $\omega$ as a division of cash-flows, see the remark at the end of Section 2.2.
Section 3.5. Based on her private information, the principal sends the agent message $m \in [\tilde{\theta}, \tilde{\theta}]$. In line with a standard cheap talk framework, the principal’s information about $e$ is non-verifiable and the content of $m$ does not affect the agent’s or the principal’s payoff directly. These assumptions capture the informal nature of communication. I denote by $\rho(\tilde{\theta}) \in [\theta, \tilde{\theta}]$ the message sent by the principal and by $M$ the set of messages on the equilibrium path.

**Stage 2:** In the second stage, the agent observes the message from the principal and chooses between the two actions. I denote by $x_A(m, \tilde{\beta}) \in \{L, R\}$ the decision of the agent conditional on observing message $m$ and his private benefits $\tilde{\beta}$.

**Stage 3:** The third stage is the key departure of the model from the existing literature. The principal observes the agent’s decision and decides whether to intervene and override it. Formally, let $x_P(e, x_A) \in \{L, R\}$ be the principal’s decision. If $x_P = x_A$ then the principal did not intervene and the agent’s decision is implemented. In this case, neither the principal nor the agent incurs any costs. If $x_P \neq x_A$ then the principal intervenes and changes the agent’s decision.\(^9\) In this case, the principal incurs a cost $c \in (0, |\Delta|)$ and the agent incurs a cost $\kappa \geq 0$. If instead $c \geq |\Delta|$, then intervention is too costly to have any effect. In the applications which I discuss in Section 4, the costs $\kappa$ and $c$ can be either pecuniary or non-pecuniary.

**Stage 4:** Payoffs are realized and distributed to the principal and the agent. Overall, the principal and the agent maximize their expected utilities, which are given respectively by

$$u_P(\tilde{\theta}, x_A, x_P; c) = \begin{cases} v(\tilde{\theta}, x_P) - c & \text{if } x_P \neq x_A \\ v(\tilde{\theta}, x_A) & \text{if } x_P = x_A \end{cases}$$

and

$$u_A(\tilde{\theta}, x_A, x_P, \tilde{\beta}; \omega, \kappa) = \begin{cases} \omega \cdot v(\tilde{\theta}, x_P) + \tilde{\beta} \cdot 1_{\{x_P = R\}} - \kappa & \text{if } x_P \neq x_A \\ \omega \cdot v(\tilde{\theta}, x_A) + \tilde{\beta} \cdot 1_{\{x_A = R\}} & \text{if } x_P = x_A. \end{cases}$$

**Solution concept**

A Perfect Bayesian Equilibrium of the game consists of three parts: The principal’s communication strategy $\rho^*$, the agent’s decision $x_A^*$, and the principal’s intervention strategy $x_P^*$.

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\(^*\text{Since the agent is indifferent with zero probability, I restrict attention to pure strategies.}\)

\(^\text{10\ A previous version of the paper shows similar results when the agent’s action can only be partly reversed.}\)
Specifically, the equilibrium is defined as follows: (i) For any realization of $\tilde{\theta}$, if $\rho^*(\tilde{\theta}) = m$ then $m$ maximizes the expected utility of the principal conditional on $\tilde{\theta}$ and given $x_A^*$ and $x_P^*$, where the expectations are taken with respect to $\tilde{\beta}$; (ii) for any message $m \in M$, the strategy $x_A^*$ maximizes the expected utility of the agent given $\rho^*$ and $x_P^*$, where the expectations are taken with respect to $\tilde{\theta}$ conditional on $m$; (iii) for any realization of $\tilde{\theta}$ and $x \in \{L, R\}$, $x_P^*$ maximizes the expected utility of the principal. Finally, all players have rational expectations in that each player’s belief about the other players’ strategies is correct in equilibrium. Moreover, the agent uses Bayes’ rules to update their beliefs from the principal’s message about $\tilde{\theta}$.\footnote{The principal learns from $a_A$ about $\tilde{\beta}$, but this information is immaterial for her decision to intervene.}

2 Analysis

I solve the model backward. All omitted proofs are given in the Appendix and Online Appendix. Consider first the decision of the principal to intervene. Suppose the agent chooses action $R$. If the principal does not intervene, the agent’s decision is not reversed and the principal’s payoff is $v(\tilde{\theta}, R)$. If the principal intervenes then the agent’s decision is reversed and the principal’s payoff is $v(\tilde{\theta}, L) - c$. Therefore, conditional on $x_A = R$, the principal intervenes if and only if $\tilde{\Delta} < -c$. Suppose the agent chooses action $L$. Similarly, if the principal intervenes her payoff is $v(\tilde{\theta}, R) - c$ and otherwise her payoff is $v(\tilde{\theta}, L)$. Conditional on $x_A = L$, the principal intervenes if and only if $c < \tilde{\Delta}$. Overall, the principal intervenes whenever she finds the agent’s initial decision detrimental.\footnote{For this reason, similar results hold if instead the principal chooses the probability that intervention succeeds, $\lambda$, at a cost of $c(\lambda)$, where $c' > 0$ and $c'' > 0$.}

Lemma 1 In any equilibrium, the principal intervenes if and only if $x_A = R$ and $\tilde{\Delta} < -c$, or $x_A = L$ and $c < \tilde{\Delta}$.

The next result shows that given message $m$ and expected intervention policy of the principal, the agent is more likely to choose action $L$ when his private benefits are small.

Lemma 2 In any equilibrium and for any message $m \in M$, there is $b(m)$ such that the agent chooses action $L$ if and only if $\tilde{\beta} \leq b(m)$.
As in any cheap-talk game, there always exists an equilibrium in which the agent ignores all messages from the principal, and these messages are uninformative. These equilibria are often referred to as babbling equilibria and their outcome is equivalent to assuming no communication between the principal and the agent.

**Proposition 1** A babbling equilibrium always exists. In any babbling equilibrium the agent chooses action $L$ if and only if
\[
\beta \leq b_N \quad \text{where} \quad b_N = \kappa \times \frac{\Pr\{\Delta < -c\} - \Pr\{c < \Delta\}}{\Pr\{-c < \Delta < c\}} - \omega \mathbb{E}[\Delta|c < \Delta < c].
\] (5)

The principal intervenes as described by Lemma 1.

Without communication, the agent cannot avoid intervention even if he forgoes his private benefits and chooses action $L$. If $b_N \leq 0$ then the agent “follows his bias” and chooses action $R$ with probability one, even though it triggers intervention by the principal whenever $c < -\Delta$. If $b_N > 0$ then the agent “goes against his bias” and chooses action $L$ when $\tilde{\beta}$ is small. Intuitively, based on his prior about $\Delta$, the agent believes that action $L$ is less likely to trigger intervention than action $R$.

With communication, the principal can influence the agent’s decision by sending the appropriate message. Communication is effective only if in equilibrium the principal reveals information about $\Delta$ and the agent conditions his decision on this information with a positive probability. I refer to equilibria with this property as influential.

**Definition 1** An equilibrium is influential if there exist $\beta_0 \geq 0$ and $m_1 \neq m_2 \in M$ such that \( \mathbb{E}[\Delta|m_1] \neq \mathbb{E}[\Delta|m_2] \) and \( x_A(m_1, \beta_0) \neq x_A(m_2, \beta_0) \).

Since the principal uses her influence to maximize her expected payoff as given by (3), in any influential equilibrium there are exactly two disjoint sets of messages on the equilibrium path, $M_R$ and $M_L$, with distinctive properties. Messages in $M_R$ maximize the probability that the agent chooses action $R$, and messages in $M_L$ maximize the probability that the agent chooses action $L$. Therefore, messages in $M_R$ can be interpreted as instructions to choose $R$, and messages in $M_L$ can be interpreted as instructions to choose $L$. Note that both $M_R$ and $M_L$ can have more than one message in equilibrium.\(^{13}\) Based on (3), if the equilibrium is influential

\(^{13}\)Formally, $M_R = \arg\min_{m \in M} b(m)$ and $M_L = \arg\max_{m \in M} b(m)$. If the equilibrium is influential then it must be $\min_{m \in M} b(m) < \max_{m \in M} b(m)$.\]
then $\Delta \geq 0 \Rightarrow m \in M_R$ and $\Delta < 0 \Rightarrow m \in M_L$. Hereafter, I use the terminology “instructing the agent” to describe the principal’s communication strategy. Overall, if the equilibrium is influential then the principal instructs the agent to choose action $R$ if $\Delta \geq 0$ and action $L$ if $\Delta < 0$.

An influential equilibrium exists only if the agent finds it in his best interests to follow the principal’s instructions. Suppose the principal sends a message $m \in M_R$. The agent follows the instructions and chooses action $R$ if and only if

$$\omega \mathbb{E}[v(\bar{\theta}, R)|m] + \tilde{\beta} \geq \Pr[\Delta \leq c|m](\omega \mathbb{E}[v(\bar{\theta}, L)|\Delta \leq c, m]) + \Pr[\Delta > c|m](\omega \mathbb{E}[v(\bar{\theta}, R)|\Delta > c, m] + \tilde{\beta} - \kappa). \quad (6)$$

The left hand side of (6) is the agent’s expected payoff if he follows instructions. In this case, the principal does not intervene, action $R$ is implemented, and the agent consumes his private benefits. The right hand side of (6) is the agent’s expected payoff if he disobeys the principal and chooses action $L$. According to Lemma 1, if $\Delta > c$ then the principal intervenes, the agent’s decision is reversed, and he incurs an additional cost $\kappa$. Since $\tilde{\beta} \geq 0$ and $m \in M_R \Leftrightarrow \Delta \geq 0$, the inequality in (6) always holds. Therefore, the agent always follows the principal’s instructions to choose action $R$.

The challenge of the principal is convincing the agent to choose action $L$. Suppose the principal sends a message $m \in M_L$. The agent follows the instructions and chooses action $L$ if and only if

$$\omega \mathbb{E}[v(\bar{\theta}, L)|m] \geq \Pr[\Delta \geq -c|m](\omega \mathbb{E}[v(\bar{\theta}, R)|\Delta \geq -c, m] + \tilde{\beta}) + \Pr[\Delta < -c|m](\omega \mathbb{E}[v(\bar{\theta}, L)|\Delta < -c, m] - \kappa). \quad (7)$$

The left hand side of (7) is the agent’s expected payoff if he follows instructions. In this case, the principal does not intervene and action $L$ is implemented. The right hand side of (7) is the agent’s expected payoff if he disobeys the principal and chooses action $R$. If $\Delta < -c$ then the principal intervenes, the agent’s decision is reversed, and he incurs an additional cost $\kappa$. If $\Delta \geq -c$ then the principal does not intervene, the agent’s decision is unchanged, and he consumes his private benefits. The next result shows that the agent follows the principal’s instructions if and only if $\tilde{\beta} \leq b^*(\kappa, c)$, which is given by expression (8) below.

