# Conservative Decisions and Career Concerns

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**Abstract**

Decision makers (DM) are often perceived to be conservative in their choices, preferring to maintain the status quo rather than changing it. I develop a model which explains the existence of such status-quo bias as a rational response of a principal to the asymmetry of information between a DM and career concerned advisors. Two opposing factors affect the type of DM the principal wishes to appoint. First, the closer the preferences of the DM are to the principal's preferences, the more likely it is that a decision taken is favorable to the principal. Second, the more conservative the DM is, the weaker are the incentives of the advisor to engage in strategic communication. I find that if career concerns are strong enough, it is always optimal for a principal to appoint a conservative DM.

**keywords:** Career concerns, Conservatism, Communication

**JEL codes:** D21 D82 D83

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*'The manager accepts the status quo; the leader challenges it'* – Warren Bennis

# 1 Introduction

Policy makers are given the responsibility to carry out decisions which are intended to maximize the welfare of their constituency. Similarly, managers are appointed to make choices that maximize firm value. A common view is that the better aligned the preferences of the principal (e.g. the public, CEO) and the decision maker the lower are the agency costs, and the better off is the principal. Nonetheless, there are many cases in which a decision makers are generally perceived as more conservative than principals wish. Government agencies tend to be slow with regards to policy changes. Only in 2013 did the US Federal Aviation Administration began allowing electronic devices to be used by passengers during takeoff and landing of airplanes. This move arrives after a number of years in which experts claimed there is scant evidence for any risk caused by such devices to flight safety (Plumer 2013). In a related example, Li (2001) describes overcautiousness and conservative behavior by the US Food and Drug Administration in the approval of new drugs. In organizations, middle managers are maintained by many as 'useless' (Nayeem 2013), unimaginative and prone to the status quo (Huy 2001). Additional examples of conservatism in decision making can be found in the need for unanimity in jury decision making, and in the requirement of supermajority in parliamentary votes on exceptional decisions.

This paper considers a channel which explains the prevalence of conservative decision makers, and the indirect benefits they may bring. Specifically, I show that it can be to the benefit of the principal to appoint a conservative decision maker rather than an unbiased one. Conservatism is defined as a stronger preference to maintain the status quo relative to the principal's preference. The decision maker's main task is viewed as choosing the preferred course of action using information obtained by better informed agents. This reflects a fairly frequent situation as it is common for government agencies to enlist the assistance of outside experts, for managers to hire consultants, and for politicians to seek the advice of think tanks and NGOs.

The model presented in this paper is driven by the fact that the decision maker's preferences affect the advisor's incentives to reveal information truthfully. The reason is that the advisor cares about the labor market's perception of his ability, which his future career depends upon. The labor market, not privy to communication between the decision maker and the advisor, can only base its belief on the advisor's ability from the decision maker's choice and its outcome. A high ability advisor is more likely than a low ability one to know, and inform the decision maker, that the status quo should be abandoned. Thus, a choice made by the decision maker to change the status quo increases the perceived ability of the advisor. The incentive to appear able may lead the advisor to suggest the decision maker to alter the status quo even if it is not optimal for the principal. By appointing a conservative decision maker, the principal can lower the cost of strategic communication. A conservative decision maker requires strong evidence in order to change the status quo, making it less likely the status quo is maintained due to a low ability advisor. In turn, the incentive for an advisor to recommend a change in the status quo decreases.

A number of papers have explored whether a certain degree of difference in the preferences of a decision maker (She) and an advisor (He) can benefit an organization. Rotemberg and Saloner (1993) investigate how the choice of a CEO by shareholders affects employees' effort to innovate. They contrast the impact of a profit maximizing and an altruistic leadership styles have on employees. In some situations shareholders may prefer to appoint an altruistic CEO who implements unprofitable innovations which benefit only the employees. Since such a CEO increases the probability that any innovation is implemented, a lower compensation is needed to bring employees to exert effort. Rotemberg and Saloner (2000) explore the benefit of appointing a 'visionary' CEO for a firm. Such a CEO incentivizes employees to exert effort to innovate in projects the CEO is biased in favor of. Rotemberg and Saloner also consider the positive effect of unbiased middle managers in the presence of a biased CEO, counter-balancing her bias in the more extreme cases. Similarly, in my paper the decision maker, or the 'middle manager' has different preferences from her superior. Van den Steen (2005) also presents a model in which it can be beneficial for a board of directors to appoint a manager with a vision (biased belief) in order to affect employee self-selection and effort.

Dur and Swank (2005) analyze a situation in which a decision maker must make a choice between keeping the status quo and implementing a new project. A decision maker who is biased towards the status quo can benefit from appointing an advisor who is less biased than her. A less biased advisor has a higher value of information, and thus exerts more effort to obtain it. On the other hand, an advisor with closer bias to the decision maker's bias reports his information more accurately. It is optimal for the decision maker to appoint an advisor who is mildly less biased than her. Employing similar intuition, Che and Kartik (2009) examine the benefit of a difference in opinions, or prior beliefs, between a decision maker and an advisor. Nayeem (2013) specifically focuses on the benefit for an organization to appoint a biased middle manager. Using a similar channel as Dur and Swank (2005), he shows that with a biased middle manager, a worker must exert more effort in order to be able to change the manager's mind about the preferred action.

This paper departs from the papers described in the preceding paragraphs in two major aspects. First, effort plays no part in the model. The focus of the paper is mainly on the communication between the decision maker and the advisor. Difference in preferences, contrary to the previous literature, increases the incentive of the advisor to reveal information truthfully. Second, advisors are motivated by career concerns, or the labor market's perception of their ability.

Differences in preferences are also found to be beneficial in a macroeconomic framework. In an influential paper, Rogoff (1985) explores the optimal choice of a central banker to society. He shows that a choice of a 'conservative' central banker, one who is biased towards inflation-rate stabilization more than the public, can be beneficial to the economy. Such a central banker credibly lowers inflation expectation of wage setters, resulting in lower inflation growth. Unlike previous papers discussed, the benefit of having difference in preferences is not due to a change in agents' incentives, but due to a change in expectation formation by market participants. Extending this insight, Waller (1992) looks at a multi-sector economy and Herrendorf and Lockwood (1997) shows the benefit of conservatism in the presence of contingent performance contracts.

This study is also related to the literature on career and reputational concerns.[1] For the most part, this literature focuses on the effect career concerns may have on an agent's willingness to manipulate the labor market's perception of him. First to explicitly model the role of career concerns, Holström (1999) shows that a career concerned manager who is in charge of a firm's investment decision opts to avoid risky options in certain cases. Many papers explore the role of career concern on herd behavior, mainly focusing on investment and managerial decisions. In Scharfstein and Stein (1990) career concerned managers have an incentive to ignore private information and choose an investment similar to that of other managers. The reputational cost of investment failure is thus shared by all managers. For a similar reason, in Visser and Swank (2007) career concerned committee members present a unanimous front when revealing their decision to the public. Unlike the herding literature, they investigate a simultaneous rather than consecutive decision making by agents. As committee decisions are determined by a voting rule, the public's perception of each member's ability in Visser and Swank (2007) depends on other members' decisions. Relatedly, in this paper I consider a case in which final project choice is not only determined by the advisor's input but also by the decision maker's preferences. The

[1] To a large extent, career concerns (e.g. Milbourne et al. 2001) and reputational concerns (e.g. Suurmond et al. 2004) are used interchangeably in the literature. I choose to use the term career concerns for the remainder of this paper.

labor market's perception of the advisor's ability is thus shaped by the decision maker.

Zwiebel (1995) employs managerial career concerns to explain corporate conservatism, or the reluctance of many firms to implement new innovations. Managers' ability is judged by the market according to their relative performance to other managers. Managers who are moderately able wish to take the standard industry action since it allows the market to easily compare their performance with other managers. Moderate managers can then differentiate themselves from bad managers. Prendergast and Stole (1996) demonstrate that in the presence of career concerns, early-career managers may overreact to received information while later-career managers tend to exhibit conservatism. A young manager wishes to demonstrate activism since high ability managers receive high quality information which drives them to action. An older manager, one who has made a number of decisions in the past, wishes to appear consistent in her decision making, as it is also indicative of high ability. My paper, though similar is its observation of conservative decision making in organizations, sets to show that conservatism may be the result of an optimal choice by a principal best responding to an agency problem. Additionally, the model assumes that an information gathering advisor has career concerns rather than a decision maker.

Levy (2004) considers agents who know their own ability in order to show the existence of anti-herding on the prior. With quality of information and ability being positively correlated, a choice against the prior is more likely the more accurate the signal of the agent is about the state of the world. Career concerns thus increase the incentive of a less able agent to select the ex-ante less likely choice, resulting in anti-herding behavior. In this paper I consider an agent which has similar incentives as in Levy (2004). A choice which goes against the prior enhances the labor market's perception of the advisor's ability. Ottaviani and Sörensen (2006) expand the analysis on career concerns to a model with continuous signals, states and manager abilities. They show that career concerns can cause herd behavior even with conditionally independent signals across managers. Similarly to them, I examine a situation in which the advisor receives signals and sends messages on a continuous space. Unlike Ottaviani and Sörensen, in this paper messages are verifiable and final project choice is binary.

The remainder of the paper is organized as follows. Section 2 presents the model. Section 3 solves the model and presents first results with an unbiased manager. Section 3.4 explores the effect of manager bias on model results. Section 4 examines the optimal manager choice from the principal's perspective. Section 5 relaxes assumptions made in basic model. Section 6 concludes.

## 2 The model

There are three active players in the model: a principal, a decision maker and an informed agent. For ease of discussion, henceforth I refer to the decision maker as the manager (She) and to the agent as the expert (He). The labor market is a passive player in the model, as it only updates its beliefs about the expert, taking no actions. The principal appoints a manager with a bias $\delta_{DM}$ to make a decision whether to maintain the status quo or implement a new project. The manager must make a binary decision whether to keep the status quo ($x = o$) or implement a new project ($x = n$). The decision outcome depends on project choice $x$ and the state of the world $\Gamma \in \{o, n\}$. The prior probability that the state of the world $\Gamma$ is $\Gamma = o$ is given by $p = \Pr(\Gamma = o)$, and that $\Gamma = n$ is $1 - p$. Probability $p$ is a stochastic term which is distributed according to $f(p)$. The function $f(p)$ is continuous and has support $[0, 1]$. Ex-ante, only the density function $f(p)$ is publicly known. The manager hires an expert to investigate the probability of project success $p$. An expert of type $t$ is smart ($t = h$) or dumb ($t = l$). The prior probability that an expert is smart $h$ is common knowledge and equals $\pi = \Pr(t = h)$. The expert knows his own type $t$.

