Transparency, Recruitment and Retention in the Public Sector*

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Abstract

This paper analyses how the publication of performance indicators affects a public sector organisation’s ability to recruit and retain good staff. In our benchmark model a public sector employer chooses between a policy of ‘transparency’ (truthful disclosure in every period) and ‘confidentiality’ (silence in every period). We highlight the possibility of an informational trade-off. Publishing - as opposed to simply collecting - performance data minimises the cost of recruitment, but raises the cost of retaining good staff. We then show that, in the absence of incentive considerations and discounting, confidentiality is (weakly) optimal for any project value. The paper concludes by exploring the robustness of this prediction to alternative wage setting behaviour, disclosure policies and human capital accumulation.

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1 Introduction

Motivating (or inducing effort from) current employees is clearly an important objective in any organisation. It is therefore no surprise that, by the late 1980’s, the lessons of incentive theory had begun to filter through into both public and private organisational design.

As Hood (1991) notes, one unifying feature of the so called ‘New Public Management’ schemes was a belief that incentivisation demanded greater transparency. So much so that over the last decade we have seen a dramatic increase in the measurement and publication of public sector performance indicators. In the UK, for instance, teachers, doctors and police officers must now submit performance data such as exam results, waiting times or conviction rates for publication in league tables; academics are now regularly inspected and receive widely publicised grades for the quality of their teaching and research; while government departments are now bound by Public Service Agreements with very public penalties for failure.

Recent headlines, however, serve as a stark reminder that the recruitment and retention of good staff can prove equally vital to organisational success. For instance, reporting on the perceived ‘recruitment and retention crisis’ in the UK public sector, the Audit Commission (2002) comments that current staff shortages are likely to stall the delivery of public service improvements.

The scale of this problem is reflected in Government targets. The Department of Health (DoH) has stated a need to recruit an additional 35,000 nurses and 15,000 consultants and GPs by 2008, the Department for Education and Skills (DfES) 10,000 teachers and 20,000 non-teaching staff by 2006 and the Home Office 9,000 more police officers by the end of 2003. Likewise, the Government Economics Service must surely be hoping to improve on 2001 when it filled just 50% of its vacancies for civil service economists. Low levels of retention are also a worry. In 1998 a survey of UK GPs revealed that 14% expected to quit the health profession within 5 years; a follow up survey in 2001 revealed that this figure had risen to 22%.

Accordingly, if public services are ever to be provided efficiently, it seems important to understand how policies - designed to provide incentives - affect employee sorting over time (i.e. recruitment and retention) and vice versa. In this paper we take a first step towards this aim by exploring how greater transparency in public sector performance affects sorting behaviour in the absence of incentive considerations. It is often claimed that the introduction of performance indicators has increased paperwork and, in turn, deterred potential applicants and de-motivated current staff.

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2 Source: ‘So You Really Want to Make a Difference?’, Financial Times 24/10/02.
3 Figures taken from Sibbald, Bojke and Gravelle (2003).
4 See, for instance, the Audit Commission (2002) and a recent article in The Economist titled ‘Talent in the Public Sector: Finding People to Run the Country’, 17/01/03.
an alternative, informational perspective. Specifically, abstracting from direct measurement costs, we investigate how the publication of performance information affects the public sector’s ability to recruit and retain good staff.

To fix ideas we begin by focusing on the following, rather stylised set-up. A risk neutral agent, motivated purely by financial gain, chooses whether to work for a public sector organisation or to take a job in the private sector in each of 3 periods. All employers require the agent to work on a project that can either succeed or fail, where the probability of success depends only on the agent’s innate talent which is, initially, unknown to all players and is constant across sectors. The only difference between employers is therefore their ability to respond to performance. Private sector employers (‘the market’) always offer the agent a wage equal to their expectation of her future productivity conditional on her observable history. In contrast, public sector pay is independent of performance, with any initial offer binding in all future periods.\textsuperscript{5}

While workers are \textit{ex ante} identical, over time employers may either encounter an agent whose project(s) succeeded, an agent whose project(s) failed or an agent with mixed fortunes. Such ‘outcome types’ differ in their value to employers: for example, the first type of agents are more valuable because past success is a signal of talent and hence of future productivity. Our aim is to establish how the publication of performance information influences the level of public sector pay at which each performance type of agent is willing to work in the public sector.

We begin our analysis by establishing equilibrium sector choices when the public sector organisation publishes the project outcome (equivalently the agent’s performance) at the end of every period. We term this a policy of ‘transparency’. Our first result (Proposition 1) is that, under transparency, the public sector organisation can hire any given performance type (with positive probability) at a wage equal to her market value.

Spelling out the simple intuition behind Proposition 1 aids the interpretation of later results. In general, agents must weigh up two pecuniary incentives when contemplating whether to work in the public sector. The first is what we term a \textit{current} pay incentive: will ‘going public’ maximise my current income? The second is what we term a \textit{future} pay incentive: will ‘going public’ maximise my future income? Under transparency, the market always offers a wage equal to its expectation of the agent’s future productivity conditional on her past performance. Since future wage offers then depend on performance but not sector choices, each performance type chooses a sector purely on the basis of her current pay incentive. Accordingly, the public sector employer can hire any performance type (with positive probability) simply by meeting the market’s wage offer.