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Proposition 2 An influential equilibrium always exists. Moreover,

(i) In any influential equilibrium the principal instructs the agent to choose action $R$ if and only if $\bar{\Delta} \geq 0$. If the principal instructs the agent to choose action $R$, the agent chooses action $R$ with probability one and the principal never intervenes. If the principal instructs the agent to choose action $L$, the agent chooses action $L$ if and only if $\bar{\beta} \leq b^*(\kappa, c)$, where

$$b^*(\kappa, c) = \kappa \times \frac{\Pr[\bar{\Delta} < -c]}{\Pr[-c \leq \bar{\Delta} < 0]} - \omega \mathbb{E}[\bar{\Delta}] - c \leq \bar{\Delta} < 0].$$

(8)

If the agent follows the instructions to choose action $L$ then the principal never intervenes. If the agent ignores the instructions to choose action $L$, the principal intervenes if and only if $\bar{\Delta} < -c$.

(ii) Every influential equilibrium Pareto dominates every non-influential equilibrium.

Since a larger $b^*(\kappa, c)$ implies a higher probability that the agent follows the instructions of the principal in equilibrium, the threshold $b^*(\kappa, c)$ measures the effectiveness of communication.

Corollary 1

(i) $b^*(\kappa, c)$ strictly increases with $\kappa$ and $\omega$.

(ii) If $\kappa/\omega \geq \mathbb{E}[\bar{\Delta} | \bar{\Delta} < 0] + |\Delta|$ then $b^*(\kappa, c)$ decreases with $c$. If $\kappa/\omega < \mathbb{E}[\bar{\Delta} | \bar{\Delta} < 0] + |\Delta|$ then $b^*(\kappa, c)$ strictly increases with $c$ if and only if $c \in (c^{\min}, |\Delta|)$ where $c^{\min} \in (0, |\Delta|)$ is the unique solution of

$$\omega c^{\min} = \kappa + b^*(\kappa, c^{\min}).$$

(9)

Part (i) of Corollary 1 is intuitive: the principal intervenes only if the agent ignores her instructions, and in order to avoid the negative consequences of intervention, the agent is more likely to follow the principal’s instructions when $\kappa$ is higher. Also, as $\omega$ increases, the conflict of interests between the principal and the agent is effectively smaller, and therefore, the agent is more likely to follow the principal’s instructions. Part (ii) is more subtle. Figure 1 depicts $b^*(\kappa, c)$ as a function of $c$ when $\bar{\Delta} = \bar{\theta} \sim U[-1, 1]$, $\omega = 1$, and $\kappa = 0.02$. At any point above the blue curve the agent ignores the principal’s instructions and chooses action
$R$ with probability one. At any point below the blue curve the agent follows the principal’s instructions. Seemingly, the ability of the principal to influence the agent should decrease with the cost of intervention, as in those instances the threat of intervention is less credible. Corollary 1 shows that this intuition is misleading when $c$ is large. In fact, it can be shown that if $\kappa = 0$ then $c_{\text{min}} = 0$ and $b^* (0, c)$ is increasing in $c$. I defer the discussion on the intuition behind this result to Section 2.1.

![Figure 1 - Comparative statics of $b^*$ with respect to $c$](image)

According to Proposition 2, the probability of intervention in equilibrium is

$$\eta^* (\kappa, c) \equiv \Pr[\beta \geq b^* (\kappa, c)] \Pr[\Delta < -c]. \quad (10)$$

The principal does not need to intervene if the agent follows her instructions. Since $b^* (\kappa, c)$ increases with $\kappa$ and $\omega$, $\eta^* (\kappa, c)$ is decreasing in $\kappa$ and $\omega$. By contrast, $\eta^* (\kappa, c)$ has an inverted U-shape as a function of $c$. Figure 2 illustrates this point when $\Delta = \tilde{\beta} \sim U [-1, 1]$, $\omega = 1$, and $\beta \sim U [0, 1]$. Intuitively, when $c$ is small the principal can influence the agent through communication. Intervention serves only as a threat, which results with a low probability of intervention. However, if $c$ is large, intervention is too costly and the principal is less likely to intervene even if the agent disobeys her. Therefore, intervention is observed only if it is not credible enough to deter the agent from ignoring the principal’s instructions, but it is sufficiently profitable as a corrective tool.\(^{14}\) As a result, unobserved intervention is not necessarily evidence that intervention is ineffective.

\(^{14}\)Figure 2 also illustrates that the probability of intervention in any babbling equilibrium (the black line) is higher than in any influential equilibrium. The formal proof is in the Online Appendix.
Remark on equilibrium selection Since multiple equilibria always exist, hereafter, I assume that the equilibrium in play is influential (which always exists). Selecting the most informative equilibrium is standard in the literature. Part (ii) of Proposition 2 also supports this selection.\footnote{It can be shown that an application of NITS criterion by Chen et al. (2008) to this setup would also select the influential equilibrium.}

2.1 Does intervention prompt disobedience?

To understand the interaction between communication and intervention, consider a benchmark in which intervention is either prohibitively costly or entirely ineffectual. This is a special case of the baseline model with $c > |\Delta|$. According to Proposition 2,

$$
\lim_{c \to |\Delta|} b^*(\kappa, c) = -\omega \mathbb{E}[\Delta | \Delta < 0].
$$

(11)

Therefore, communication is considered less effective with intervention than without it if and only if

$$
b^*(\kappa, c) < -\omega \mathbb{E}[\Delta | \Delta < 0].
$$

(12)

If condition (12) holds then intervention prompts disobedience, and otherwise, intervention reinforces compliance. The next result follows immediately from (12).
Proposition 3 Suppose $c < |\Delta|$. Intervention prompts disobedience if and only if

$$\kappa/\omega < \mathbb{E}\tilde{\Delta}|\tilde{\Delta} < 0 - \mathbb{E}|\tilde{\Delta} < -c].$$

To understand the intuition behind Proposition 3, note that the agent is willing to forgo her private benefits and choose action $L$ if he learns that $\tilde{\Delta} < -\tilde{\beta}/\omega$. However, in equilibrium, the principal does not reveal whether $\tilde{\Delta} < -\tilde{\beta}/\omega$ or $\tilde{\Delta} \in [-\tilde{\beta}/\omega, 0)$. The principal intentionally conceals this information, because if she did not, the agent would have chosen action $R$ when $\tilde{\Delta} > -\tilde{\beta}/\omega$. Instead, the principal pretends that $\tilde{\Delta}$ is lower than it really is in order to persuade the agent to choose $L$ even when $\tilde{\Delta} > -\tilde{\beta}/\omega$. The agent understands the principal’s incentives, and hence, the only information that can be inferred from the instructions to choose action $L$ is $\tilde{\Delta} < 0$.

Intervention allows the agent to elicit information from the principal that is otherwise not revealed by her instructions. If the agent ignores the principal’s instructions, the principal has to decide whether to intervene. Intervention is an informed decision. In equilibrium, the principal intervenes only if she is convinced that the implementation of action $R$ is sufficiently detrimental to justify incurring the costs of intervention. Therefore, the principal’s decision to intervene reveals the value of $\tilde{\Delta}$ relative to $-c$. In particular, if the principal does not intervene, the agent infers that the principal believes that choosing action $R$ does not justify intervention, that is, $\tilde{\Delta} > -c$. These are the states in which the agent prefers consuming his private benefits even at the expense of a lower value of $v(\tilde{\theta}, x)$. In those cases, the principal’s decision not to intervene “confirms” the agent’s initial decision to disobey. On the other hand, if the principal intervenes, the agent infers that the principal believes that choosing action $R$ is detrimental, that is, $\tilde{\Delta} < -c$. Since the agent is also concerned about the value of $v(\tilde{\theta}, x)$, he prefers forgoing his private benefits when he learns that $\tilde{\Delta}$ is low. In those cases, intervention benefits the agent since it “corrects” his initial decision when it is indeed detrimental.

By ignoring the principal’s instructions the agent effectively “forces” the principal to make an informed decision which inevitably reveals information about $\tilde{\Delta}$ she was trying to conceal. Against this informational benefit, the agent suffers the direct cost of intervention, $\kappa$. Combined, the agent benefits from the principal’s intervention if and only if $\omega\tilde{\Delta} + \tilde{\beta} < -c$. Note that when deciding whether to intervene, the principal behaves as if she is biased toward action $R$, where the bias is $c$. Therefore, if $\omega c \approx \kappa + \tilde{\beta}$ then the principal’s “bias” coincides with
the preferences of the agent. As can be seen by (9), the minimum of $b^*(\kappa, c)$ as a function of $c$ is obtained when $\omega c = \kappa + b^*(\kappa, c)$. When $c = c^\text{min}$ the agent’s informational benefit from intervention is the highest, and hence, the likelihood that the agent follows the principal’s instructions is the lowest. This also explains the intuition behind part (ii) of Corollary 1.

Proposition 3 also implies that intervention is more likely to prompt disobedience when the conflict of interests between the principal and the agent is smaller (high $\omega$). Note that higher $\omega$ increases the influence of the principal over the agent both with and without intervention. However, Proposition 3 suggests that the positive effect of $\omega$ is weaker with intervention. There are two reasons behind this result. First, without intervention, the only force that governs the incentives of the agent to comply is learning about $e$. By contrast, with intervention, the agent also tries to avoid the cost $\kappa$, and therefore, the effect of $\omega$ is weaker. Second, the agent’s informational benefits from disobedience increase with $\omega$, as the agent has stronger incentives to learn about $\Delta$. Therefore, agents who are compensated for performances are more likely to comply with instructions without the possibility of intervention. In this respect, pay for performances and intervention are substitutes.

Overall, the possibility of intervention creates additional tension between the principal and the agent. Condition (13) reflects the agent’s trade-off between the direct cost from intervention and the benefit from the information in the principal’s decision to intervene.
Figure 3 illustrates that when $\tilde{\Delta} = \tilde{\theta} \sim U[-1, 1]$ and $\omega = 1$, condition (13) becomes $\frac{v}{c} < \frac{1}{2}$. Importantly, intervention prompts disobedience only because intervention is an informed decision. Hypothetically, if the principal could commit to intervening whenever the agent ignores her instructions, then intervention would necessarily reinforce compliance. Intuitively, since the principal’s decision to intervene does not depend on $\tilde{\Delta}$, ignoring the instructions of the principal imposes a direct cost on the agent without providing the informational benefit of correction and confirmation.