*Information.* With probability $\omega$ an expert receives a signal $s \in [0, 1]$ about the value of $p$. With probability $1 - \omega$ an expert receives an uninformative signal $s = \varnothing$. If $s \neq \varnothing$, the expert observes the true state of the world of $p$ with probability $\Pr(s = p|t) = \alpha_t$ and a random value $\epsilon$ with probability $\Pr(s = \epsilon|t) = 1 - \alpha_t$, where $\epsilon \sim f(\epsilon)$ has the same distribution as $p$. That is, the expert's type determines the quality of the signal he receives $\alpha_t$. A smart expert receives a higher quality, or a lower variance, signal about the probability of $\Gamma$ than a dumb expert. Modeling the role of the expert in this fashion, though less common in the career concerns literature, is first suggested by Holmström (1999) in Section 3.2. Holmström examines the behavior of an agent who receives an informative signal on the probability of an investment success only in case he is able. Structuring the model in this manner allows for a binary outcome and a continuous signal and message space. This keeps the model relatively simple to analyze while allowing the flexibility to include bias of preferences. In order to facilitate the analysis further, I begin by imposing that $\alpha_h = 1$ and $\alpha_l = 0$. In Section 5 I relax this assumption.

*Communication.* Once an investigation has been conducted, the expert sends a message $m \in \{s, \varnothing\}$ to the manager. That is, the expert cannot lie to the manager about the value of his signal $s$; he can only send a message which is equal to his signal or an empty message.[2] If I had

[2]This can be explained by the ability of the manager to verify a message $m$, or by assuming very high costs of

allowed the expert to send any message $m \in [0,1]$ regardless of his signal $s$, then in equilibrium a continuous message space would not be possible. In case of such 'cheap talk', the effective message space degenerates to binary messages (e.g. Crawford and Sobel 1982, Ottaviani and Sörensen 2006). If the manager receives an uninformative signal she must rely only on her prior beliefs. The expert's message $m$ is observable only to the manager.

*Preferences.* The proper decision on $x$ depends on the state of the world. A project is successful only if the decision made matches the state of the world $x = \Gamma$. The utility of the principal and the manager is given by

$$U_i\left(x|\Gamma = x\right) = \begin{cases} \delta_i \text{ if } x = n \\ 1 - \delta_i \text{ if } x = o \end{cases}$$
$$U_i\left(x|\Gamma \neq x\right) = 0 \tag{1}$$

where the subscript $i \in \{a, m\}$ denotes the principal and the manager, respectively. $\delta_i$ is equal to the threshold probability $p$ for which player $i$'s preferences for the status quo and project implementation are equal. For $p < \delta_i$ ($p > \delta_i$) player $i$ prefers project implementation (status quo). In the rest of the paper I refer to the principal's preferences as the 'correct' ones and denote the principal's threshold as $\delta \equiv \delta_a$. I refer to a manager as unbiased in case $\delta_{DM} = \delta$, conservative if $\delta_{DM} < \delta$ and reformist otherwise. Ex-ante, without additional information, the principal prefers to maintain the status quo. That is, the expected probability that the status quo results in a positive decision outcome satisfies $E[p] \equiv \bar{p} > \delta$.

The expert cares about the principal's utility and his perceived ability by the labor market. Underlying this assumption is that i) the expert wants the 'correct' choice to be implemented; ii) the expert's likelihood of being hired by other managers in the future is determined by the labors market's perception of the his ability. The market forms a belief about the probability that the expert is smart at the end of the game based on the manager's decision on $x$ and the decision outcome. Importantly, the market does not observe the message $m$ sent by the expert. I denote by $\pi_x^+ = \Pr\left(t = h|x, x = \Gamma\right)$ and $\pi_x^- = \Pr\left(t = h|x, x \neq \Gamma\right)$ the posterior beliefs of the market about the probability the expert is smart conditional on the chosen project $x$ and decision

lying (e.g. criminal charges).

outcome, good ($\pi_x^+$) or bad ($\pi_x^-$). The utility of the expert is given by

$$U_e\left(x|\Gamma=x\right)=\begin{cases}\delta+\lambda\pi_n^+ \text{ if } x=n\\ (1-\delta)+\lambda\pi_o^+ \text{ if } x=o\end{cases}$$
$$U_e\left(x|\Gamma\neq x\right)=\begin{cases}\lambda\pi_n^- \text{ if } x=n\\ \lambda\pi_o^- \text{ if } x=o\end{cases} \tag{2}$$

where $\lambda$ specifies the relative weight the expert places on career concerns. For ease of analysis and without a loss of generality I assume that in case the utility from both projects is equal $E\left[U_i\left(n\right)\right]=E\left[U_i\left(o\right)\right]$ all players prefer project implementation over the status quo.[3]

*Timing.*

1. Nature chooses $t\in\{h,l\}$, $p\in[0,1]$ and $\Gamma\in\{n,o\}$.
2. The principal appoints a manager with a bias $\delta_{DM}\in[0,1]$.
3. The expert receives a signal $s\in[0,1]$ with probability $\omega$.
4. The expert sends a message $m\in\{s,\varnothing\}$ to the manager.
5. The manager receives message $m$ and makes a choice $x\in\{n,o\}$ whether to maintain the status quo or implement the new project.
6. The market observes $x$ and $\Gamma$. It then updates its beliefs about expert type.
7. Payoffs for the expert, manager and principal are realized.

*Equilibrium.* The expert's strategy $\sigma_t\left(s\right)$ maps an informative signal an expert of type $t$ receives to a probability with which the expert sends a message $m=s$, such that $\sigma_t\left(s\right)=\Pr\left(m=s|s\right)$. With probability $1-\sigma_t\left(s\right)$ the expert sends an empty message $m=\varnothing$. The manager's strategy $\sigma_{DM}\left(m\right)$ maps the messages $m$ received by the manager to a decision $x\in\{n,o\}$. This model is a dynamic game with incomplete information. I solve this game using the Perfect Bayesian Equilibrium concept, where I consider only equilibria in which the expert's strategy is monotone.

[3]Throughout this paper I use the term career concerns as equivalent to $\lambda$, the weight the expert places on his reputation. I use reputation as a synonym to the labor market's beliefs about the expert's ability.

**Definition 1.** *An expert's strategy is defined as monotone if*

- $\sigma_t(s) \geq \sigma_t(s')$ *for* $U_e(m = s|t, s) \geq U_e(m = s'|t, s')$*, where*
- $\sigma_t(s) = \sigma_t(s')$ *for* $U_e(m = s|t, s) = U_e(m = s'|t, s')$

I focus on monotone equilibria in order to simplify the analysis. Definition 1 specifies that the probability an expert sends an informative message $m = s$ is the same for all signals that result in equal expected utility for the expert. Without this restriction, the continuous signal space would allow for many possible equilibria which add only clatter to the analysis of the model.

An equilibrium is found such that i) the expert's strategy maximizes his expected utility given the market's beliefs and the manager's strategy; ii) the manager's strategy maximizes her expected utility given the expert's strategy.

# 3 The manager and the expert

I begin the equilibrium analysis by first only considering the interaction of the manager and the expert. Throughout this section I treat the manager's bias $\delta_{DM}$ as a given parameter. Only later, in Section 4, do I treat $\delta_{DM}$ as a choice variable of the principle. Accordingly, the role of the principal in the model is mostly ignored in this section. In Subsection 3.1, Uncustomarily, the equilibrium analysis begins with the second stage of the game, in which the manager makes a decision $x$ based on the message $m$ received from the expert. This choice is made in order to outline the manager's strategy first. Since the expert's strategy is conditional on the manager's strategy, this choice simplifies the discussion of the expert's strategy in the following subsections. Subsection 3.2 finds the equilibrium strategies when the manager's and the expert's incentives are aligned, with $\delta_{DM} = \delta$ and $\lambda = 0$. Subsection 3.3 expands the analysis to the presence of experts with career concerns. Subsection 3.4 relaxes the assumption that the manager is unbiased.

## 3.1 The manager

To solve the model I first explore the equilibrium strategy of the manager given the message $m$ she receives from the expert. Since the analysis of an unbiased and a biased manager is identical, I immediately explore the general case now, allowing for $\delta_{DM} \neq \delta$. Let us define

$p_{DM}(m) = E[p|m]$ as the manager's expected value of $p$ conditional on message $m$. The manager's implementation decision depends on the expected decision outcomes of the projects. She implements the project $(x = n)$ if $p_{DM}(m) \leq \delta_{DM}$ and maintains the status quo if $(x = o)$ if $p_{DM}(m_p) > \delta_{DM}$. That is, the manager maximizes her expected utility by implementing the new project if the expected value of $p$ is below the threshold value $\delta_{DM}$ and by keeping the status quo otherwise. The expected value $p_{DM}(m)$ is determined by the expert strategies $\sigma_h(s)$ and $\sigma_l(s)$, such that

$$p_{DM}(m) = \frac{\pi \cdot \sigma_h(m)}{\pi \cdot \sigma_h(m) + (1-\pi) \cdot \sigma_l(m)} \cdot m + \frac{(1-\pi) \cdot \sigma_l(m)}{\pi \cdot \sigma_h(m) + (1-\pi) \cdot \sigma_l(m)} \cdot \bar{p} \qquad (3)$$

The expected value $p_{DM}$ is determined by a weighted average of the message $m$ and the prior $\bar{p}$. If an expert is smart then the message received is fully informative and is equal to the probability $p$, while if the message was sent by a dumb expert it is fully uninformative. The higher is the prior that an expert is smart (dumb) and the higher the probability a smart (dumb) expert sends a message $m = s$ the higher (lower) is the weight the manager places on the message being informative.

From expression (3) it is clear that given the expert's strategy, the expected value $p_{DM}(m|\sigma_h, \sigma_l)$ is strictly increasing with $m$, $\forall m \neq \varnothing$. I can thus define a threshold message $\bar{m}$ such that

$$p_{DM}(\bar{m}|\sigma_h(\bar{m}), \sigma_l(\bar{m})) = \delta_{DM}, \text{ or} \qquad (4)$$

$$\bar{m} = \delta_{DM} - \frac{\sigma_l(\bar{m})}{\sigma_h(\bar{m})} \cdot \frac{(1-\pi)}{\pi} (\bar{p} - \delta_{DM})$$

With a slight abuse of notation I denote $\bar{m}$ as the strategy of the manager in the rest of the paper, such that

$$\sigma_{DM} = \begin{cases} n \text{ if } m \leq \bar{m} \\ o \text{ if } m > \bar{m} \end{cases}$$

Note that for any $\delta_{DM} \leq \bar{p}$ the threshold message $\bar{m}$ must be lower than or equal to the manager's threshold value $\delta_{DM}$, or $\bar{m} \leq \delta_{DM}$. That is, if the manager ex-ante prefers the status quo then any message $m$ that leads the manager to implement the project must be lower than $\delta_{DM}$. Any message larger than $\delta_{DM}$ can only reinforce the manager's preference to maintain the status quo.

## 3.2 Aligned incentives

To understand the dynamics of the model I first explore an equilibrium in which the incentives of the expert and the manager are aligned. That is, I examine the model with a manager who is not biased $\delta_{DM} = \delta$ and under the assumption that the expert places zero weight on his reputation $\lambda = 0$.

Using expression (2) with $\lambda = 0$ it is straightforward to find that an expert, similarly to the manager, prefers project implementation if the expected value of $p$ is lower than the threshold value $E\left[p|s,t\right] \leq \delta$, and the status quo otherwise. A smart expert knows $p$ with certainty and thus prefers project implementation if $s \leq \delta$ and the status quo if $s > \delta$. For a dumb expert, receiving an uninformative signal $s$, the expected value is always $E\left[p|s,l\right] = \bar{p}$. Since I defined that $\bar{p} > \delta$, a dumb expert always prefers to maintain the status quo.