**Remark on biased self-perception** The analysis does not depend on the cost of intervention itself, but rather on the belief of the agent about the principal’s self-perception of this cost. For example, if it is a common knowledge that the principal underestimates (overestimates) the difficulty of intervening in the agent’s decision, for all purposes of the analysis, the relevant cost of intervention is lower (higher). Therefore, an overconfident principal, who behaves as if the cost of intervention $c$ is smaller than it really is, will be able to exert more influence on the agent through communication if and only if $c < c_{\text{min}}$. In those cases, overconfidence can benefit the principal.\(^{16}\)

### 2.2 The value of intervention

**The principal’s perspective** If intervention prompts disobedience then the principal can benefit from a commitment not to intervene in the agent’s decision. Building on Proposition 2, the principal’s expected payoff in any influential equilibrium is

$$U_P(\kappa, c) = \mathbb{E}[v(\tilde{\theta}, L)] + \Pr[\tilde{\Delta} \geq 0] \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] + \Pr[\tilde{\beta} > b^*(\kappa, c)] \Pr[-c \leq \tilde{\Delta} < 0] \mathbb{E}[\tilde{\Delta} | -c \leq \tilde{\Delta} < 0] - \eta(\kappa, c) c,$$

where $\eta(\kappa, c)$ is given by (10). The first line of (14) is the principal’s expected utility if her first best is implemented. The second line is the principal’s expected disutility when the agent disobeys her. The first term in that line is the disutility when principal does not intervene and the second term is the disutility when she does.

\(^{16}\)In a different context, Gervais and Goldstein (2007) show that overconfidence can be desired in firms that face effort coordination problems.
Several implications follow. First, since \( b^* (\kappa, c) \) increases with \( \kappa \) and \( \omega \), so does \( U_P (\kappa, c) \). Intuitively, with higher \( \kappa \) or \( \omega \) the agent has stronger incentives to follow the principal’s instructions either because he tries to avoid the costs of intervention or because he puts a smaller weight on his private benefits. This benefits the principals since she can exert influence on the agent without incurring the cost of intervention. Second, the principal obtains the highest payoff when \( c = 0 \). Interestingly,

\[
\lim_{c \to 0} b^* (\kappa, c) = \begin{cases} 
\infty & \text{if } \kappa > 0 \\
0 & \text{if } \kappa = 0.
\end{cases}
\]  

That is, if \( \kappa > 0 \) the principal obtains her first best without ever intervening in equilibrium; the threat is sufficient. However, if \( \kappa = 0 \) then the principal intervenes with probability one to obtain her first best. Third, in most applications intervention is costly. The next result shows that although intervention is optional, if \( c \) is large then a commitment not to intervene in the agent’s decision can benefit the principal.

**Proposition 4** \( U_P (\kappa, c) \) increases in \( \kappa \) and \( \omega \). Moreover,

(i) If \( \kappa/\omega \geq \mathbb{E}[\Delta|\tilde{\Delta} < 0] + |\Delta| \) then \( U_P (\kappa, c) \) decreases in \( c \).

(ii) If \( \kappa/\omega < \mathbb{E}[\Delta|\tilde{\Delta} < 0] + |\Delta| \) then there is \( \overline{c} \in (c^*, |\Delta|) \) such that \( U_P (\kappa, |\Delta|) > U_P (\kappa, c) \) for all \( c \in (\overline{c}, |\Delta|) \).

How can the principal be better off without the option to intervene? This is possible only if intervention prompts disobedience. Based on Proposition 3, it is necessary that \( c > c^* \), where \( c^* \) is the value of \( c \) that satisfies condition (13) with equality. If \( c \in (c^*, \overline{c}] \) then intervention can still partly substitute for communication, and it is therefore preferred by the principal even though it prompts disobedience. In those cases, intervention is probable but still desired by the principal. However, as \( c \) further increases, intervention becomes more expensive and less desirable as a substitute for communication. If \( c > \overline{c} \) then the principal is better off without the option to intervene. In this region, the principal prefers effective communication over ineffective intervention. In this respect, *words speak louder without actions*. In fact, since every influential equilibrium Pareto dominates every non-influential equilibrium (part (ii) of Proposition 2), having only the option to communicate is also superior to having only the
option to intervene. Put differently, in this region, words also speak louder than actions. These observations are illustrated by the left panel of Figure 4, which plots the principal’s expected payoff as a function of $c$ when $\Delta = \bar{\theta} \sim U[-1,1]$, $\omega = 1$, and $\bar{\beta} \sim U[0,1]$. The right panel of Figure 4 shows that a commitment not to intervene in the agent’s decision is optimal only if $\kappa$ is small relative to $c$.

Figure 4 - The value of intervention from the principal’s perspective

Notice that the condition in part (ii) of Proposition 4 is more likely to hold when $\omega$ is large. Indeed, recall that communication is more effective without intervention when $\omega$ is large. For this reason, as the conflict of interests between the principal and the agent is mitigated, the principal prefers committing not to intervene in the agent’s decision. In the Online Appendix, I show that if $\bar{\beta}$ is exponentially distributed then $\lim_{\omega \to \infty} [U_P (\kappa, |\Delta|) - U_P (\kappa, c)] > 0$ for all $c \in (0, |\Delta|)$.

The agent’s perspective  The agent’s expected payoff in any influential equilibrium is

$$U_A (\kappa, c) = \omega \mathbb{E}[v(\bar{\theta}, L)] + \Pr[\Delta \geq 0] (\omega \mathbb{E}[\Delta | \Delta \geq 0] + \mathbb{E}[\bar{\beta}]) + \Pr[-c \leq \Delta < 0] \Pr[\bar{\beta} > b^* (\kappa, c)] \mathbb{E}[\bar{\beta} - b^* (\kappa, c)]$$

The first line of (16) is similar to the first line of (14), with the adjustment of $\omega$ and the addition of the agent’s private benefits. The second line of (16) is the agent’s expected net benefit from disobeying the principal, which is given by $\bar{\beta} - b^* (\kappa, c)$. By revealed preferences, this term is always positive.
The value of the agent’s option to disobey the principal decreases with $\kappa$, and therefore, $U_A(\kappa, c)$ decreases with $\kappa$ as well. Also, since $v(\tilde{\theta}, x) \geq 0$, higher $\omega$ increases the payoff of the agent without harming his option to disobey the principal. As the next result shows, the effect of $c$ is more subtle.

**Proposition 5** $U_A(\kappa, c)$ decreases in $\kappa$ and increases in $\omega$. Moreover,

1. If $\kappa/\omega \geq \mathbb{E}[\hat{\Delta}\hat{\Delta} < 0] + |\hat{\Delta}|$ then $U_A(\kappa, c)$ increases in $c$.

2. If $\kappa/\omega < -\mathbb{E}[\hat{\beta}/\omega|\hat{\beta}/\omega > -\mathbb{E}[\hat{\Delta}\hat{\Delta} < 0]] + |\hat{\Delta}|$ then there is $\bar{\nu} \in (\nu^*, |\Delta|)$ such that $U_A(\kappa, c) > U_A(\kappa, |\Delta|)$ for all $c \in (\bar{\nu}, |\Delta|)$.

Part (i) of Proposition 5 is intuitive: to avoid the punishment effect of intervention, the agent prefers a principal who is unlikely to intervene (high $c$). By contrast, according to part (ii), the agent can be better off with a principal that has the option to intervene. Intuitively, intervention benefits the agent since it forces the principal to use information that she would not have used otherwise. This informational benefit denominates the punishment effect when $\kappa$ is low and $\omega$ is high. For this reason, and perhaps ironically, a commitment not to intervene in the agent decision can be desired by the principal but not by the agent.

**Remark** Parameter $\omega$ can be interpreted as the division of cash-flows between the agent and the principal. Under this interpretation, $\omega \in (0, 1)$ and the principal’s utility is rewritten as $(1 - \omega)u_P(\tilde{\theta}, x_A, x_P; \frac{c}{1-\omega})$. The analysis of the model under this interpretation is the same as in Section 2, with the following two exceptions. First, higher $\omega$ reduces the principal’s share of $v(\tilde{\theta}, x)$, and therefore, could harm her even if it increases her influence on the agent. Second, higher $\omega$ decreases the incentives of the principal to intervene. Effectively, the principal behaves as if her cost of intervention is $\frac{c}{1-\omega}$ instead of $c$. This force is another reason why intervention is more likely to prompt disobedience when $\omega$ is high.

### 3 Extensions

In this section I consider several extensions to the baseline model.
3.1 Multiple principals

Suppose there are $N \geq 2$ principals and one agent (e.g., a board of directors, consortium of investors). The utility function of each principal is given by (3) and each principal observes $\Delta$. The key difference from the baseline model is that if $T \leq N$ principals intervene then the agent’s decision is reversed with probability $T/N$, and with probability $T/N$ his decision does not change. Each principal incurs the cost $c$ if and only if she decides to intervene, and the agent incurs the cost $\kappa$ if and only if intervention succeeds. The decisions to intervene are made simultaneously. These assumptions emphasize the free-rider problem among principals. Since there is no other conflict of interests between the principals, they will always agree on the instructions that should be sent to the agent and on the action that should be implemented upon intervention (e.g., a majority is obtained if a formal vote is required). The baseline model is a special case where $N = 1$.

Since all principals would like to avoid intervention, they collectively instruct the agent to choose action $R$ if and only if $\Delta \geq 0$, and they never intervene if the agent follows their instructions. Similar to the baseline model, the agent always follows the instructions to choose action $R$. Suppose the agent disobeys the instructions to choose action $L$. If $\Delta > -c$ then no principal intervenes. If $\Delta < -c$ then a symmetric equilibrium requires that each principal intervenes with probability $e^* \in [0, 1]$. The benefit of each principal from intervention conditional on $\Delta$ and other $N - 1$ principals follow strategy $e^*$ is $-\Delta \left( \frac{N-1}{N} e^* + \frac{1}{N} \right) - c$, where $\frac{N-1}{N} e^*$ is the expected probability of successful intervention employed by the other $N - 1$ principals.\footnote{The probability of success has a binomial distribution with parameters $e^*$ and $N - 1$.} Similarly, the expected benefit from nonintervention is $-\Delta \frac{N-1}{N} e^*$. Therefore, in equilibrium, each principal intervenes if and only if $\Delta < -Nc$, and the probability of intervention is one if $\Delta < -Nc$ and zero otherwise. Essentially, the equilibrium is the same as the one described by Proposition 2, with the exception that the cost of intervention is $Nc$ instead of $c$. Intuitively, because of the free-rider problem, each principal internalizes only a fraction $1/N$ of the total benefit from intervention, and therefore, is less likely to intervene. Therefore, the comparative statics of $c$ can be interpreted as a comparative statics of $N$. In particular, there is an inverted U-shape relationship between $N$ and the frequency of intervention, and a U-shape relationship between $N$ and the collective ability of principals to exert influence through communication.
3.2 Unobservable actions

Suppose the principal does not observe the agent’s decision before she intervenes. This corresponds to situations in which the organization is opaque or complex. The principal can still intervene as in the baseline model and dictate the final decision, however, she incurs the cost $c$ regardless of the agent’s actual decision (otherwise, we are back to the baseline model). I also assume that if the principal intervenes but eventually did not change the agent’s action, the agent’s does not incur any additional cost.

In this extension, the principal still has incentives to instruct the agent to choose action $R$ if and only if $\bar{\Delta} \geq 0$. Similar to the baseline model, the agent always follows the instructions to choose action $R$. Suppose the principal instructs the agent choose action $L$, and let $G^*$ be the probability that the agent follows this instruction in equilibrium. Then, the principal intervenes if and only if $\bar{\Delta} < -\frac{c}{1-G^*}$. In the Online Appendix, I show that Proposition 2 continues to hold with the exception that the threshold $b^*(\kappa, c)$ is given by the solution of

$$b^{**} = b^*(\kappa, \frac{c}{1 - G(b^{**})}). \quad (17)$$

While the solution is not necessarily unique, it always exists. According to Corollary 1, if $c > c^\text{min}$ then $b^*(\kappa, c)$ increases with $c$. Therefore, if $c > c^\text{min}$ then $b^{**} > b^*(\kappa, c)$, which means that the principal has more influence on the agent when she does not observe his action. Intuitively, when the principal cannot observe the agent’s decision before she decides whether to intervene, the benefit from intervention is smaller. This situation is equivalent to having a higher cost of intervention. The only complication is that the benefit from intervention is endogenous, as it depends on the incentives of the agent to follow the principal’s instructions, which in turn depends on the incentives of the principal to intervene. This result shows that intervention is more likely to prompt disobedience in organizations that lack transparency.

3.3 Partially informed principal

Suppose the principal is partially informed about $\tilde{\theta}$ (e.g., a generalist manager). For example, the principal observes signal
\[ \tilde{s} = \begin{cases} \tilde{\theta} & \text{with probability } \gamma \in [0, 1] \\ \tilde{\varepsilon} & \text{with probability } 1 - \gamma, \end{cases} \] (18)

where \( \tilde{\varepsilon} \) and \( \tilde{\theta} \) are identically and independently distributed. The principal does not know whether \( \tilde{s} = \tilde{\theta} \) or \( \tilde{s} = \tilde{\varepsilon} \). Parameter \( \gamma \) is the quality of the principal’s private information. The baseline model is a special case where \( \gamma = 1 \). For simplicity, I also assume \( \mathbb{E}[\tilde{\Delta}] = 0 \).

In the Online Appendix, I show that similar to Proposition 2 the agent follows the principal’s instructions if and only if \( \tilde{\beta} \leq \gamma b^* (\kappa/\gamma, c/\gamma) \), and similar to Proposition 3 intervention prompts disobedience if and only if

\[ \kappa/(\gamma \omega) < \mathbb{E}[\tilde{\Delta}|\tilde{\Delta} < 0] - \mathbb{E}[\tilde{\Delta}|\tilde{\Delta} \leq -c/\gamma]. \] (19)

As \( \gamma \) decreases, the instructions of the principal become a weaker signal of \( \tilde{\Delta} \) and the agent’s informational benefits from intervention decrease. Therefore, the punishment from intervention has a larger impact on the agent’s incentives. This effect, which is reflected by the scaling of \( \kappa \) by \( \gamma \) in (19), extends the region in which intervention reinforces compliance. On the other hand, the principal has a larger cost of intervention per unit of information, and therefore, she is less likely to intervene. This effect, which is reflected by the scaling of \( c \) by \( \gamma \) in (19), extends the region in which intervention prompts disobedience. When the distribution of \( \tilde{\Delta} \) is uniform, these affects are cancelled out, and condition (19) is equivalent to (13) for any \( \gamma \in (0, 1) \).

Interestingly, without intervention, the agent’s compliance increases with \( \gamma \): the agent has more reasons to follow the principal’s instructions if the latter has more information. However, with intervention, the agent’s compliance can decrease with \( \gamma \).\footnote{In the Online Appendix, I provide sufficient conditions under which \( \frac{\partial}{\partial \gamma} [\gamma b^* (\kappa/\gamma, c/\gamma)] < 0. \)} Intuitively, the informational benefits from disobedience increase with \( \gamma \). Therefore, the agent has fewer incentives to challenge a relatively uninformed principal. As a result, better informed principals benefit relatively more from a commitment not to intervene in the agent’s decisions.

### 3.4 Continuum of actions

In this section, I consider an extension of the model in which the agent chooses from a continuum of actions. For this purpose, consider the leading example of Crawford and Sobel (1982),
which has been used extensively in the literature on communication and delegation. In particular, suppose \( x \in [\bar{\theta}, \tilde{\theta}] \), \( v(\tilde{\theta}, x) = -(\tilde{\theta} - x)^2 \), and the agent’s payoff is \( v(\tilde{\theta} + \beta, x) \) where \( \beta > 0 \) is a scalar. In addition, suppose that if the agent chooses \( x_A \) and the principal intervenes by choosing \( x_P \), the principal incurs an additional cost of \( c(x_P - x_A)^2 \) and the agent incurs an additional cost of \( \kappa(x_P - x_A)^2 \), where \( c > 0 \) and \( \kappa \geq 0 \). Intuitively, intervention has more consequences as the distance between \( x_P \) and \( x_A \) grows. Crawford and Sobel (1982) is a special case of this model where \( c = 1 \) and \( \kappa = 0 \).

**Proposition 6** Suppose the principal sends message \( m \) in equilibrium. Then, the agent chooses action

\[
x_A^*(m) = \mathbb{E}[\tilde{\theta}|m] + \beta \frac{1 + c}{\kappa/c + c},
\]

and the principal’s intervention strategy is

\[
x_P^*(x_A, \tilde{\theta}) = x_A + \frac{\tilde{\theta} - x_A}{1 + c}.
\]

Moreover, the set of communication strategies \((\rho^*)\) that arises in equilibrium under parameter values \((\beta, c, \kappa)\) is identical to the set of communication strategies that arises in equilibrium under parameter values \((\beta \frac{1+c}{\kappa/c+c}, \infty, 0)\).

According to Proposition 6, the decision of the agent in equilibrium reflects a bias of \( \beta \frac{1+c}{\kappa/c+c} \). Intuitively, the agent anticipates the intervention of the principal and adjusts his decision accordingly. If \( \frac{1+c}{\kappa/c+c} > 1 \), which holds if and only if \( c > \kappa \), then the decision of the agent conditional on message \( m \) is more extreme than it would have been without intervention. The agent expects the principal to intervene by adjusting his decision \( x_A \) by \( \frac{\tilde{\theta} - x_A}{1+c} \). As one might expect, the intensity of intervention is decreasing in \( c \) and increasing in the distance of \( x_A \) from \( \tilde{\theta} \), the principal’s ideal point. By “over-shooting” and choosing an extreme action, the agent ensures that the action that is eventually implemented by the principal is closer to his own ideal point, \( \tilde{\theta} + \beta \). This element is missing from the baseline model. Since the principal corrects the decision of the agent only if it is sufficiently distant from \( \tilde{\theta} \), similar to the intuition in the baseline model, “over-shooting” is not as costly from the agent’s perspective. By contrast if \( \frac{1+c}{\kappa/c+c} < 1 \) then the agent moderates his decision in order to avoid the punishment from intervention, as reflected by the cost \( \kappa \).
Proposition 6 also implies that the nature of communication in equilibrium of the game with intervention is identical to the nature of communication in equilibrium of the game without intervention, where the bias of the agent is adjusted from $\beta$ to $\beta \frac{1+c}{\kappa/c+c}$. Importantly, according to Crawford and Sobel (1982), under the most informative equilibrium the quality of communication improves when the principal and the agent have closer preferences, that is, when $\beta$ is smaller. Moreover, in the Crawford and Sobel’s setup the agent’s compliance decreases with $\beta$ in the sense that the actions of the agent in equilibrium are further away from the principal’s ideal points as inferred from her messages. Therefore, Proposition 6 implies that intervention prompts disobedience if and only if

$$\beta \frac{1+c}{\kappa/c+c} > \beta \iff c > \kappa,$$

an observation which is consistent with Proposition 3. However, different from the baseline model, here the quality of communication and the precision of the principal’s message (i.e., the number of intervals in the cheap-talk equilibrium partition) also change with the possibility of intervention. In particular, when intervention reinforces compliance ($c < \kappa$), more information is revealed by the principal in equilibrium (the partition is finer), and when intervention is counterproductive, the principal’s messages become nosier (the partition is coarser).

### 3.5 Informed agent

In this section I consider the setup of Section 3.4 with two-sided information asymmetry. Specifically, suppose $\tilde{\theta} = \tilde{\theta}_P + \tilde{\theta}_A$, the principal is privately informed about $\tilde{\theta}_P$, the agent is privately informed about $\tilde{\theta}_A$, and $\tilde{\theta}_P$ and $\tilde{\theta}_A$ are independent.

**Proposition 7** Suppose the principal sends message $m$ in equilibrium. Then, conditional on $\tilde{\theta}_A$, the agent chooses action

$$x_A(\tilde{\theta}_A, m) = \tilde{\theta}_A + \mathbb{E}[\tilde{\theta}_P|m] + \frac{1+c}{c} \beta,$$

and the principal’s intervention strategy is

$$x_P(x_A, \tilde{\theta}_P, m) = x_A + \frac{\tilde{\theta}_P - \mathbb{E}[\tilde{\theta}_P|m] - \frac{1+c}{c} \beta}{1+c}.$$
Moreover, the set of communication strategies (ρ*) that arises in linear equilibrium under parameter values (β, c, κ) is identical to the set of communication strategies that arises in equilibrium under parameter values (β \frac{1+c}{c}, \infty, 0).^{19}

Proposition 7 shows that the decision of the agent in equilibrium depends on his private information about \( \tilde{\theta}_A \) and reflects a bias \( \beta \frac{1+c}{c} \). Similar to Proposition 6, the set of communication strategies is identical to the one in a game without intervention and a bias \( \beta \frac{1+c}{c} \). However, notice that here \( \beta \frac{1+c}{c} > \beta \) for all \( c < \infty \). That is, intervention always prompts disobedience and reduces the quality of communication, even if \( \kappa \) is arbitrarily large. In this respect, the main result is getting even stronger when the agent is privately informed.