With aligned incentives, an expert who receives an informative signal $s > \bar{m}^*$ is indifferent between sending an informative message $m = s$ or an uninformative message $m = \varnothing$. Both of these messages lead the manager to maintain the status quo. To simplify further discussion, from now on I only mention the expert's decision to send an informative signal $m = s$ for $s > \bar{m}^*$.

If $s \leq \bar{m}^*$, a smart expert who receives an informative signal always sends a non-empty messages to the manager $m = s$. A dumb expert on the other hand sends an empty message $m = \varnothing$ to avoid misleading the manager. I define misleading as any message sent by the expert which does not maximize the manager's expected utility. If a dumb expert sends a message $m = s$ when $s \leq \bar{m}^*$ the manager implements the project although it is preferred neither by the manager nor by the expert. In order to avoid this outcome, a dumb expert sends an empty project message $m = \varnothing$ if $s \leq \bar{m}^*$. Using expression (4), and given the expert's equilibrium strategies, I find the threshold message $\bar{m}^* = \delta$ to be the equilibrium.[4] Figure 1 presents the expert equilibrium strategy.

**Proposition 1.** *If the incentives of the expert and the manager are aligned $\delta_{DM} = \delta$ and $\lambda = 0$ then i) the expert does not mislead the manager; ii) the first-best outcome for the principle results.*

The labor market's posterior belief about the expert's type is determined by the manager's choice $x$ and the state of the world $\Gamma$. It infers the equilibrium strategies of the expert $\sigma_t^*$ and the

[4]Actually, there are infinite threshold equilibira $\bar{m}^* \in \left[\frac{\delta_{DM}-(1-\pi)\cdot\bar{p}}{\pi}, \delta_{DM}\right]$. I choose to focus on a simple equilibrium to analyze $\bar{m}^* = \delta_{DM}$. One justification for this choice can be the assumption that there is a very low probability that a manager implement the project for a message $m \in (\bar{m}^*, \delta_{DM}]$. In that case a dumb expert always report $m = \varnothing$ if $s \leq \delta_{DM}$ and the unique equilibrium is $\bar{m}^* = \delta_{DM}$.

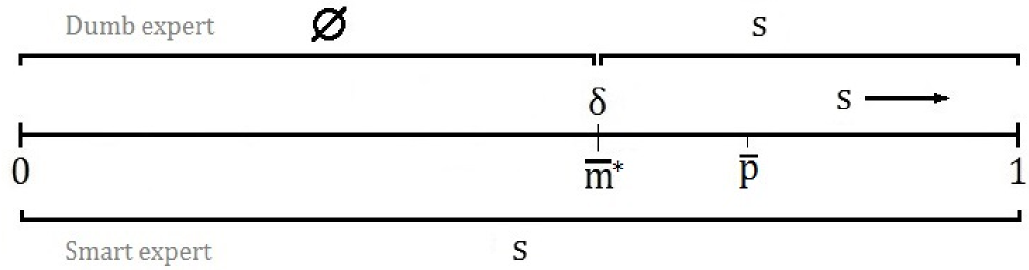


**Figure 1:** Equilibrium message $\bar{m}^*$ and expert strategies with $\delta_{DM} = \delta$ and $\lambda = 0$.

manager's threshold $\bar{m}^*$, and updates its belief in a Bayesian fashion, such that[5]

$$\pi_x^+ = \frac{\Pr(x = \Gamma | t = h, x) \Pr(t = h)}{\Pr(x = \Gamma | x)}$$
$$\pi_x^- = \frac{\Pr(x \neq \Gamma | t = h, x) \Pr(t = h)}{\Pr(x \neq \Gamma | x)}$$

The relations between the labor market's posterior beliefs are given by

$$1 = \pi_n^+ = \pi_n^- > \pi_o^+ > \pi_o^- \tag{5}$$

Since only a smart expert reveals a signal $s \leq \delta$ to the manager, project implementation by the manager, regardless of decision outcome, must indicate that the expert is smart $\pi_n^+ = \pi_n^- = 1$. A dumb expert always sends a message that leads the manager to maintain the status quo. A smart expert sends such a message only if he receives a signal $s > \delta$ or an uninformative signal $s = \varnothing$. In expectation, the status quo must be more likely to be kept due to an advice of a dumb expert than of a smart expert. Since a smart expert is better informed of the project probability $p$, a successful decision outcome of the status quo is more likely to be due to a smart expert, or $\pi_o^+ \geq \pi_o^-$.

When the incentives of the manager and expert are aligned the most efficient outcome possible for the principle results. The expert does not mislead the manager, while the manager always makes the preferred decision by the principal.

[5]See Appendix for full details of the posterior beliefs.

### 3.3 Career concerns

An expert with career concerns $\lambda > 0$ has an incentive to send a message that not only maximizes the expected decision outcome of project choice but also increases his reputation. As career concerns $\lambda$ increase, so do the incentives of an expert to mislead the manager.

Since without career concerns the reputation of the expert is higher after project implementation than with a decision to keep the status quo, as $\lambda$ increases from $\lambda = 0$ project implementation becomes more attractive to the expert. A smart expert learns $p$, the probability that project implementation is successful, with certainty if he receives an informative signal. Thus, an informative signal $s$ affects a smart expert's expected valuation of the two alternatives. A signal $s$ received by a dumb expert on the other hand has no informational value. For this reason I discuss the effect of career concerns on the expert's strategy separately for each type.

The lower is the signal $s$ received by a smart expert, the higher is the probability project implementation (status quo) has a positive (negative) outcome. I can define a threshold signal $\bar{s}$ for which a smart expert is indifferent between implementation and status quo.[6] This threshold $\bar{s}$ is given by

$$\bar{s} = \frac{\delta + \lambda\left(\pi_n^+ - \pi_o^-\right)}{1 + \lambda\left(\pi_n^+ - \pi_n^- + \pi_o^+ - \pi_o^-\right)} \tag{6}$$

where for a signal $s \leq \bar{s}$ a smart expert prefers project implementation and for a signal $s > \bar{s}$ he prefers the keep the status quo.

Note that with $\lambda = 0$, as in the previous subsection, the threshold is given by $\bar{s} = \delta$. Since the expected reputation from project implementation is higher, the threshold increases with $\lambda$ such that $\bar{s} > \delta$.[7] The stronger are career concerns the larger is the range of signal values $s$ for which the expert prefers implementation. The manager chooses to implement the project only for a message $m \leq \bar{m}^* \leq \delta$. Thus, a smart expert cannot mislead the manager to implement the project for any signal $s > \bar{m}^*$.

A dumb expert on the other hand may receive a signal $s \leq \bar{m}^*$ if the state of the world is $p > \bar{m}^*$. He sends a message $m = \varnothing$ for $s \leq \delta$ only as long as the expected utility he receives from project implementation is lower than the expected utility maintaining the status quo, such that

$$(1-\bar{p}) \cdot \left(\delta + \lambda\pi_n^+\right) + \bar{p} \cdot \lambda\pi_n^- < \bar{p} \cdot \left(1 - \delta + \lambda\pi_o^+\right) + (1-\bar{p}) \cdot \lambda\pi_o^- \tag{7}$$

Since $\delta < \bar{p}$, with $\lambda = 0$ this inequality always holds. There must also exist some threshold

[6] That is, $\bar{s}$ satisfies $E\left[U_e\left(x=n\right)|s=\bar{s}, t=h\right] = E\left[U_e\left(x=o\right)|s=\bar{s}, t=h\right]$.

[7] See Appendix for proof.

value $\bar{\lambda}$ such that this inequality does not hold at any level of career concerns $\lambda \geq \bar{\lambda}$. The reason is that as long inequality (7) holds the expert's expected reputation from implementation is higher than from the status quo, as seen in expression (5). Therefore, if $\lambda \rightarrow \infty$ this inequality can never hold, and the threshold value lies in the range $\bar{\lambda} \in (0, \infty)$.[8]

For any signal $s \leq \bar{p}$, the expected utility of a smart expert from implementation (status quo) is higher (lower) than that of a dumb expert. As a result, as long as a smart expert's threshold is $\bar{s} \leq \bar{p}$, it must also be that $\lambda \leq \bar{\lambda}$ and inequality (7) holds. In case career concerns are high enough for inequality (7) to be violated, such that $\lambda \geq \bar{\lambda}$, it is never the case that a dumb expert strictly prefers implementation over status quo. If that had been the case then for any $s \leq \bar{m}^*$ the dumb expert would report $m = s$, just as a smart expert. This would result in a lower expected reputation from implementation than from the status quo, making the status quo more attractive to the dumb expert.[9] Thus, if inequality (7) does not hold the expert must follow a mixed strategy for $s \leq \bar{m}^*$, such that $\sigma_l^* \left(s | s \leq \bar{m}^*\right) \in (0, 1)$.

For ease of exposition, I refer to this equilibrium strategy as $\sigma_l^* \equiv \sigma_l^* \left(s | s \leq \bar{m}^*\right)$. Note that for $s \leq \bar{m}^*$, equilibrium strategy $\sigma_l^*$ is independent of the received signal $s$. The reason is that the expert's expected value of the probability $p$ is always $\bar{p}$, regardless of the signal received. Given Definition 1, it must then be the case that $\sigma_l^*$ is equal for all signals $s \leq \bar{m}^*$. The equilibrium probability $\sigma_l^*$ is uniquely defined by

$$(1 - \bar{p}) \cdot \left(\delta + \lambda \pi_n^+ \left(\sigma_l^*\right)\right) + \bar{p} \cdot \lambda \pi_n^- \left(\sigma_l^*\right) = \bar{p} \cdot \left(1 - \delta + \lambda \pi_o^+ \left(\sigma_l^*\right)\right) + (1 - \bar{p}) \cdot \lambda \pi_o^- \left(\sigma_l^*\right) \tag{8}$$

If inequality (7) does not hold, or $\lambda > \bar{\lambda}$, then it must be the case that $\sigma_l^* > 0$. As career concerns increase so does the incentive of a dumb expert to mislead the manager when receiving a signal $s \leq \bar{m}^*$. A dumb expert's equilibrium strategy $\sigma_l^*$ then increases. In turn, the probability that project implementation is the result of a dumb expert's advice increases.

From the manager's perspective, a message $m \leq \bar{m}^*$ may be sent by a smart expert, in which case $p_{DM} = m$, or by a dumb expert, in which case $p_{DM} = \bar{p}$. As shown in (3), if a message $m \leq \bar{m}^*$ is sent by a dumb expert with probability $\sigma_l^* > 0$ then the manager's expected value $p_{DM}$ is larger than the message $m$. For the manager to be indifferent between implementation

[8] Using expression (5) and inequality (7) the threshold is found to be given by $\bar{\lambda} = \frac{\bar{p} - \delta}{1 - \left(\bar{p}\pi_o^+ + (1 - \bar{p})\pi_o^-\right)}$.