To understand the intuition behind Proposition 7, notice that in a sharp contrast to the analysis in Section 3.4, \( \kappa \) has no effect on the equilibrium (the informed agent behaves as if \( \kappa = 0 \)). If the agent is uninformed, larger \( \kappa \) weakens his incentives to choose actions that are distant from the principal’s ideal point. However, when the agent is privately informed about \( \tilde{\theta}_A \), choosing a distant action does not increase the intensity of intervention by the principal. In equilibrium, the principal infers \( \tilde{\theta}_A \) from the agent’s decision and updates her ideal point accordingly. In particular, the principal rationally interprets distant actions as strong signals about \( \tilde{\theta}_A \). For this reason, taking an action that is closer to the principal’s ideal point fails to reduce the intensity of intervention since the principal attributes it to changes in \( \tilde{\theta}_A \). In equilibrium, the principal learn from \( x_A \) about \( \tilde{\theta}_A \) and intervenes to undo the bias in the agent’s initial decision, taking into account the cost of intervention. The intensity of intervention, which is measured by \( \frac{1}{1+c}(\tilde{\theta}_P - \mathbb{E}[\tilde{\theta}_P|m] - \frac{1+c}{c}\beta) \), is independent of \( x_A \), and therefore, it is beyond the agent’s control. For this reason, \( \kappa \) does not factor into the agent’s consideration when choosing \( x_A \). More generally, this observation implies that when the agent is privately informed, the punishment that intervention imposes on the agent has a weaker disciplinary effect. The agent takes more extreme actions in anticipation of the principal’s intervention, knowing that the principal will intervene more aggressively only if \( \tilde{\theta}_P \) justifies doing so.

Finally, notice that if \( \kappa > 0 \) then \( \frac{1+c}{c} > \frac{1+c}{\kappa/c+c} \). That is, with private information, the agent is less likely to comply with the principal’s instructions, and consequently, communication becomes nosier. This result does not hold when the principal does not have the option to

---

19 A linear equilibrium means that the agent’s decision is linear in \( \tilde{\theta}_A \). Notice that without intervention (i.e., \( c = \infty \)) all equilibria are linear.
intervene. In those cases, the amount of information that is communicated by the principal is invariant to the agent’s private information (Harris and Raviv (2005)).

4 Applications

In this section I discuss four main applications of the model.

4.1 Managerial leadership

Leadership is often defined as the ability to influence and motivate others to achieve a certain goal successfully (e.g., Hermelin (1998)). It involves articulating a strategy that is appropriate given the organization’s strategic position and the environment it faces. Without the ability to persuade others to follow their vision, leaders have to choose between a compromise with an undesired outcome and exercising their authority to bring about a change. The extent to which leaders can use their power depends on various characteristics of the organization and its leadership. As a general message, the model suggests that the ease at which corporate leaders can exercise their power can diminish their ability to influence others to voluntarily follow their vision. In this regard, the model can be applied to study interactions between managers and their subordinates, owners of small businesses and their employees, firms and labor unions, or CEOs\headquarters and division managers.

As an example, consider the interaction between the CEO of a company (principal) and a representative division manager (agent). The firm has to decide whether to stick with the status quo ($x = R$) or reorganize the operations of the division ($x = L$), for example, by divesting some of its assets, standardizing its products, introducing new IT systems, focusing on new geographical areas or products, etc. These decisions are not contractible since their attractiveness depend on a variety of macro, industry, and firm-specific factors which cannot be perfectly anticipated. The CEO has superior knowledge on the benefit from changing the status quo, $\bar{\theta}$. For example, if the proposal is to divest assets, the CEO has a better understanding of the market conditions, demand for corporate assets by investors, and the external cost of financing. If the proposal is to enter new markets, the CEO has a better knowledge of the complementarities with other products of the company, unwanted cannibalization, and alternative investment opportunities. While the CEO is interested in maximizing the value of
the whole firm, the division manager is biased toward maximizing the profits of his division. In particular, the division manager could be biased toward maintaining the status quo ($\beta > 0$). Generally, the conflict of interests arises because the division manager is being compensated based on the profitability of his division or because of his career concerns (his skills are better reflected in the performances of his division). The bias can also stem from private benefits (e.g., the prestige of controlling larger assets) or costs (the effort that the implementation of a new strategy requires).

The CEO will lay out her vision and try to persuade the division manager to follow her strategy. If she is unsuccessful, the ability of the CEO to intervene and implement the strategy in spite of the division manager’s resistance (parameter $c$) depends on factors such as the CEO’s managerial style (e.g., hands-off approach), the CEO’s characteristics (e.g., aversion to confrontation), the autonomy that was granted to the division over its operations, the complexity of the implementation of the proposed strategy, and the busyness of the CEO (e.g., the alternative cost of intervention is higher when the CEO oversees larger firms). In turn, intervention is likely to harm the division manager’s reputation, ego, or compensation ($\kappa > 0$).

Applied to this context, the model suggests that CEOs can increase their influence as leaders by adopting a hands-off managerial style and delegating authority to their division managers, especially when they oversee large, complex, and opaque organizations (Section 3.2), whose employees are compensated for performances (large $\omega$) and have high outside options (low $\kappa$). The analysis in Section 3.3 also suggests that generalist CEOs (who have relatively imprecise information about $\tilde{\theta}$) can be more effective than specialist CEOs, and that specialist CEOs would particularly benefit from adopting a hands-off managerial style.

### 4.2 Corporate boards

In a typical public corporation, the CEO runs the company on a daily basis, but the board of directors sets the strategy, approves major decisions, and has the right to replace the CEO. In many cases, board members are executives in related industries, lawyers, bankers, accountants, academics, and in some cases, savvy investors such as activist hedge fund managers (Gow, Shin, and Srinivasan (2014)) and venture capitalists (even long after the IPO, see Celikyurt, Sevilir and Shivdasani (2014)). These individuals often use their business, legal, and finance expertise, to advise and direct the CEO on a variety of issues such as strategy, public relations, crisis
management, and M&A. In many cases, however, the CEO has a different agenda. CEOs may try to build and empire, maintain their reputation, or seek the “quite life”. Therefore, monitoring the CEO and intervening as needed is an integral part of directors’ duties.

Intervention, however, requires coordination among directors (e.g., to avoid free-riding). Therefore, the effective cost of intervention is higher in larger boards with more diverse and busy directors. Since the ability of the principal (the board) to influence the agent (the CEO) is non-monotonic in $c$, the analysis suggests that the effectiveness of the board’s advisory role is also non-monotonic (U-shape) in the number of directors, their diversity, busyness, and independence. In particular, based on Section 3.1, a large board is a commitment device not to intervene in the CEO’s decision, and therefore, can be optimal. Importantly, when large boards are optimal, they are also advising the CEO more effectively, which can explain why we observe many large boards (e.g., Hermalin and Weisbach (2003)).

The analysis also sheds light on the optimal composition of the board, suggesting that boards with a powerful CEO and a limited capacity of intervention can be optimal. This result is consistent with Adams, Hermalin, and Weisbach (2010), who observe that corporate boards are often “too friendly” to their CEOs. Moreover, the analysis suggests that a friendly board is more likely to be optimal when the CEO’s pay is highly sensitive to firm performances (high $\omega$) or when the CEO does not fear intervention as much (low $\kappa$). CEOs will not suffer the consequences of intervention if their reputation in the labor market is already established (e.g., long tenure, proximity to retirement) or if they are entitled to a generous severance package which protects their compensation if they are fired. This prediction differs from Adams and Ferreira (2007) who argue that friendly boards are particularly desired when the CEO dislikes board monitoring the most. Indeed, in their model there is a hold-up problem: the board monitors the CEO more intensively when the latter cooperates. A friendly board is a mean by which the board commits not to monitor the CEO, and more commitment is needed when monitoring inflicts larger costs on the CEO (high value of parameter $b$ in their model). In addition, Adams and Ferreira (2007) argue that friendly board are less likely to be optimal when the independent directors are better informed. My model offers a different prediction:

\[\text{For related studies on optimal board size see also Hermalin and Weisbach (1998), Harris and Raviv (2008), and Raheja (2005).}\]

\[\text{Adams and Ferreira (2007) also show that when board is highly informed, the opposite can hold since it becomes too costly to incentivize the CEO to cooperate by setting a friendly board.}\]
better informed directors (information about actions or fundamentals) can have more influence on the CEO without intervention, i.e., when the board is friendly.

### 4.3 Private equity

Private equity investors (venture capital and leveraged buyout funds) typically hold board seats and other control rights in their portfolio companies, which give them the power to make strategic decisions, replace management, and even liquidate the firm (Kaplan and Stromberg (2003, 2004), Cornelli and Karakas (2015)). At the same time, these investors also provide expertise and post-investment added value to their portfolio companies. Consistent with this view, the empirical evidence suggests that VCs provide advice and support to small entrepreneurial start-ups, help with the professionalization of the management team and the commercialization of the product, foster innovation, and improve productivity.\(^{22}\) Similarly, in a typical leveraged buyout, the private equity fund appoints experts from the industry (e.g., Ex-CEOs), consultants, and its own general partners, as board members of the acquired company. Moreover, many of the large PE shops have an in-house operational research team whose purpose is to identify attractive investment opportunities, develop value creation plans for those investments, and help the fund to turnaround the operations of the target firm after the investment is made (e.g., cost-cutting, productivity improvements, repositioning, or acquisition opportunities).\(^{23}\)

The implications of the model for corporate boards can also be applied to private equity, as in most cases the private equity investors use the board of directors to control the company. However, relative to boards of public companies, boards of private equity controlled firms are likely to be better informed (see Section 3.3 for comparative statics with respect to the quality of the principal’s private information) and suffer from fewer coordination problems among directors (see Section 3.1). Nevertheless, private equity firms tend to co-invest (often referred to as club investment in leveraged buyouts and syndication in venture capital). When the deal has more than one sponsor, the investors share the cash-flows and control rights in the company, which can result in coordination problems between investors. Moreover, private equity firms make multiple investments. A large number of portfolio companies increases the alternative cost of intervention and the cost of becoming informed about each specific portfolio company.

\(^{22}\)See Hellmann and Puri (2000, 2002); Kortum and Lerner (2000); Bottazzi, Rin, and Hellmann (2008); Chemmanur, Krishnan, and Nandy (2011); Gompers et al. (2016).

\(^{23}\)See Kaplan, Strömberg (2009); Acharya et al. (2013); Gompers, Kaplan, Mukharlyamov (2016).
While the motives behind co-investment and diversification are likely to be related to capital constraints and risk-sharing, the analysis suggests that they may have additional real benefits by committing the private equity investors not to intervene in their portfolio companies.