[9] The difference in project success rates due to a smart and a dumb expert is lower for implementation than for status quo. The outcome of the status quo is thus a noisier signal on expert's type than the outcome of the project. If both expert types advise the two projects at equal probabilities than the expected reputation of a dumb expert from the status quo is higher than from project implementation.

and status quo, such that $p_{DM} = \delta$, it is then required a lower threshold message $\bar{m}^*$ than $\delta$. As the probability $\sigma_l^*$ increases, the threshold message $\bar{m}^*$ decreases.

**Proposition 2.** *As the weight of career concerns $\lambda$ increases so does the equilibrium probability $\sigma_l^*$ with which a dumb expert misleads the manager to implement the project by reporting $m = s$ when $s \leq \bar{m}^*$. An increase in probability $\sigma_l^*$ decreases the manager's threshold message $\bar{m}^*$.*

Since a dumb expert's expected decision outcome from the status quo is larger than from implementation, in order for equality (8) to hold it must be that the expected reputation from project implementation is larger than the expected reputation from the status quo for any $\lambda$. The increase in the weight of career concerns $\lambda$ leads a dumb expert to opt for the 'smart choice', i.e. a choice which a better informed expert is more likely to make.

## 3.4 A biased manager

The incentives of a manager with $\delta_{DM} \neq \delta$ and the principal are not aligned. A change in $\delta_{DM}$ away from $\delta$ affects the expert's choice to reveal his signal due the change in the manager's threshold message $\bar{m}^*$. From equation (4) we observe that the manager's message threshold increases with $\delta_{DM}$. I limit the analysis only to managers who ex-ante prefer the status quo, such that $\delta_{DM} \leq \bar{p}$.[10] Managers are thus allowed to be biased in favor of implementation but not extremely so. This implies, as shown by expression (4), that the manager's threshold message must also be $\bar{m}^* \leq \bar{p}$.

As the bias of the manager towards implementation rises, so does the range of messages for which the manager implements the project. To examine the effect of the manager's bias on the expert's behavior I look at two cases separately. Let's first look at the effect of the bias when a smart expert's threshold is lower than the manager's threshold $\bar{s} \leq \bar{m}^*$. In this situation a smart expert sends an empty message $m = \varnothing$ for any signal $s \in (\bar{s}, \bar{m}^*]$. Since I limit the discussion to a mildly reformist manager $\delta_{DM} \leq \bar{p}$, it then must also be that $\bar{s} \leq \bar{p}$. From expressions (7) we know that if $\bar{s} \leq \bar{p}$ then it is also the case that $\lambda \leq \bar{\lambda}$, such that a dumb expert does not mislead the manager to implement the project. Thus, if there exists a range of signals for which the manager wishes to implement the project while a smart expert does not, it must be the case that a dumb expert does not mislead the manager $\sigma_l^* = 0$. In Section 3.2 we saw that if the manager is not biased and $\sigma_l^* = 0$ then $\bar{s} = \bar{m}^* = \delta$. As a result, for it to be $\bar{s} \leq \bar{m}^*$, the manager must

[10] A manager with $\delta_{DM} > \bar{p}$ implements a project when receiving $m = \varnothing$. This always has a negative effect on the principal. As this case does not contribute to the understanding of the principal's choice of manager I exclude it from further analysis.

be unbiased or a reformist $\delta_{DM} \geq \delta$. An increase in $\delta_{DM}$ then increases $\bar{m}^*$ but has no effect on the manager's choice and final decision outcomes. The only effect of an increase in $\delta_{DM}$ is that a smart and a dumb expert now send an empty message for a larger range of signals $s \in (\bar{s}, \bar{m}^*]$ and $s \in (0, \bar{m}^*]$, respectively.

The second case I look at is when a smart expert's threshold is higher than the manager's threshold $\bar{s} > \bar{m}^*$. Now, for any signal $s \in (\bar{m}^*, \bar{s}]$ the expert prefers implementation over status quo but cannot mislead the manager. An increase (decrease) of $\delta_{DM}$ increases (decreases) the range of signals $s \in [0, \bar{m}^*]$ for which a smart expert leads the manager to implement the project and decreases (increase) the probability that it is a smart expert who leads the manager to maintain the status quo. If career concerns are low enough $\lambda < \bar{\lambda}$ for a dumb expert not to mislead the manager $\sigma_l^* = 0$ then this change in $\bar{m}^*$ lowers the posterior beliefs of the status quo, $\pi_o^+$ and $\pi_o^-$. The reason is that both positive and negative decision outcomes of the status quo are now less likely to be the result of a message sent by a smart expert. The posterior beliefs after an implementation do not change since with $\sigma_l^* = 0$ an implementation must be the result of a smart expert's advice. If career concerns are high enough $\lambda \geq \bar{\lambda}$ then an increase in $\bar{m}^*$ must lead to an increase in the probability that a dumb expert misleads the manager $\sigma_l^* > 0$. If $\sigma_l^*$ had not changed then an increase in $\bar{m}^*$ would increase the expected reputation of implementation relative to the status quo, leading to a relative increase in the expected utility from implementation and breaking condition (8). Thus, to sustain condition (8) it must be that a dumb expert's equilibrium strategy $\sigma_l^*$ increases. This change increases the probability that implementation is the result of a dumb expert's message and decreases the probability that it is a dumb expert who led the manager to maintain the status quo.

**Proposition 3.** *If career concerns are high enough $\lambda > \bar{\lambda}$, such that $\sigma_l^* > 0$ and $\bar{s} > \bar{m}^*$, then an increase in $\delta_{DM}$ increases the probability that a dumb expert misleads the manager to implement the project $\sigma_l^*$. A decrease in $\delta_{DM}$ lowers $\sigma_l^*$.*

# 4 An optimal choice of manager

This section, building on the analysis in Section 3, examines what is the optimal level of bias $\delta_{DM}$ that the principal wishes a manager to have. There are two effects the principal must consider when deciding on the type of manager to appoint. First is the direct effect on implementation choice, the failure of a manager to make the preferred choice by the principal due to difference in preferences. For example, with no career concerns $\lambda = 0$, the manager's threshold is $\bar{m}^* = \delta_{DM}$. A reformist manager who receives a message $m \in (\delta, \delta^{DM}]$ implements the project although the principal would prefer her not to. The second effect is an indirect effect on communication, the change in the incentives of the expert to communicate strategically with the manager. For example, as discussed in Subsection 3.4, a conservative manager is more likely to maintain the status quo than an unbiased one. It follows that a choice of status quo is less likely to result from a dumb expert's message. The incentive of a dumb expert to mislead the manager is then reduced. To appoint an optimal manager $\delta_{DM}$, the principal considers the possible tradeoff between the direct and indirect effects.

Let's first consider the case that career concerns are low $\lambda < \bar{\lambda}$ such that a dumb expert does not mislead the manager $\sigma_l^* = 0$. In that case no benefit can result to the principal from the indirect effect. The direct effect of a biased manager is always negative. I thus focus on situations in which career concerns are high enough $\lambda > \bar{\lambda}$ for a dumb expert to mislead the manager. It must then also be the case that the threshold of a smart expert is higher than that of the manager $\bar{s} > \bar{m}^*$. The expected utility of the principal, conditional on expert type is given by

$$E\left[U_a|t=h\right] = \omega \cdot \int_0^{\bar{m}^*} (1-p)\, f(p)\, dp \cdot \delta + \left( (1-\omega)\, \bar{p} + \int_{\bar{m}^*}^1 p f(p)\, dp \right) \cdot (1-\delta)$$
$$E\left[U_a|t=l\right] = \omega \cdot \left(\bar{p}\,(1-\delta) - F(\bar{m}^*) \cdot \sigma_l^* \cdot (\bar{p}-\delta)\right) + (1-\omega)\, \bar{p} \cdot (1-\delta)$$

The principal maximizes his utility if the project is implemented for $E[p] \leq \delta$ and the status quo is kept otherwise. In case an expert is smart, principal's utility is maximized when the manager's equilibrium strategy is $\bar{m}^* = \delta$. If the expert is dumb, and $\sigma_l^* > 0$, then the principal's expected utility is higher the lower is the threshold message $\bar{m}^*$. Thus, in case the manager's threshold message is high, such that $\bar{m}^* > \delta$, a decrease in $\bar{m}^*$ is always beneficial for the principal. From expression (4) we observe that $\bar{m}^* > \delta$ can only occur if the manager a reformist, with $\delta_{DM} > \delta$.

With $\bar{m}^* \leq \delta$ a change in the manager's bias $\delta_{DM}$ has the opposite effect on the expected utility of the principal from each expert type. An increase in $\delta_{DM}$ increases $\bar{m}^*$ and thus decreases the set of messages $m \in (\bar{m}^*, \delta]$ for which the manager does not implement the project. As a result, an increase in $\delta_{DM}$ increases the principal's expected utility if the expert is smart. An increase in $\delta_{DM}$, increasing $\bar{m}^*$, has the reverse effect on the principal's expected utility if the expert is dumb. With an increase in $\bar{m}^*$ a dumb expert has more opportunity and stronger incentives to mislead the manager. The expected utility of the principal is given by

$$E\left[U_a|\bar{m}^*\right] = \pi E\left[U_a\left(t=h\right)\right] + \left(1-\pi\right) E\left[U_a\left(t=l\right)\right]$$

In equilibrium, the principal knows what effect his choice of the manager's bias $\delta_{DM}$ has on the manager's strategy $\bar{m}^*$. From (4) we know that an increase in $\delta_{DM}$ increases the threshold message $\bar{m}^*$. Hence, to find under which conditions it is optimal for the principal to appoint a biased manager I can use the first derivative of the principal's expected utility with respect to $\bar{m}^*$,

$$\begin{aligned}\frac{\partial E\left[U_a|\bar{m}^*\right]}{\partial \bar{m}^*} &= \omega\left(f\left(\bar{m}^*\right)\cdot\left(\pi\cdot\left(\delta-\bar{m}^*\right)+\left(1-\pi\right)\cdot\left(\delta-\bar{p}\right)\cdot\sigma_l^*\right)\right) \\ &+ \omega\left[\left(1-\pi\right)\cdot F\left(\bar{m}^*\right)\frac{\partial\sigma_l^*}{\partial\bar{m}^*}\cdot\left(\delta-\bar{p}\right)\right]\end{aligned} \tag{9}$$

The first part of (9) captures the effect a change in $\bar{m}^*$ has on project implementation. An increase in $\bar{m}^*$ increases the set of messages for which the manager implements the project. If the expert is smart then an increase in $\bar{m}^*$ is beneficial to the principal since $\delta - \bar{m}^* > 0$. If the expert is dumb then an increase in the message space increases the opportunity of the expert to mislead the manager to implement the project. Since $\delta - \bar{p} < 0$, such an increase leads to a lower expected utility. The second part of (9) captures the effect a change in $\bar{m}^*$ has on communication. An increase in $\bar{m}^*$ strengthen the incentive of a dumb expert to mislead the manager to implement the project, or $\frac{\partial\sigma_l^*}{\partial\bar{m}^*} \geq 0$, and decreases the principal's expected utility. When appointing a manager with a bias $\delta_{DM}$, the principal must consider the possible contradictory effect of the bias on project implementation and on communication.