4.4 Shareholder activism

Activist hedge funds have a market-wide perspective on asset valuation and performances of peer companies that corporate boards of public companies often lack. In a typical campaign, the activist buys a sizeable stake in a public company and then engages with the management or the board of directors of the target firm, expressing her dissatisfaction or view of how the company should be managed. Occasionally, if the company refuses to comply with the activist’s demand, the activist ends up litigating or launching a proxy fight in order to oust the incumbent directors, gain board seats, and force her ideas on the company. Running a successful proxy fight, however, is costly since it requires the activist to reach out to other shareholders of the firm in order to win their vote.

Applied to this context, the analysis highlights that activist intervention can be counter-productive. Therefore, policies that reduce the cost of intervention for activists (e.g., the adoption of an easier proxy access) and forces that ease the coordination among shareholders (e.g., the rise of institutional/index investment or the increased influence of proxy advisory firms) can have unintended adverse consequences. Moreover, the analysis can explain why some activist hedge funds choose to file schedule 13-G instead of schedule 13-D, build reputation for working constructively with management (e.g., ValueAct) as opposed to being adversarial (e.g., Pershing Square), target companies with dispersed ownership or companies in which obtaining significant voting rights is too costly (large cap or dual class firms). In all of these instances the activist at least partially commits not to force her ideas on the firm.

Related, activists investors can always exit their position by selling their stake in the company. If it is easier to exit (e.g., the stock is liquid and the negative price impact upon selling is small) then a displeased activist might be tempted to sell her shares instead of intervening

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24 The idea that outsiders have information that insiders can learn from is central to a new literature that studies how firms use information in stock prices to make investment decisions (e.g., see Bond, Edmans, and Goldstein (2012) for a survey on real effects of financial markets).

25 Baker, Gibbons, and Murphy (1999) assume that authority is non-contractible, but can be informally given through commitments enforced by reputation.
when she fails to influence the board. In other words, the ease at which the activist can exit is a commitment not to intervene by running a proxy fight. The analysis therefore suggests that when the cost of intervention is high \( (c > c_{\text{min}}) \), exit complements the ability of the activist to voice herself and affect the board through communications. However, when the cost of intervention is small \( (c < c_{\text{min}}) \), exit harms the ability of the activist to influence the board using her voice, and in this respect, exit substitutes voice.

5 Concluding remarks

Interactions between managers, directors, and investors are crucial to our understanding of how corporations are managed and governed. In many of these interactions, contracts only partially resolve the conflicts of interests, and as a result, communication and intervention become the primary mechanisms of governance. This paper sheds new light on corporate governance by analyzing a principal-agent model with incomplete contracts and a top-down information structure. Surprisingly, the main result of the paper demonstrates that a credible threat of intervention can decrease the incentives of the agent to follow the principal’s instructions. In those cases, intervention prompts disobedience, communication is less effective with intervention than without it, and the two mechanisms substitute one another. The key insight is that the possibility of intervention creates additional tension by providing the agent with opportunity to challenge the principal to back her words with actions. Through this novel channel intervention prompts disobedience. This result provides a novel argument as to why a commitment not to intervene (and therefore, relying solely on communication) can be optimal. In this respect, words do speak louder without actions. Building on this core insight, the analysis considers several variants of the baseline model and provides novel predictions related to managerial leadership, corporate boards, private equity, and shareholder activism.
References


Appendix

Proof of Lemma 2. Suppose \( m \in M \). Based on Lemma 1, the agent’s expected utility is

\[
\begin{align*}
\text{Pr}[\bar{\Delta} \geq -c|m] \mathbb{E}[\omega v(\bar{\theta}, R) + \bar{\beta}|\bar{\Delta} \geq -c, m] \\
+ \text{Pr}[\bar{\Delta} < -c|m](\mathbb{E}[\omega v(\bar{\theta}, L)|\bar{\Delta} < -c, m] - \kappa) \\
+ \text{Pr}[\bar{\Delta} < c|m]\mathbb{E}[\omega v(\bar{\theta}, L)|\bar{\Delta} < c, m]
\end{align*}
\]

if \( x_A = R \)

\[
\begin{align*}
\text{Pr}[\bar{\Delta} \geq c|m] \mathbb{E}[\omega v(\bar{\theta}, L)|\bar{\Delta} < c, m] \\
+ \text{Pr}[\bar{\Delta} \geq c|m](\mathbb{E}[\omega v(\bar{\theta}, R) + \bar{\beta}|\bar{\Delta} \geq c, m] - \kappa)
\end{align*}
\]

if \( x_A = L \).

(25)

Comparing the two terms, the agent chooses \( x_A = L \) if and only if \( \bar{\beta} \leq b(m) \), where

\[
b(m) \equiv \kappa \frac{\text{Pr}[\bar{\Delta} < -c|m] - \text{Pr}[\bar{\Delta} \geq c|m]}{\text{Pr}[-c \leq \bar{\Delta} < c|m]} - \omega \mathbb{E}[\bar{\Delta} | 0 \leq \bar{\Delta} < c, m]
\]

as required. ■

Proof of Proposition 1. Based on Lemma 2, conditional on message \( m \), \( x_A = L \Leftrightarrow \bar{\beta} \leq b(m) \), where \( b(m) \) is given by (26). When the equilibrium is non-influential, no message is informative about \( \bar{\Delta} \). Therefore, \( b(m) = b_N \) for any \( m \), where \( b_N \) is given by (5). ■

Proof of Proposition 2. First, suppose an influential equilibrium exists. According to Lemma 2, for any \( m \in M \) the agent chooses action \( L \) if and only if \( \bar{\beta} \leq b(m) \), where \( b(m) \) is given by (26). Therefore, \( \text{Pr}[x_A(m, \bar{\beta}) = R] = 1 - G(b(m)) \). Using Lemma 1, if the principal sends message \( m \) then her expected utility conditional on \( \bar{\theta} \) is

\[
\mathbb{E}[u_p|\bar{\theta}, m] = v(\bar{\theta}, L) + \begin{cases}
(1 - G(b(m))) (-c) & \text{if } \bar{\Delta} < -c \\
(1 - G(b(m))) \bar{\Delta} & \text{if } \bar{\Delta} \in [-c, c) \\
(1 - G(b(m))) \bar{\Delta} + G(b(m)) (\bar{\Delta} - c) & \text{if } \bar{\Delta} \geq c.
\end{cases}
\]

(27)

Therefore, if \( \bar{\Delta} > 0 \), the principal chooses \( m \in \arg\min_{m \in M} b(m) \) and if \( \bar{\Delta} < 0 \), the principal chooses \( m \in \arg\max_{m \in M} b(m) \). According to Definition 1, it must be \( \min_{m \in M} b(m) < \max_{m \in M} b(m) \) and both \( M_R \) and \( M_L \) are not empty.

Suppose \( m \in M_R \). Since \( m \in M_R \Rightarrow \bar{\Delta} \geq 0 \), (26) can be rewritten as

\[
b(m) = -\kappa \frac{\text{Pr}[\bar{\Delta} \geq c|m]}{\text{Pr}[0 \leq \bar{\Delta} < c|m]} - \omega \mathbb{E}[\bar{\Delta}|0 \leq \bar{\Delta} < c, m]
\]

(28)

which is always negative. Since \( \bar{\beta} > 0 \) with probability one, the agent follows the principal’s instructions and chooses action \( R \) with probability one.

Suppose \( m \in M_L \). Since \( m \in M_L \Rightarrow \bar{\Delta} < 0 \), (26) can be rewritten as

\[
b(m) = \kappa \frac{\text{Pr}[\bar{\Delta} < -c|m]}{\text{Pr}[-c \leq \bar{\Delta} < 0|m]} - \omega \mathbb{E}[\bar{\Delta}|c \leq \bar{\Delta} < 0, m].
\]

(29)
Since \( b(m) = \max_{m \in M} b(m) \) for all \( m \in M_L, b(m) \) is invariant to \( m \in M_L \). Since \( m \in M_L \) if and only if \( \Delta < 0 \), some algebra and integration over all \( m \in M_L \) show that \( b(m) = b^*(\kappa, c) \). Therefore, in any influential equilibrium, the agent follows the principal’s instructions and chooses action \( L \) if and only if \( \bar{\beta} \leq b^*(\kappa, c) \). Note that the intervention policy follows from Lemma 1.

Next, I show that an influential equilibrium always exists. Consider an equilibrium in which the principal sends message \( m_R \) if \( \Delta \geq 0 \) and message \( m_L \neq m_R \) otherwise. As was proved above, the agent always follows the principal’s instructions if he observes message \( m_R \). Since \( m = m_L \) if and only if \( \Delta < 0 \), (26) evaluated at \( m_L \) can be rewritten as \( b^*(\kappa, c) \). Thus, the agent follows the principal’s instructions to implement action \( L \) if and only if \( \bar{\beta} \leq b^*(\kappa, c) \). Given the agent’s expected behavior, it is in the best interest of the principal to follow the proposed communication strategy. Finally, notice that since \( b^*(\kappa, c) > 0 \), this equilibrium is indeed influential. This completes part (i).

Finally, I prove part (ii). First notice that \( b^*(\kappa, c) > b_N \) if and only if

\[
\frac{\kappa}{\omega} \left[ \frac{\Pr[\Delta < -c]}{\Pr[-c \leq \Delta < 0]} - \frac{\Pr[\Delta < -c] - \Pr[\Delta > c]}{\Pr[-c < \Delta < c]} \right] > \mathbb{E}[\Delta | -c \leq \Delta < 0] - \mathbb{E}[\Delta | -c < \Delta < c],
\]

which always holds. Therefore, for any realization of \( \bar{\theta} \), the principal is weakly better off under influential equilibrium. Indeed, if \( \Delta \geq 0 \) the principal is getting her preferred action under influential equilibrium without the need to intervene. If \( \Delta < 0 \) then, because \( b^*(\kappa, c) > b_N \), the principal is more likely to get her preferred action under influential equilibrium, and therefore, can save more of the intervention costs.

According to Proposition 1, in any non-influential equilibrium, the agent’s expected payoff conditional on \( \bar{\beta} \) is

\[
\mathbb{E}[u^N_A(\bar{\beta})] = \begin{cases} 
\omega \mathbb{E}[v(\bar{\theta}, L)] + \Pr[\Delta > c](\omega \mathbb{E}[\Delta | \Delta > c] + \bar{\beta} - \kappa) & \text{if } \bar{\beta} \leq b_N \\
\omega \mathbb{E}[v(\bar{\theta}, R)] + \bar{\beta} - \Pr[\Delta < -c](\omega \mathbb{E}[\Delta | \Delta < -c] + \bar{\beta} + \kappa) & \text{else},
\end{cases}
\]

(31)

According to Proposition 2, the agent’s expected payoff conditional on \( \bar{\beta} \) in any influential equilibrium is

\[
\mathbb{E}[u^*_A(\bar{\beta})] = \begin{cases} 
\omega \mathbb{E}[v(\bar{\theta}, L)] + \Pr[\Delta > 0](\omega \mathbb{E}[\Delta | \Delta > 0] + \bar{\beta}) & \text{if } \bar{\beta} \leq b^*(\kappa, c) \\
\omega \mathbb{E}[v(\bar{\theta}, R)] + \bar{\beta} - \Pr[\Delta < -c](\omega \mathbb{E}[\Delta | \Delta < -c] + \bar{\beta} + \kappa) & \text{else},
\end{cases}
\]

(32)

Recall that \( b_N < b^*(\kappa, c) \). Then, \( \bar{\beta} \geq b^*(\kappa, c) \) then the agent is indifferent. If \( \bar{\beta} \leq b_N \) then the agent is better off under influential equilibrium since not only action \( R \) is taken more often, he also avoids intervention. If \( b_N < \bar{\beta} < b^*(\kappa, c) \) then a direct comparison shows that \( \mathbb{E}[u^*_A(\bar{\beta})] \geq \mathbb{E}[u^N_A(\bar{\beta})] \) for all \( \bar{\beta} \) in this range, as required.

Proof of Corollary 1. Part (i) follows trivially from (8). Consider part (ii), and let \( \phi \) and
\( \Phi \) be the pdf and cdf of \( \tilde{\Delta} \), respectively. Therefore,

\[
 b^* = \frac{\kappa \Phi (-c) - \omega \int_{-c}^c \Delta \phi (\Delta) \, d\Delta}{\Phi (0) - \Phi (-c)} 
\]

(33)

Notice that \( b^* = -\mathbb{E}[\tilde{\Delta} | \tilde{\Delta} < 0] \) for all \( c \geq |\Delta| \), and if \( c \in [0, |\Delta|) \) then

\[
 \frac{\partial b^*}{\partial c} = \frac{\phi (-c)}{\Phi (0) - \Phi (-c)} (-\kappa + \omega c - b^*). 
\]

(34)

Also note that \( \frac{\partial b^*}{\partial c} < 0 \iff \omega c - \kappa < b^* \), which holds if and only if \( \Lambda (c) < 0 \) where

\[
 \Lambda (c) \equiv \frac{\omega}{\Phi (0)} \int_{-c}^0 (\Delta + c) \phi (\Delta) \, d\Delta - \kappa. 
\]

(35)

Notice that \( \Lambda (c) \) is a continuous and increasing function of \( c \). Moreover, \( \Lambda (0) = -\kappa \) and \( \Lambda (|\Delta|) = \omega \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} < 0] - \omega |\Delta| - \kappa. \) Therefore, if \( \Lambda (|\Delta|) \leq 0 \) then \( b^* \) decreases with \( c \). If \( \Lambda (|\Delta|) > 0 \) then by the intermediate value theorem, there is a unique \( c_{\text{min}} \in (0, |\Delta|) \) such that \( \frac{\partial b^*}{\partial c} < 0 \iff c < c_{\text{min}} \). Based on (34), \( c_{\text{min}} \) satisfies (9), as required.

**Proof of Proposition 4.** Let \( \phi \) and \( \Phi \) be the pdf and cdf of \( \tilde{\Delta} \), respectively. \( U_P \) can be rewritten from (14) as

\[
 U_P = \mathbb{E}[v(\tilde{\theta}, L)] + \mathbb{P}[\tilde{\Delta} \geq 0] \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] 
\]

\[ \quad + (1 - G (b^*)) \left( - \int_{-c}^{c} (\Delta + c) \phi (\Delta) \, d\Delta + \int_{\Delta}^{0} \Delta d\Phi (\theta) \right). \]

Therefore,

\[
 \frac{\partial U_P}{\partial c} = g (b^*) \left( \int_{\Delta}^{0} (\Delta + c) \phi (\Delta) \, d\Delta - \int_{\Delta}^{0} \Delta d\Phi (\theta) \right) \frac{\partial b^*}{\partial c} - (1 - G (b^*)) \Phi (-c) 
\]

Note that the term in parentheses is positive. Therefore, if \( \frac{\partial b^*}{\partial c} < 0 \) then \( \frac{\partial U_P}{\partial c} < 0 \). According to part (ii) of Corollary 1, if \( \kappa / \omega \geq \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] + |\Delta| \) then \( \frac{\partial b^*}{\partial c} < 0 \). Therefore, if \( \kappa / \omega \geq \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] + |\Delta| \) then \( \frac{\partial U_P}{\partial c} < 0 \) as required for part (i). Suppose \( \kappa / \omega < \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] + |\Delta| \). Notice that \( U_P (\kappa, c) \) is differentiable in \( c \) and \( U_P (\kappa, 0) > U_P (\kappa, |\Delta|) \). Therefore, to prove part (ii) it is sufficient to show \( \lim_{c \to -|\Delta|} \frac{\partial U_P}{\partial c} > 0 \). Note that

\[
 \lim_{c \to -|\Delta|} \frac{\partial U_P}{\partial c} = g (b^* (\kappa, |\Delta|)) \left( \int_{\Delta}^{0} \Delta d\Phi (\Delta) \right) \frac{\partial b^*}{\partial c} |c = |\Delta|. 
\]

Therefore, \( \lim_{c \to -|\Delta|} \frac{\partial U_P}{\partial c} > 0 \) if and only if \( \frac{\partial b^*}{\partial c} |c = |\Delta| > 0 \). According to Corollary 1, \( \frac{\partial b^*}{\partial c} > 0 \) if and only if \( c \in (c_{\text{min}}, |\Delta|) \) and \( \kappa / \omega < \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] + |\Delta|. \) This completes the proof.
Proof of Proposition 5. Let $\phi$ and $\Phi$ be the pdf and cdf of $\tilde{\Delta}$, respectively. $U_\alpha(\kappa, c)$ can be rewritten from (16) as

$$U_\alpha = \omega \mathbb{E}[v(\tilde{\theta}, L)] + \text{Pr}[\tilde{\Delta} \geq 0]\{\omega \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] + \mathbb{E}[\tilde{\beta}]\} + (\Phi(0) - \Phi(-c)) \int_{b^*}^{\infty} (\beta - b^*) g(\beta) d\beta.$$  

Therefore

$$\frac{\partial U_\alpha}{\partial \kappa} = -(\Phi(0) - \Phi(-c)) (1 - G(b^*)) \frac{\partial b^*}{\partial \kappa},$$

and note that $\frac{\partial b^*}{\partial \kappa} > 0$ implies $\frac{\partial U_\alpha}{\partial \kappa} < 0$. Similarly,

$$\frac{\partial U_\alpha}{\partial \omega} = \mathbb{E}[v(\tilde{\theta}, L)] + \text{Pr}[\tilde{\Delta} \geq 0] \mathbb{E}[\tilde{\Delta} | \tilde{\Delta} \geq 0] - (\Phi(0) - \Phi(-c)) (1 - G(b^*)) \frac{\partial b^*}{\partial \omega},$$

Based on (8), $\frac{\partial b^*}{\partial \kappa} = -\mathbb{E}[\tilde{\Delta}] - c \leq \tilde{\Delta} < 0$. Therefore, $\frac{\partial U_\alpha}{\partial \omega}$ can be rewritten as

$$\frac{\partial U_\alpha}{\partial \omega} = \mathbb{E}[v(\tilde{\theta}, L)] + \int_0^\infty \Delta \phi(\Delta) d\Delta + (1 - G(b^*)) \int_{-c}^0 \Delta \phi(\Delta) d\Delta$$

$$> \mathbb{E}[v(\tilde{\theta}, L)] + \int_0^\infty \Delta \phi(\Delta) d\Delta + \int_{-c}^0 \Delta \phi(\Delta) d\Delta$$

$$= \mathbb{E}[v(\tilde{\theta}, L)] + \int_{-c}^\infty \Delta \phi(\Delta) d\Delta$$

$$\geq \mathbb{E}[v(\tilde{\theta}, L)] + \mathbb{E}[\tilde{\Delta}] = \mathbb{E}[v(\tilde{\theta}, R)] \geq 0,$$

as required. The last inequality follows from the assumption that $v(\tilde{\theta}, R) \geq 0$. Next,

$$\frac{\partial U_\alpha}{\partial c} = \phi(-c) \int_{b^*}^{\infty} (\beta - b^*) g(\beta) d\beta - (\Phi(0) - \Phi(-c)) (1 - G(b^*)) \frac{\partial b^*}{\partial c},$$

Based on (34),

$$\frac{\partial U_\alpha}{\partial c} = \phi(-c) (1 - G(b^*)) [\mathbb{E}[\tilde{\beta}] \tilde{\beta} > b^*] + \kappa - \omega c].$$

Therefore, $\frac{\partial U_\alpha}{\partial c} > 0$ if and only if

$$\mathbb{E}[\tilde{\beta}] \tilde{\beta} > b^*] + \kappa - \omega c > 0.$$  

Since $\frac{\partial b^*}{\partial \kappa} > 0$, the LHS is increasing in $\kappa$. Suppose $\kappa/\omega \geq \mathbb{E}[\tilde{\Delta}] | \tilde{\Delta} < 0] + |\tilde{\Delta}|$. According to part (ii) of Corollary 1 $\frac{\partial b^*}{\partial \kappa} < 0$. Therefore, the LHS of (42) is decreasing in $c$. For this reason, if (42) holds for $c = |\tilde{\Delta}|$ then it holds for all $c < |\tilde{\Delta}|$. Note that if $c = |\tilde{\Delta}|$ then (42) holds if and only if

$$\kappa/\omega > -\mathbb{E}[\tilde{\beta}/\omega | \tilde{\beta}/\omega > -\mathbb{E}[\tilde{\Delta}] | \tilde{\Delta} < 0] + |\tilde{\Delta}|.$$  

(43)
However, if \( \kappa/\omega \geq \mathbb{E}[\hat{\Delta} | \hat{\Delta} < 0] + |\Delta| \) holds then (43) holds. Therefore, if \( \kappa/\omega \geq \mathbb{E}[\hat{\Delta} | \hat{\Delta} < 0] + |\Delta| \) then \( \frac{\partial U_A}{\partial c} > 0 \), which completes part (i). Suppose (43) does not hold. By the same argument as above, \( \lim_{c \to |\Delta|} \frac{\partial U_A}{\partial c} < 0 \). Since \( \lim_{c \to |\Delta|} U_A(\kappa, c) = U_A(\kappa, |\Delta|) > U_A(\kappa, 0) \), there exists \( \tilde{c}_P \) as required by part (ii).