To find whether it is optimal for the principal to appoint a biased manager I examine the marginal expected utility (9) when a manager is unbiased. Inputting $\bar{m}^* = \delta_{DM} - \frac{\sigma_l^*}{\sigma_h^*}\cdot\frac{(1-\pi)}{\pi}\left(\bar{p}-\delta_{DM}\right)$, as given in expression (4), and $\delta_{DM} = \delta$, the first order derivative with an unbiased manager is

$$\frac{\partial E\left[U_a|\bar{m}^*\right]}{\partial\bar{m}^*} = -\omega\left(1-\pi\right)F\left(\bar{m}^*\right)\frac{\partial\sigma_l^*}{\partial\bar{m}^*}\cdot\left(\bar{p}-\delta\right) \tag{10}$$

For any $F\left(\bar{m}^*\right) > 0$ and $\sigma_l^* > 0$ the marginal utility is negative, indicating that the principal's equilibrium choice of the manager's bias is $\delta_{DM} < \delta$. That is, if career concerns are high enough for a dumb expert to mislead the manager $\lambda > \bar{\lambda}$, it is always optimal for the principal to appoint a manager who is conservative, i.e. biased towards status quo. The reason is that an unbiased manager does not internalize the effect of the message threshold on communication but only on project implementation. In choosing $\bar{m}^*$, the manager best responds to given strategies of the expert types. Threshold $\bar{m}^*$ of an unbiased manager thus does not take into account the benefit of improved communication with a dumb expert which is the result of a lower threshold. The principal hence opts for appointing a conservative manager.

**Proposition 4.** *If career concerns are high enough $\lambda > \bar{\lambda}$, such that $\sigma_l^* > 0$, then the principal always appoints a conservative manager, $\delta_{DM}^* < \delta$. If $\lambda < \bar{\lambda}$, such that $\sigma_l^* = 0$, then the principal appoints an unbiased manager $\delta_{DM}^* = \delta$.*

The effect of career concerns $\lambda$ on the the equilibrium bias of the manager $\delta_{DM}^*$ chosen by the principal is not unidirectional. It depends on the functional form of the probability distribution $F(p)$. By equating (9) to zero and using (4), the equilibrium bias is given by the following implicit equation

$$\delta_{DM}^* = \delta - \frac{(1-\pi)(\bar{p}-\delta)}{(\pi + (1-\pi)\cdot\hat{\sigma}_l)} \cdot \frac{F(\hat{m})}{f(\hat{m})} \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \tag{11}$$

where, for ease of exposition, I define $\hat{m} = \bar{m}^*(\delta_{DM}^*)$ and $\hat{\sigma}_l = \sigma_l^*(\delta_{DM}^*)$.

From equation (11), we observe that the larger the effect of the threshold on a dumb expert's incentive to mislead the manager $\frac{\partial \hat{\sigma}_l}{\partial \hat{m}}$, the more conservative is the manager appointed. Similarly, the larger is the set of messages $m \in [0, \hat{m}]$ for which a dumb expert has the opportunity to mislead the manager $F(\hat{m})$, the more conservative is the manager. The reason is that the larger is $F(\hat{m})$ the more opportunity a dumb expert has to mislead the manager, and the stronger is the effect a change in $\sigma_l^*$ has. The probability distribution function $f(\hat{m})$ has the opposite effect. The larger it is, the more costly it becomes for the principal to have a biased manager who ignores a message from a smart expert to implement the project.

To find the effect of career concerns $\lambda$ on the optimal bias of the manager I take the first derivative of (11), such that

$$\frac{\partial \delta_{DM}^*}{\partial \lambda} = \frac{(1-\pi)}{(\pi + (1-\pi)\cdot\hat{\sigma}_l)} \cdot \left( \frac{\partial \hat{\sigma}_l}{\partial \lambda} (\delta - \delta_{DM}^*) - \frac{\partial}{\partial \lambda} \left( \frac{F(\hat{m})}{f(\hat{m})} \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \right) \cdot (\bar{p} - \delta) \right) \tag{12}$$

If $\frac{\partial \delta_{DM}^*}{\partial \lambda} > 0$ then an increase in the expert's career concerns lead the principal to appoint a more conservative manager. This effect is driven by an increase in the incentive of a dumb expert to mislead the manager, which can be curtailed by a more conservative manager. On the other hand, it is also possible that $\frac{\partial \delta_{DM}^*}{\partial \lambda} < 0$, in which case an increase in career concerns leads the principal to appoint a less conservative manager. This effect is driven by a reduction in the message space $m \in [0, \bar{m}^*]$ for which a dumb expert can mislead the manager, reducing the benefit of a having a conservative manager.

To examine the sign of $\frac{\partial \delta^*_{DM}}{\partial \lambda}$ in more detail I focus on the expression $\frac{\partial}{\partial \lambda}\left(\frac{F(\hat{m})}{f(\hat{m})}\frac{\partial \hat{\sigma}_l}{\partial \hat{m}}\right)$, which can be larger or smaller then zero.[11] Other components of equation (12) are strictly positive. For a given bias $\delta_{DM}$, an increase in career concerns $\lambda$ leads to an increase in the dumb expert's equilibrium strategy $\sigma^*_l$ and thus to a decrease in the manager's equilibrium threshold $\bar{m}^*$. An increase in $\lambda$ then lowers $F(\bar{m}^*)$, reducing the range of messages for which a dumb expert misleads the manager and thus the benefit a lower $\sigma^*_l$ has for the principal. If the density function $f(\bar{m}^*)$ is increasing $\frac{\partial f(\bar{m}^*)}{\partial \bar{m}^*} > 0$ then a decrease in $\bar{m}^*$ lowers the cost of having a conservative manager who ignores a message from a smart expert to implement the project. This cost is increasing if $\frac{\partial f(\bar{m}^*)}{\partial \bar{m}^*} < 0$. The sensitivity of a dumb expert's strategy $\sigma^*_l$ to the manager's threshold $\bar{m}^*$ is increasing with higher career concerns $\lambda$, enhancing the effect of a biased manager has on the dumb expert's equilibrium strategy. Note that $\frac{\partial \delta^*_{DM}}{\partial \lambda} > 0$ if $\hat{m} = 0$ since $F(0) = 0$. As a result, it must be that $\delta^*_{DM} > 0$ and the optimal manager always implements the project for some message $m$.

# 5 Imperfect quality of information

In this section I relax the assumption of the basic model on the signal quality $\alpha_t$ of the expert types, such that $1 > \alpha_h > \alpha_l > 0$. I show that, similarly to the basic model, it can be optimal for the principal to appoint a conservative manager. This result is even stronger in this section than before as a principal appoints a conservative manager for any positive level of career concerns $\lambda > 0$.

The expected value of probability $p$ of an expert of type $t$ after receiving a signal $s$ is now given by

$$p_t(s) \equiv E[p|s,t] = \begin{cases} \alpha_t s + (1-\alpha_t)\,\bar{p} \text{ if } s \neq \varnothing \\ \bar{p} \text{ if } s = \varnothing \end{cases} \tag{13}$$

Since the expected value $p_t$ of is conditional on the value of an informative signal, there is a unique signal $s = \bar{s}_t$ for which both implementation and the status quo have an equal expected utility for an expert of type $t$. The threshold $\bar{s}_t$ is given by

$$\bar{s}_t = \frac{1}{\alpha_t} \cdot \left( \frac{\delta + \lambda\left(\pi^+_n - \pi^-_o\right)}{1 + \lambda\left(\pi^+_n - \pi^-_n + \pi^+_o - \pi^-_o\right)} - (1-\alpha_t) \cdot \bar{p} \right) \tag{14}$$

[11]See Appendix for detailed analysis.

where $\bar{s}_h > \bar{s}_l$.[12] That is, the set of signals $s \in [0, \bar{s}_t]$ for which an expert prefers implementation is larger for a smart expert than a dumb expert. Note that with no career concerns $\lambda = 0$ the expected value of probability $p$ after a signal $s = \bar{s}_t$ is $p_t(\bar{s}_t) = \delta$, or that both expert types prefer implementation only if $p_t \leq \delta$. As in the basic model, with $\lambda = 0$ and an unbiased manager, an implementation of the project is more likely to be a result of a smart expert's advice than a dumb expert's advice. A dumb expert, refraining from misleading the manager, sends a message $m = s$ which leads to implementation only if $s \leq \bar{s}_l$ and an empty message $m = \varnothing$ if $\bar{s}_l < s \leq \bar{m}$. A smart expert sends a message which leads to implementation for a larger set of signals $s \in [0, \bar{s}_h]$. Similarly, also with career concerns $\lambda > 0$ implementation is more likely to be the result of a message sent by a smart expert. As a result, and similarly to expression (6), an increase in career concerns $\lambda$ increase the threshold $\bar{s}_t$.

An important change from the basic model is that with both expert types receiving an informative signal $s$, in equilibrium only pure strategies are used. Namely, an expert of type $t$ always sends a message $m = s$ for any signal $s \leq \bar{s}_t$. If $s > \bar{s}_t = q_t$ then the expert strategy depends on the manager's threshold $\bar{m}$.

As in the basic model the manager equilibrium strategy can be presented using an equilibrium threshold. Adjusting expression (3), I find the manager's expected value of probability $p$ conditional on a message $m$ is

$$\begin{aligned} p_{DM}(m) \equiv E[p|m] = & \frac{\pi \cdot \sigma_h(m)}{\pi \cdot \sigma_h(m) + (1-\pi) \cdot \sigma_l(m)} \cdot p_h(m) \\ & + \frac{(1-\pi) \cdot \sigma_l(m)}{\pi \cdot \sigma_h(m) + (1-\pi) \cdot \sigma_l(m)} \cdot p_l(m) \end{aligned}$$

Similarly to the basic model, when receiving a message, the manager does not always know the type of the expert sending it. Hence, the manager's expected value $p_{DM}$ is a weighted average. To find the threshold message of the manager $\bar{m}$ I equate $p_{DM}(\bar{m}) = \delta_{DM}$. Since the expert employs pure equilibrium strategies I focus on the following two equilibrium thresholds of the manager

$$\begin{aligned} \bar{m}_l^* &= \bar{m}^*(\sigma_h^* = 1, \sigma_l^* = 1) = \delta_{DM} - \frac{1 - (\pi \cdot \alpha_h + (1-\pi) \cdot \alpha_l)}{\pi \cdot \alpha_h + (1-\pi) \cdot \alpha_l}(\bar{p} - \delta_{DM}) \\ \bar{m}_h^* &= \bar{m}^*(\sigma_h^* = 1, \sigma_l^* = 0) = \delta_{DM} - \frac{(1-\alpha_h)}{\alpha_h}(\bar{p} - \delta_{DM}) \end{aligned} \tag{15}$$

[12] See Appendix.

where $\bar{m}_h^* > \bar{m}_l^*$.