**Proof of Proposition 6.** Conditional on \( \tilde{\theta} \) and the agent’s decision, \( x_A \), and regardless of the message sent by the principal to the agent, the principal solves

\[
 x_P \in \arg\max_x \{-(\tilde{\theta} - x)^2 - c(x - x_A)^2\} \Rightarrow x_P(x_A, \tilde{\theta}) = x_A + \frac{\tilde{\theta} - x_A}{1 + c}.
\]

Conditional on \( x_A \) and \( \tilde{\theta} \), the principal’s utility is

\[
 u_P = -(\tilde{\theta} - x_P(x_A, \tilde{\theta}))^2 - c(x_P(x_A, \tilde{\theta}) - x_A)^2 = -\frac{c}{1 + c}(\tilde{\theta} - x_A)^2.
\]

The agent expects the principal to follow intervention policy \( x_P(x_A, \tilde{\theta}) \), and therefore, given message \( m \), he solves

\[
x_A^* \in \arg\max_{x_A} \mathbb{E}[-(\tilde{\theta} + \beta - x_P(x_A, \tilde{\theta}))^2 - \kappa(x_P(x_A, \tilde{\theta}) - x_A)^2 | m] \Rightarrow x_A^* = \mathbb{E}[\tilde{\theta} | m] + \beta \frac{1 + c}{\kappa/c + c}.
\]

It follows, at the communication stage, the principal behaves as if her preferences are represented by the utility function \( -(\tilde{\theta} - x_A)^2 \), and the agent behaves as if \( c = \infty \), \( \kappa = 0 \) and his preferences are represented by the utility function \( -(\tilde{\theta} + \beta \frac{1 + c}{\kappa/c + c} - x_A)^2 \).

**Proof of Proposition 7.** Consider the model without intervention. As in Harris and Raviv (2005), in any equilibrium, if the agent observes \( \tilde{\theta}_A \) and the principal sends message \( m \), the agent chooses \( x_A(\tilde{\theta}_A, m) = \tilde{\theta}_A + \mathbb{E}[\tilde{\theta}_P | m] + \beta \). Therefore, the principal’s expected utility from sending message \( m \) is

\[
 -\mathbb{E}[(\tilde{\theta}_P + \tilde{\theta}_A - x_A(\tilde{\theta}_A, m))^2 | \tilde{\theta}_P, m] = -(\tilde{\theta}_P - \mathbb{E}[\tilde{\theta}_P | m] - \beta)^2,
\]

which is independent of \( \tilde{\theta}_A \), and hence, perfectly predictable by the principal. Intuitively, the unknown private information of the agent is canceled by the agent’s (optimal) choice of \( x_A \).

We are back to the standard Crawford and Sobel (1982), where \( x_A(\tilde{\theta}_A, m) = \tilde{\theta}_A + \hat{x}_A(m) \) where \( \hat{x}_A(m) \) is given by the Crawford and Sobel’s model when only the principal has private information.

Consider the model with intervention. Suppose that in equilibrium the agent follows a linear strategy

\[
x_A(\tilde{\theta}_A, m) = \alpha \tilde{\theta}_A + \phi(m),
\]

where \( \alpha \) is a scalar and \( \phi(\cdot) \) is a real function. Conditional on \( \tilde{\theta}_P \), message \( m \), and the agent’s
decision \( x_A \), the principal solves

\[
\max_y \{ \mathbb{E}[-(\tilde{\theta}_P + H(x_A, \tilde{\theta}_A, m) - y)^2 - c(y - x_A)^2] \}
\]

where

\[
H(x_A, \tilde{\theta}_A, m) = \begin{cases} 
\frac{x_A - \phi(m)}{\alpha} & \text{if } \alpha \neq 0 \\
\tilde{\theta}_A & \text{if } \alpha = 0.
\end{cases}
\]

Indeed, if \( \alpha = 0 \) the principal does not learn anything from action \( x_A \) about \( \tilde{\theta}_A \). Therefore, the principal chooses

\[
x_P(x_A, \tilde{\theta}_P, m) = x_A + \frac{\tilde{\theta}_P + \mathbb{E}[H(x_A, \tilde{\theta}_A, m)] - x_A}{1 + c}.
\]

The agent expects the principal to follow intervention policy \( x_P(x_A, \tilde{\theta}_P, m) \), and therefore, given message \( m \) and the observation of \( \tilde{\theta}_A \), the agent solves

\[
\max_y \mathbb{E} \left[ -\left( \tilde{\theta}_P + \tilde{\theta}_A + \beta - x_P(y, \tilde{\theta}_P, m) \right)^2 - \kappa \left( x_P(y, \tilde{\theta}_P, m) - y \right)^2 | \tilde{\theta}_A, m \right]
\]

\[
= \max_y \mathbb{E} \left[ -\left( \tilde{\theta}_P + \mathbb{E}[H(y, \tilde{\theta}_A, m)] - y \right)^2 + \tilde{\theta}_A - \mathbb{E}[H(y, \tilde{\theta}_A, m)] + \beta \right] \left( \tilde{\theta}_A, m \right)
\]

We first argue that \( \alpha = 0 \) cannot be an equilibrium. To see why, suppose on the contrary \( \alpha = 0 \) is an equilibrium. Then, \( \mathbb{E}[H(y, \tilde{\theta}_A, m)] = \mathbb{E}[\tilde{\theta}_A] \) and the agent chooses

\[
x_A(\tilde{\theta}_A, m) = \mathbb{E}[\tilde{\theta}_P|m] + \mathbb{E}[\tilde{\theta}_A] + c^2 + c \tilde{\theta}_A - \mathbb{E}[\tilde{\theta}_A] + \beta,
\]

which implies \( \alpha = \frac{c^2 + c}{\alpha + c} \neq 0 \), a contradiction. Suppose \( \alpha \neq 0 \). In this case, \( \mathbb{E}[H(y, \tilde{\theta}_A, m)] = \frac{y - \phi(m)}{\alpha} \) and the agent chooses

\[
x_A(\tilde{\theta}_A, m) = \frac{1}{1 + \frac{\kappa - c}{\alpha} \cdot \frac{1 - \alpha}{1 + c}} \tilde{\theta}_A + \frac{1 - \alpha}{1 + \frac{\kappa - c}{\alpha} \cdot \frac{1 - \alpha}{1 + c}} \left( \mathbb{E}[\tilde{\theta}_P|m] - \frac{\phi(m)}{\alpha} \right) + \frac{\phi(m)}{\alpha} + \beta \tag{45}
\]

Matching coefficients implies

\[
\alpha = \frac{1}{1 + \frac{\kappa - c}{\alpha} \cdot \frac{1 - \alpha}{1 + c}} \Leftrightarrow \alpha \in \left\{ 1, \frac{\kappa - c}{\kappa + c^2} \right\}.
\]

Notice that \( \alpha = \frac{\kappa - c}{\kappa + c^2} \) cannot be an equilibrium. Indeed, if \( \alpha = \frac{\kappa - c}{\kappa + c^2} \) then the second term in (45) becomes \( \phi(m) + \frac{\kappa - c}{\kappa + c^2} \beta \). Requiring that this term is equal to \( \phi(m) \) (matching coefficients)
requires either $\frac{\alpha - \kappa}{\kappa + c^2} = 0$ or $\beta = 0$. The former condition does not hold since $\alpha = \frac{\alpha - \kappa}{\kappa + c^2}$ and we prove that this can be an equilibrium only if $\alpha \neq 0$. The second condition does not hold by the assumption $\beta \neq 0$. Therefore, if $\alpha = 1$ then matching the coefficient on the second term implies $\phi(m) = E[\tilde{\theta}_P|m] + \frac{1 + c}{c} \beta$, and hence,

$$x_A(\tilde{\theta}_A, m) = \tilde{\theta}_A + E[\tilde{\theta}_P|m] + \frac{1 + c}{c} \beta.$$ 

This implies

$$x_P(x_A, \tilde{\theta}_P, m) = x_A + \frac{\tilde{\theta}_P - E[\tilde{\theta}_P|m] - \frac{1 + c}{c} \beta}{1 + c}.$$ 

Thus, if the principal expects the agent to chooses action $x_A(\tilde{\theta}_A, m)$, the principal’s expected utility conditional on $\tilde{\theta}_P$ and on sending message $m$ is

$$u_P(\tilde{\theta}_P, m) = E \left[ \frac{- (\tilde{\theta}_P + \tilde{\theta}_A - x_P(x_A(\tilde{\theta}_A, m), \tilde{\theta}_P, m))^2}{c(x_P(x_A(\tilde{\theta}_A, m), \tilde{\theta}_P, m) - x_A(\tilde{\theta}_A, m))^2} | m, \tilde{\theta}_P \right]$$

$$= E \left[ \frac{- (\tilde{\theta}_P + \tilde{\theta}_A - (\tilde{\theta}_A + E[\tilde{\theta}_P|m] + \frac{1 + c}{c} \beta))^2}{c \left( \tilde{\theta}_P - E[\tilde{\theta}_P|m] - \frac{1 + c}{c} \beta \right)^2} | m, \tilde{\theta}_P \right]$$

$$= E \left[ \frac{- \left( \tilde{\theta}_P - E[\tilde{\theta}_P|m] - \frac{1 + c}{c} \beta \right)^2}{1 + c} - c \left( \frac{\tilde{\theta}_P - E[\tilde{\theta}_P|m] - \frac{1 + c}{c} \beta}{1 + c} \right)^2 \right] | m, \tilde{\theta}_P$$

$$= \frac{c}{1 + c} \left( \tilde{\theta}_P - E[\tilde{\theta}_P|m] - \frac{1 + c}{c} \beta \right)^2 | m, \tilde{\theta}_P$$

Thus,

$$u_P(\tilde{\theta}_P, m) = - \frac{c}{1 + c} \left( \tilde{\theta}_P - E[\tilde{\theta}_P|m] - \frac{1 + c}{c} \beta \right)^2$$

(46)

Recall that without intervention, the principal expected utility conditional on $\tilde{\theta}_P$ and on sending message $m$ is given by (44). One can see that the only difference from (46) is that $\beta$ is replaced by $\frac{1 + c}{c} \beta$, and the entire term is scaled by $\frac{c}{1 + c}$. It follows that at the communication stage, the principal behaves as if her preferences are represented by the utility function $-(\tilde{\theta}_P + \tilde{\theta}_A - x_A)^2$, and the agent behaves as if $c = \infty$, $\kappa = 0$, and his preferences are represented by the utility function $-(\tilde{\theta}_P + \tilde{\theta}_A + \beta \frac{1 + c}{c} - x_A)^2$. □