The threshold message is $\bar{m}^* = \bar{m}_l^*$ if after receiving a signal $s$ both expert types prefer implementation $s \leq \bar{s}_l < \bar{s}_h$ and it is $\bar{m}^* = \bar{m}_h^*$ if only the smart expert prefers implementation $\bar{s}_l < s \leq \bar{s}_h$. In case both expert types prefer the status quo $\bar{s}_l < \bar{s}_h < s$ then the manager always receives an uninformative message $m = \varnothing$. Figure 2 presents the manager's strategy given an informative message $m$ sent and the threshold strategy $\bar{s}_l$. If $\bar{s}_l \leq \bar{m}_l^*$ then for any signal for which a dumb expert prefers implementation $s \leq \bar{s}_l$, so does the manager. For example, with no career concerns $\lambda = 0$ and an unbiased manager $\delta_{DM} = \delta$, an expert does not mislead the manager and thus it must be that $\bar{s}_l \leq \bar{m}_l^*$. If career concerns are high enough or the manager is conservative enough then it is possible that $\bar{s}_l > \bar{m}_l^*$. In that case, for threshold values $\bar{s}_l \in (\bar{m}_l^*, \bar{m}_h^*]$, the manager's decision $x$ is not monotonous with respect to the received message $m$.

To illustrate the effect of a dumb expert's threshold $\bar{s}_l$ on the manager's strategy $\bar{m}^*$, let us focus on a dumb expert's threshold $\bar{s}_l = s_l'$ as given in Figure 2. For any message $m < \bar{m}_l^*$ the manager implements the project as even if such a message is sent by both expert types the manager prefers implementation. For a higher message $m \in (\bar{m}_l^*, s_l']$ the manager maintains the status quo. The reason is that a dumb expert who receives a signal $s \in (\bar{m}_l^*, s_l']$ prefers implementation and thus sends a message $m = s$. As a result, the manager, knowing a message $m > \bar{m}_l^*$ can be sent by both expert types, keeps the status quo. For $m \in (s_l', \bar{m}_h^*]$ the manager implements the project as she is certain only a smart expert sends that message. For any $m > \bar{m}_h^*$ the manager always maintains the status quo.

In equilibrium, the bias of the manager has a similar effect to the one found in the basic model. If the manager becomes conservative $\delta_{DM} < \delta$, then the two thresholds $\bar{m}_h$ and $\bar{m}_l$ decrease. That is, the manager require a stronger evidence in order to implement the project. In turn, it becomes more likely that a smart expert leads a manager to maintain the status quo, thus increasing the posterior beliefs $\pi_o^+$ and $\pi_o^-$. Since the expert's incentive to mislead the manager to implement the project is reduced, the thresholds $\bar{s}_h$ and $\bar{s}_l$ decrease.

Let us assume that manager is not biased $\delta_{DM} = \delta$. As shown in expression (14), with no career concerns the expected value of $p$ at the expert threshold is $p_t\left(\bar{s}_t|\lambda = 0\right) = \delta$. In that case, the expert does not mislead the manager. The principal gain nothing by appointing a biased manager. If career concerns increase then $p_t\left(\bar{s}_t|\lambda > 0\right) > \delta$. A dumb expert can mislead the manager since she is uncertain which expert type she communicates with. That is, a dumb expert can send a message that drives the manager to implement the project only because she believes it may come from a smart expert. A smart expert cannot mislead the manager in such a

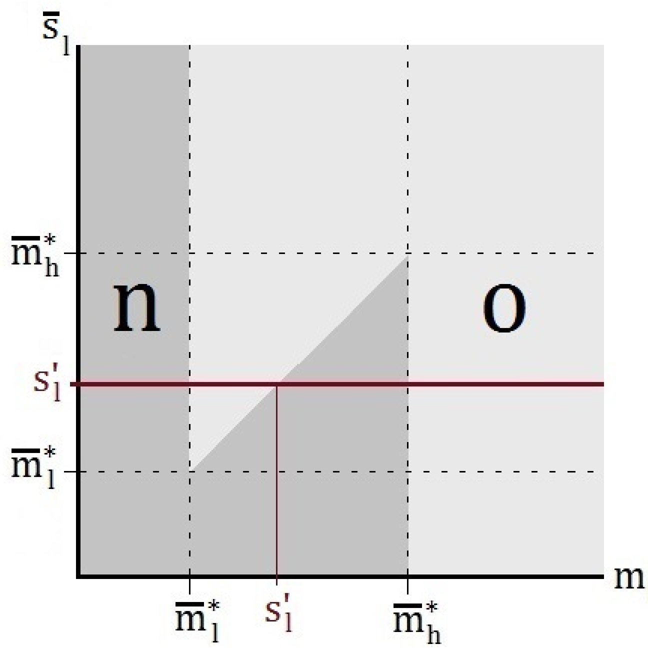


**Figure 2:** Manager's strategy $\sigma^*_{DM}(m)$ given expert thresholds $\bar{s}_h$ and $\bar{s}_l$. Within the darker area the manager implements the project $x = n$. Within the lighter area the manager maintains the status-quo $x = o$.

way. A conservative manager reduces the threshold $\bar{s}_l$, decreasing the probability a dumb expert misleads the manager. The downside is that a conservative manager, with a lower threshold $\bar{m}^*_h$, maintains the status quo more often then the principal wishes. Nonetheless, following the same intuition presented in Section 4 I find that the principal always appoint a conservative manager if career concerns are positive $\lambda > 0$ (See Appendix for a proof).

# 6 Conclusion

This paper aims to explain the prevalence of conservative decision makers in organizations. I show that when decision makers rely on information from career motivated advisors it is beneficial for a principal to appoint a conservative decision maker. i.e. a decision maker who is biased towards the status quo. Two opposing factors affect the type of decision maker the principal wishes to appoint. First, the closer the preferences of the decision maker are to the principal's preferences, the more likely it is that a decision taken is favorable to the principal. Second, the more conservative the decision maker is, the weaker are the incentives of the advisor to mislead the decision maker. As a result, if career concerns are strong enough, it is optimal for the principal to appoint a conservative decision maker.

An important assumption used in the paper is that advisors do not exert effort to obtain information. This assumption is used in order for the model to focus on the effect of the decision maker's preferences on communication. Previous research (e.g. Che and Kartik 2009; Nayeem 2013) examining the effect of biased preferences on effort decisions finds that difference in preferences can increase the advisor's effort. The model developed in this paper finds that only a decision maker who is biased towards the status quo benefits the principal. That is, the direction in the difference in preferences matters. Incorporating the effect of effort on information acquisition using a similar methodology to the one used in the previous research should thus not change the main insight of this paper.

Another assumption employed in the paper is that communication between the decision maker and the advisor is hidden from the labor market. This may be a reasonable assumption in some cases (e.g. in-house experts) but less so in others (e.g. publicly available reports). The reason the decision maker's bias affects communication in the model is that it changes the noise of the signal received by the labor market about the advisor's ability. Enabling the labor market to perfectly observe communication in the model erases any benefit a biased decision maker provides the principal. On the other hand, in case the labor market can observe only part of the communication (e.g. an official report accompanied by informal discussions) the qualitative results of the model still hold.

# 7 Appendix

### Posterior beliefs

In order to write down the posterior beliefs of the principal, given project choice and decision outcome, I define $z = \min(\bar{m}^*, \bar{s})$. Note that in Section 3.2, with career concerns $\lambda = 0$ and an unbiased manager $\delta_{DM} = \delta$, it is the case that $z = \delta$. The posterior beliefs are given by:

$$\begin{aligned}
\pi_o^+ &= \Pr(t = h | x = o, \Gamma = o) = \frac{\Pr(\Gamma = o | t = h, x = o) \Pr(t = h)}{\Pr(\Gamma = o | t = h, x = o) \Pr(t = h) + \Pr(\Gamma = o | t = l, x = o) \Pr(t = l)} \\
&= \frac{\left((1-\omega)\bar{p} + \omega \cdot (1 - F(z)) \cdot \int_z^1 p \cdot \frac{f(p)}{1-F(z)} dp\right) \cdot \pi}{\left((1-\omega)\bar{p} + \omega \cdot (1 - F(z)) \cdot \int_z^1 p \cdot \frac{f(p)}{1-F(z)} dp\right) \cdot \pi + (1 - \omega + \omega \cdot ((1 - F(\bar{m}^*)) + (1 - \sigma_l) \cdot F(\bar{m}^*))) \cdot \bar{p} \cdot (1 - \pi)} \\
&= \frac{(1-\omega)\bar{p} + \omega \int_z^1 p f(p) dp}{(1-\omega)\bar{p} + \omega \left(\int_z^1 p f(p) dp \cdot \pi + \bar{p}(1 - \sigma_l \cdot F(\bar{m}^*)) \cdot (1 - \pi)\right)} \cdot \pi
\end{aligned}$$

$$\begin{aligned}
\pi_o^- &= \Pr(t = h | x = o, \Gamma = n) = \frac{\Pr(\Gamma = n | t = h, x = o) \Pr(t = h)}{\Pr(\Gamma = n | t = h, x = o) \Pr(t = h) + \Pr(\Gamma = n | t = l, x = o) \Pr(t = l)} \\
&= \frac{\left((1-\omega)(1-\bar{p}) + \omega \cdot (1 - F(z)) \cdot \int_z^1 (1-p) \cdot \frac{f(p)}{1-F(z)} dp\right) \cdot \pi}{\left((1-\omega)(1-\bar{p}) + \omega \cdot (1 - F(z)) \cdot \int_z^1 (1-p) \cdot \frac{f(p)}{1-F(z)} dp\right) \cdot \pi + (1 - \omega + \omega \cdot (1 - F(\bar{m}^*) + (1 - \sigma_l) \cdot F(\bar{m}^*))) \cdot (1 - \bar{p}) \cdot (1 - \pi)} \\
&= \frac{(1-\omega)(1-\bar{p}) + \omega \int_z^1 (1-p) f(p) dp}{(1-\omega)\bar{p} + \omega \left(\int_z^1 (1-p) f(p) dp \cdot \pi + (1-\bar{p})(1 - \sigma_l \cdot F(\bar{m}^*)) \cdot (1 - \pi)\right)} \cdot \pi
\end{aligned}$$

$$\begin{aligned}
\pi_n^+ &= \Pr(t = h | x = n, \Gamma = n) = \frac{\Pr(\Gamma = n | t = h, x = n) \Pr(t = h)}{\Pr(\Gamma = n | t = h, x = n) \Pr(t = h) + \Pr(\Gamma = n | t = l, x = n) \Pr(t = l)} \\
&= \frac{F(z) \cdot \int_0^z (1-p) \cdot \frac{f(p)}{F(z)} dp \cdot \pi}{F(z) \cdot \int_0^z (1-p) \cdot \frac{f(p)}{F(z)} dp \cdot \pi + \sigma_l \cdot F(\bar{m}^*) \cdot (1 - \bar{p}) \cdot (1 - \pi)} \\
&= \frac{\int_0^z (1-p) \cdot f(p) dp}{\int_0^z (1-p) \cdot f(p) dp \cdot \pi + \sigma_l \cdot F(\bar{m}^*) \cdot (1 - \bar{p}) \cdot (1 - \pi)} \cdot \pi
\end{aligned}$$

$$\begin{aligned}
\pi_n^- &= \Pr(t = h | x = n, \Gamma = o) = \frac{\Pr(\Gamma = o | t = h, x = n) \Pr(t = h)}{\Pr(\Gamma = o | t = h, x = n) \Pr(t = h) + \Pr(\Gamma = o | t = l, x = n) \Pr(t = l)} \\
&= \frac{F(z) \cdot \int_0^z p \cdot \frac{f(p)}{F(z)} dp \cdot \pi}{F(z) \cdot \int_0^z p \cdot \frac{f(p)}{F(z)} dp \cdot \pi + \sigma_l \cdot F(\bar{m}^*) \cdot \bar{p} \cdot (1 - \pi)} = \frac{\int_0^z p \cdot f(p) dp}{\int_0^z p \cdot f(p) dp \cdot \pi + \sigma_l \cdot F(\bar{m}^*) \cdot \bar{p} \cdot (1 - \pi)} \cdot \pi
\end{aligned}$$

**A smart expert's threshold**

the threshold of a smart expert is given by

$$\bar{s} = \frac{\delta + \lambda\left(\pi_n^+ - \pi_o^-\right)}{1 + \lambda\left(\pi_n^+ - \pi_n^- + \pi_o^+ - \pi_o^-\right)}$$

The derivative of $\bar{s}$ is given by

$$\begin{aligned}\frac{\partial \bar{s}}{\partial \lambda} &= \frac{\left(\pi_n^+ - \pi_o^-\right) - \delta\left(\pi_n^+ - \pi_n^- + \pi_o^+ - \pi_o^-\right)}{\left(1 + \lambda\left(\pi_n^+ - \pi_n^- + \pi_o^+ - \pi_o^-\right)\right)^2} \\ &= \frac{E\left[\pi | x = n, p = \delta\right] - E\left[\pi | x = o, p = \delta\right]}{\left(1 + \lambda\left(\pi_n^+ - \pi_n^- + \pi_o^+ - \pi_o^-\right)\right)^2}\end{aligned}$$

From expressions (7) and (8) we know that $E\left[\pi | x = n, p = \bar{p}\right] > E\left[\pi | x = o, p = \bar{p}\right]$, or that a dumb expert's expected reputation from project $n$ is always higher than from project $o$. Since project $n$ is at least as likely to be successful if $p = \delta \leq \bar{p}$ then

$$E\left[\pi | x = n, p = \delta\right] > E\left[\pi | x = o, p = \delta\right]$$

It then follow that $\frac{\partial \bar{s}}{\partial \lambda} > 0$. QED.

**Derivation of inequality (10)**

Starting with the first order derivative of $E\left[U_a | \bar{m}^*\right]$,

$$\frac{\partial E\left[U_a | \bar{m}^*\right]}{\partial \bar{m}^*} = \omega \cdot \pi \cdot f\left(\bar{m}^*\right) \cdot \left(\delta - \bar{m}^*\right) - \omega\left(1 - \pi\right)\left(f\left(\bar{m}^*\right) \cdot \sigma_l^* + F\left(\bar{m}^*\right)\frac{\partial \sigma_l^*}{\partial \bar{m}^*}\right) \cdot \left(\bar{p} - \delta\right)$$

and inputting $\bar{m}^* = \delta_{DM} - \frac{\sigma_l(\bar{m}^*)}{\sigma_h(\bar{m}^*)} \cdot \frac{(1-\pi)}{\pi}\left(\bar{p} - \delta_{DM}\right)$, with $\sigma_h\left(\bar{m}^*\right) = 1$, results in

$$\begin{aligned}\frac{\partial E\left[U_a | \bar{m}^*\right]}{\partial \bar{m}^*} &= \omega \cdot \pi \cdot f\left(\bar{m}^*\right) \cdot \left(\delta - \delta_{DM} + \sigma_l^* \frac{(1-\pi)}{\pi}\left(\bar{p} - \delta_{DM}\right)\right) \\ &\quad - \omega\left(1 - \pi\right)\left(f\left(\bar{m}^*\right) \cdot \sigma_l^* + F\left(\bar{m}^*\right)\frac{\partial \sigma_l^*}{\partial \bar{m}^*}\right) \cdot \left(\bar{p} - \delta\right) \\ &= \omega \cdot f\left(\bar{m}^*\right)\left(\delta - \delta_{DM}\right)\left(\pi + \left(1 - \pi\right)\sigma_l^*\right) - \omega\left(1 - \pi\right)F\left(\bar{m}^*\right)\frac{\partial \sigma_l^*}{\partial \bar{m}^*} \cdot \left(\bar{p} - \delta\right)\end{aligned}$$

Using $\delta_{DM} = \delta$, this expression becomes

$$\frac{\partial E\left[U_a | \bar{m}^*\right]}{\partial \bar{m}^*} = -\omega\left(1 - \pi\right)F\left(\bar{m}^*\right)\frac{\partial \sigma_l^*}{\partial \bar{m}^*} \cdot \left(\bar{p} - \delta\right)$$

**Derivation of equation (11).**

To maximize the principal's expected utility $E\left[U_a\right]$, I Equate equation (9) to zero such that

$$\frac{\partial E\left[U_a|\bar{m}^*\right]}{\partial\bar{m}^*}=\omega\cdot\pi\cdot f\left(\bar{m}^*\right)\cdot\left(\delta-\bar{m}^*\right)-\omega\left(1-\pi\right)\left(f\left(\bar{m}^*\right)\cdot\sigma_l^*+F\left(\bar{m}^*\right)\frac{\partial\sigma_l^*}{\partial\bar{m}^*}\right)\cdot\left(\bar{p}-\delta\right)=0$$

which becomes

$$\hat{m}=\delta-\frac{\left(1-\pi\right)}{\pi}\left(\sigma_l^*+\frac{F\left(\hat{m}\right)}{f\left(\hat{m}\right)}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}\right)\cdot\left(\bar{p}-\delta\right)$$

where I define $\hat{m}=\bar{m}^*\left(\delta_{DM}^*\right)$ and $\hat{\sigma}_l=\sigma_l^*\left(\delta_{DM}^*\right)$. using equation (4), this expression becomes

$$\delta_{DM}-\hat{\sigma}_l\cdot\frac{\left(1-\pi\right)}{\pi}\left(\bar{p}-\delta_{DM}\right)=\delta-\frac{\left(1-\pi\right)}{\pi}\left(\hat{\sigma}_l+\frac{F\left(\hat{m}\right)}{f\left(\hat{m}\right)}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}\right)\cdot\left(\bar{p}-\delta\right)$$

and then

$$\delta_{DM}^*=\delta-\frac{\left(1-\pi\right)\left(\bar{p}-\delta\right)}{\left(\pi+\left(1-\pi\right)\cdot\hat{\sigma}_l\right)}\cdot\frac{F\left(\hat{m}\right)}{f\left(\hat{m}\right)}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}$$

**Derivation of equation (12), the first derivative $\frac{\partial\delta_{DM}^*}{\partial\lambda}$.**

To begin, lets first rewrite equation (11) as

$$\left(\pi+\left(1-\pi\right)\cdot\hat{\sigma}_l\right)\left(\delta_{DM}^*-\delta\right)=-\left(1-\pi\right)\left(\frac{F\left(\hat{m}\right)}{f\left(\hat{m}\right)}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}\right)\cdot\left(\bar{p}-\delta\right)$$

Taking first derivative of $\delta_{DM}^*$ with respect to $\lambda$ results in

$$\frac{\partial\delta_{DM}^*}{\partial\lambda}=\frac{\left(1-\pi\right)}{\left(\pi+\left(1-\pi\right)\cdot\hat{\sigma}_l\right)}\cdot\left(\frac{\partial\hat{\sigma}_l}{\partial\lambda}\left(\delta-\delta_{DM}^*\right)-\frac{\partial}{\partial\lambda}\left(\frac{F\left(\hat{m}\right)}{f\left(\hat{m}\right)}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}\right)\cdot\left(\bar{p}-\delta\right)\right)\tag{16}$$

where $\frac{\partial}{\partial\lambda}\left(\frac{F(\hat{m})}{f(\hat{m})}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}\right)$ is given by

$$\frac{\partial}{\partial\lambda}\left(\frac{F\left(\hat{m}\right)}{f\left(\hat{m}\right)}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}\right)=\frac{\partial F\left(\hat{m}\right)}{\partial\lambda}\frac{1}{f\left(\hat{m}\right)}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}-F\left(\hat{m}\right)\frac{1}{\left[f\left(\hat{m}\right)\right]^2}\frac{\partial f\left(\hat{m}\right)}{\partial\lambda}\frac{\partial\hat{\sigma}_l}{\partial\hat{m}}+\frac{F\left(\hat{m}\right)}{f\left(\hat{m}\right)}\frac{\partial^2\hat{\sigma}_l}{\partial\hat{m}\partial\lambda}$$

Since $\hat{m} = \delta_{DM} - \hat{\sigma}_l \cdot \frac{(1-\pi)}{\pi}(\bar{p} - \delta_{DM})$, the derivatives $\frac{\partial F(\hat{m})}{\partial \lambda}$ and $\frac{\partial f(\hat{m})}{\partial \lambda}$ can be rewritten as

$$\frac{\partial F(\hat{m})}{\partial \lambda} = f(\hat{m}) \frac{\partial \hat{m}}{\partial \lambda} = f(\hat{m}) \left( \frac{\partial \delta^*_{DM}}{\partial \lambda} \left( \frac{\pi + \hat{\sigma}_l (1-\pi)}{\pi} \right) - \frac{\partial \hat{\sigma}_l}{\partial \lambda} \cdot \frac{(1-\pi)}{\pi} (\bar{p} - \delta^*_{DM}) \right)$$
$$\frac{\partial f(\hat{m})}{\partial \lambda} = \frac{\partial f(\hat{m})}{\partial \hat{m}} \frac{\partial \hat{m}}{\partial \lambda} = \frac{\partial f(\hat{m})}{\partial \hat{m}} \left( \frac{\partial \delta^*_{DM}}{\partial \lambda} \left( \frac{\pi + \hat{\sigma}_l (1-\pi)}{\pi} \right) - \frac{\partial \hat{\sigma}_l}{\partial \lambda} \cdot \frac{(1-\pi)}{\pi} (\bar{p} - \delta^*_{DM}) \right)$$

Using these expressions I can now rewrite $\frac{\partial}{\partial \lambda} \left( \frac{F(\hat{m})}{f(\hat{m})} \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \right)$ as

$$\frac{\partial}{\partial \lambda} \left( \frac{F(\hat{m})}{f(\hat{m})} \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \right) = \frac{\partial \delta_{DM}}{\partial \lambda} \cdot \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \cdot \left( \frac{\pi + \hat{\sigma}_l (1-\pi)}{\pi} \right) \left( 1 - F(\hat{m}) \frac{1}{[f(\hat{m})]^2} \frac{\partial f(\hat{m})}{\partial \lambda} \right)$$
$$- \frac{\partial \hat{\sigma}_l}{\partial \lambda} \cdot \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \cdot \frac{(1-\pi)}{\pi} (\bar{p} - \delta_{DM}) \left( 1 - F(\hat{m}) \frac{1}{[f(\hat{m})]^2} \frac{\partial f(\hat{m})}{\partial \lambda} \right) + \frac{F(\hat{m})}{f(\hat{m})} \frac{\partial^2 \hat{\sigma}_l}{\partial \hat{m} \partial \lambda}$$

Inputting this expression into (16), I receive

$$\frac{\partial \delta^*_{DM}}{\partial \lambda} = \frac{(1-\pi)}{\pi + (1-\pi) \cdot \hat{\sigma}_l + A \cdot (\bar{p} - \delta)(1-\pi)} \cdot \left( \frac{\partial \hat{\sigma}_l}{\partial \lambda} (\delta - \delta^*_{DM}) + (B - C) \cdot (\bar{p} - \delta) \right)$$

where

$$A = \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \cdot \left( \frac{\pi + \hat{\sigma}_l (1-\pi)}{\pi} \right) \left( 1 - \frac{F(\hat{m})}{[f(\hat{m})]^2} \frac{\partial f(\hat{m})}{\partial \hat{m}} \right)$$
$$B = \frac{\partial \hat{\sigma}_l}{\partial \hat{m}} \cdot \frac{\partial \hat{\sigma}_l}{\partial \lambda} \cdot \frac{(1-\pi)}{\pi} (\bar{p} - \delta_{DM}) \left( 1 - \frac{F(\hat{m})}{[f(\hat{m})]^2} \frac{\partial f(\hat{m})}{\partial \hat{m}} \right)$$
$$C = \frac{F(\hat{m})}{f(\hat{m})} \frac{\partial^2 \hat{\sigma}_l}{\partial \hat{m} \partial \lambda} > 0$$

**Derivation of equation (14).**

The threshold is defined as a signal $s = \bar{s}_t$ for which both implementation and the status quo have an equal expected utility for an expert of type $t$, such that

$$(1 - p_t(\bar{s}_t)) \cdot (\delta + \lambda \pi_n^+) + p_t(\bar{s}_t) \cdot \lambda \pi_n^- = p_t(\bar{s}_t) \cdot (1 - \delta + \lambda \pi_o^+) + (1 - p_t(\bar{s}_t)) \cdot \lambda \pi_o^-$$

which can be rewritten as

$$p_t(\bar{s}_t) = \frac{\delta + \lambda (\pi_n^+ - \pi_o^-)}{1 + \lambda (\pi_n^+ - \pi_n^- + \pi_o^+ - \pi_o^-)}$$

Using expression (13) I write

$$\frac{\delta+\lambda\left(\pi_n^+-\pi_o^-\right)}{1+\lambda\left(\pi_n^+-\pi_n^-+\pi_o^+-\pi_o^-\right)}=\alpha_t\cdot\bar{s}_t+\left(1-\alpha_t\right)\bar{p}$$

which can be rewritten as

$$\bar{s}_t=\frac{1}{\alpha_t}\cdot\left(\frac{\delta+\lambda\left(\pi_n^+-\pi_o^-\right)}{1+\lambda\left(\pi_n^+-\pi_n^-+\pi_o^+-\pi_o^-\right)}-\left(1-\alpha_t\right)\cdot\bar{p}\right)$$

**Proof that the principal always appoints a conservative manager in Section 5.**

There are possible cases which are needed to be analyzed separately. One, in which a dumb expert's threshold low enough, $\bar{s}_l\leq\bar{m}_l^*$ and the other in which $\bar{s}_l>\bar{m}_l^*$. In the first case, the expected utility of the principal in equilibrium, conditional on expert type is given by

$$E\left[U_a\left(t=h\right)\right]=\omega\left(\int_0^{\bar{m}_h^*}\left(1-p_h\left(s\right)\right)f\left(s\right)dp\right)\cdot\delta+\left(\omega\left(\int_{\bar{m}_h^*}^1p_h\left(s\right)f\left(s\right)dp\right)+\left(1-\omega\right)\bar{p}\right)\cdot\left(1-\delta\right)$$
$$E\left[U_a\left(t=l\right)\right]=\omega\left(\int_0^{\bar{s}_l}\left(1-p_h\left(s\right)\right)f\left(s\right)dp\right)\cdot\delta+\left(\omega\left(\int_{\bar{s}_l}^1p_h\left(s\right)f\left(s\right)dp\right)+\left(1-\omega\right)\bar{p}\right)\cdot\left(1-\delta\right)$$

The expected utility of the principal is given by $E\left[U_a\right]=\pi E\left[U_a\left(t=h\right)\right]+\left(1-\pi\right)E\left[U_a\left(t=l\right)\right]$. Taking the first derivative with respect to $\delta_{DM}$ results in

$$\begin{aligned}\frac{\partial E\left[U_a|\delta_{DM}\right]}{\partial\delta_{DM}}&=\omega\cdot\pi\left(\frac{\partial\bar{m}_h^*}{\partial\delta_{DM}}\left(1-p_h\left(\bar{m}_h^*\right)\right)f\left(\bar{m}_h^*\right)\cdot\delta-\frac{\partial\bar{m}_h^*}{\partial\delta_{DM}}p_h\left(\bar{m}_h^*\right)f\left(\bar{m}_h^*\right)\cdot\left(1-\delta\right)\right)\\&+\omega\cdot\left(1-\pi\right)\left(\frac{\partial\bar{s}_l}{\partial\delta_{DM}}\left(1-p_l\left(\bar{s}_l\right)\right)f\left(\bar{s}_l\right)\cdot\delta-\frac{\partial\bar{s}_l}{\partial\delta_{DM}}p_l\left(\bar{s}_l\right)f\left(\bar{s}_l\right)\cdot\left(1-\delta\right)\right)\end{aligned}$$

Which can be rewritten as

$$\frac{\partial E\left[U_a|\delta_{DM}\right]}{\partial\delta_{DM}}=\omega\cdot\left(\pi\cdot\frac{\partial\bar{m}_h^*}{\partial\delta_{DM}}f\left(\bar{m}_h^*\right)\left(\delta-p_h\left(\bar{m}_h^*\right)\right)+\left(1-\pi\right)\cdot\frac{\partial\bar{s}_l}{\partial\delta_{DM}}f\left(\bar{s}_l\right)\left(\delta-p_l\left(\bar{s}_l\right)\right)\right)$$

From expressions (13) and (15) we find that $p_h\left(\bar{m}_h^*\right)=\delta_{DM}$. Thus, rewriting this expression while considering an unbiased manager $\delta_{DM}=\delta$, it becomes

$$\frac{\partial E\left[U_a|\delta_{DM}=\delta\right]}{\partial\delta_{DM}}=-\left(1-\pi\right)\cdot\frac{\partial\bar{s}_l}{\partial\delta_{DM}}f\left(\bar{s}_l\right)\left(p_l\left(\bar{s}_l\right)-\delta\right)<0$$

which is negative as long as the density function is positive $f\left(\bar{s}_l\right)>0$.

To see this, note that the derivative $\frac{\partial\bar{s}_l}{\partial\delta_{DM}}$ is positive, as discussed in Section 5 and that $p_l\left(\bar{s}_l\right)>\delta$. To see that $p_l\left(\bar{s}_l\right)>\delta$ note that from expressions (13) and (15) we find that

$p_l(\bar{s}_l) \geq \delta$, where $p_l(\bar{s}_l) = \delta$ iff $\lambda = 0$.

If the dumb expert's threshold is large enough $\bar{s}_l > \bar{m}_l^*$ then the expected utility of the principal in equilibrium, conditional on expert type is given by

$$\begin{aligned} E[U_a(t=h)] &= \omega \cdot \left( \int_0^{\bar{m}_l^*} (1 - p_h(s)) f(s)\, dp + \int_{\bar{s}_l}^{\bar{m}_h^*} (1 - p_h(s)) f(s)\, dp \right) \cdot \delta \\ &+ \left( \omega \cdot \left( \int_{\bar{m}_l^*}^{\bar{s}_l} p_h(s) f(s)\, dp + \int_{\bar{m}_h^*}^{1} p_h(s) f(p)\, dp \right) + (1-\omega)\bar{p} \right) \cdot (1-\delta) \\ E[U_a(t=l)] &= \omega \cdot \left( \int_0^{\bar{m}_l^*} (1 - p_l(s)) f(s)\, dp \right) \cdot \delta + \left( \omega \cdot \left( \int_{\bar{m}_l^*}^{1} p_l(s) f(p)\, dp \right) + (1-\omega)\bar{p} \right) \cdot (1-\delta) \end{aligned}$$

The expected utility of the principal is given by $E[U_a] = \pi E[U_a(t=h)] + (1-\pi) E[U_a(t=l)]$. Taking the first derivative with respect to $\delta_{DM}$ results in

$$\begin{aligned} \frac{\partial E[U_a|\delta_{DM}]}{\partial \delta_{DM}} &= \omega \cdot \pi \left( \frac{\partial \bar{m}_l^*}{\partial \delta_{DM}} f(\bar{m}_l^*) \cdot (\delta - p_h(\bar{m}_l^*)) - \frac{\partial \bar{s}_l}{\partial \delta_{DM}} f(\bar{s}_l)(\delta - p_h(\bar{s}_l)) + f(\bar{m}_h^*) \frac{\partial \bar{m}_h^*}{\partial \delta_{DM}} (\delta - p_h(\bar{m}_h^*)) \right) \\ &+ \omega \cdot (1-\pi) \left( \left( \frac{\partial \bar{m}_l^*}{\partial \delta_{DM}} f(\bar{m}_l^*) + \pi f(\bar{m}_h^*) \frac{\partial \bar{m}_h^*}{\partial \delta_{DM}} \right) (\delta - \delta_{DM}) - \pi \frac{\partial \bar{s}_l}{\partial \delta_{DM}} f(\bar{s}_l)(\delta - p_h(\bar{s}_l)) \right) \end{aligned}$$

Which can be rewritten as

$$\frac{\partial E[U_a|\delta_{DM}]}{\partial \delta_{DM}} = \left( \frac{\partial \bar{m}_l^*}{\partial \delta_{DM}} f(\bar{m}_l^*) + \pi f(\bar{m}_h^*) \frac{\partial \bar{m}_h^*}{\partial \delta_{DM}} \right) (\delta - \delta_{DM}) - \pi \frac{\partial \bar{s}_l}{\partial \delta_{DM}} f(\bar{s}_l)(\delta - p_h(\bar{s}_l))$$

Considering an unbiased manager $\delta_{DM} = \delta$, this expression becomes

$$\frac{\partial E[U_a|\delta_{DM} = \delta]}{\partial \delta_{DM}} = -\pi \frac{\partial \bar{s}_l}{\partial \delta_{DM}} f(\bar{s}_l)(\delta - p_h(\bar{s}_l)) < 0$$

which is negative as long as the density function is positive $f(\bar{s}_l) > 0$.

To see this, note that the derivative $\frac{\partial \bar{s}_l}{\partial \delta_{DM}}$ is positive, as discussed in Section 5 and that $p_h(\bar{s}_l) < \delta$. To see that $p_h(\bar{s}_l) < \delta$ note that from expressions (13) and (15) we find that $p_h(\bar{m}_h^*) = \delta_{DM}$. Thus, as long as $\bar{m}_h^* > \bar{s}_l$ it must be that $p_h(\bar{s}_l) < \delta_{DM}$. Indeed, it must be the case that $\bar{m}_h^* > \bar{s}_l$ since if $\bar{m}_h^* \leq \bar{s}_l$ then the reputational benefit of implementation disappear, causing the dumb expert threshold to decrease to $p_l(\bar{s}_l) = \delta$.

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