Having established this benchmark result, we then ask how equilibrium sector choices change when project outcomes are observable within, but never between, organisations. We

\textsuperscript{5}We consider alternative wage setting behaviour, along with other extensions, in Section 6.
term this a policy of ‘confidentiality’. Our second result (Proposition 2) is that the public sector employer faces an ‘informational’ trade-off: concealing performance information from outsiders makes it harder to recruit in period 1 but easier to retain good staff in periods 2 and 3.

The explanation lies in the fact that confidentiality has two separate effects. First, it has what we term an option value effect. The market now observes the agent’s performance only if she goes private. Going private rather than public today therefore has an option value: if the agent is successful she can remain in the private sector tomorrow and receive a higher wage; if she is unsuccessful she can move to the public sector and receive the fixed wage. This effect ensures that period 1 and 2 performance types face a weaker future pay incentive to go public than under transparency.

However, confidentiality also has what we term an outside offer effect. If the agent has gone public at some point in the past, the market will have failed to observe her performance. Given this decision yesterday, successful agents therefore receive a lower (outside) offer from the market today than under transparency. This effect ensures that these period 2 and 3 performance types face a stronger current pay incentive to go public than under transparency.

Having identified these effects it should be clear why it is harder to recruit in period 1: the absence of a previous period implies that confidentiality only exerts an option value effect. It is less obvious why it is easier to hire successful agents in periods 2 and 3. To see why, consider an agent who went public in period 1 and was successful. In period 2 such an agent will have a stronger current pay incentive, but a weaker future pay incentive, to go public than under transparency. The former (outside offer effect) dominates - even in the absence of discounting - because repeated observations of success increase the market’s offers at a decreasing rate. It is therefore easier to hire an agent who was successful in the public sector in period 1.

Of course, by the same logic, it must also be harder to hire an agent who was successful in the private sector in period 1 (i.e. there is no longer an outside offer effect since the agent spent the first period outside the public sector). However, it is easier to convince an agent to enter the public sector in period 1 than it is to convince her to stay in period 2 after she has tasted success (i.e. while outside offers remain the same, future success is more likely giving going private greater option value). Thus, if public sector pay is high enough to hire a successful agent in period 2, we know that she must have gone public in period 1 and hence that confidentiality improves Period 2 retention. It then follows directly from the outside offer effect that it must also be easier to retain in period 3.

Our finding that there is an informational trade-off between recruitment and retention casts over the widely held belief that greater transparency necessarily improves public sector performance. In Section 5 we ask if transparency is ever optimal in the absence of incentive considerations. Our third result (Proposition 3) is that, in the absence of (i) incentive considerations and (ii) public sector discounting, the public sector employer does (weakly) better by
adopting a policy of confidentiality over transparency, irrespective of the value she places on the worker’s output.

The intuition is as follows. Since pay setting is less flexible in the public sector, the public sector employer will choose not to hire in any period if she attaches a lower value to the agent’s output than the private sector. Conversely, if the agent’s output is of more value to the public sector employer, she will elect to hire at least one performance type. Propositions 1 and 2 tell us that, if she elects to recruit in period 1 but is resigned to see good staff leave in period 2 and 3, she minimises her wage bill by choosing a policy of transparency. In contrast, if she wants to recruit and retain the best staff, she does best by choosing a policy of confidentiality. Transparency is never optimal because, if the project is sufficiently valuable to ensure that the public sector employer wants to recruit, then it is also sufficiently valuable to ensure that she will want to retain the best staff to work on it. In short, the reduction in the expected wage bill for the best performance types more than outweighs the expected wage premium that must be paid to the worst performance types. Or, to put it another way, the ‘retention effect’ dominates.

Proposition 3 serves as a convenient baseline case: confidentiality is desirable when it prevents private sector employers from updating period 2 wage offers (i.e. the outside offer effect is sufficient to outweigh the option value effect and hence enable the public sector employer to hire successful agents at a lower wage than under transparency). In Section 6 we explore the robustness of this prediction in a more general setting when private sector employers can screen workers but must update over multiple project outcomes (i.e. when sector choices cannot perfectly reveal past performance). Other extensions considered include asymmetric disclosure policies (equivalently task allocation), seniority-based public sector pay and human capital accumulation. (IN PROGRESS).

The remainder of the paper is organised as follows. The next section discusses related approaches. Section 3 sets out the basic model. Section 4 establishes equilibrium sector choices as a function of public sector pay, first under transparency and then under confidentiality. Section 5 derives the optimal policy as a function of project value. Section 6 explores a variety of extensions and, finally, Section 7 concludes.

2 Related Literature

3 A Benchmark Model

Primitives. A centralised public sector employer $P_g$ (for government principal) and a competitive private sector labour market $P_m$ (for market principal) compete to hire an agent in each of 3 periods. Both employers require the agent to work alone on a project that can either succeed or fail. The project outcome is denoted by $y_{it} \in \{s, f\}$, where the index $i = g, m$ denotes the agent’s employer in period $t$. The probability of project success depends solely on the agent’s innate talent. Restricting attention to the possibility of ‘high-flyers’ and ‘low-flyers’, this talent state is denoted by $\theta \in \{\theta_l, \theta_h\}$, where $\Pr(y_{it} = s | \theta_h) = 1 > \Pr(y_{it} = s | \theta_l) = \theta_l > 0$ for all $i$ and $t$. Information over $\theta$ is, ex ante, symmetrically incomplete: all players begin with the common prior $\Pr(\theta = \theta_h) = \Pr(\theta = \theta_l) = \frac{1}{2}$. The agent and her employer observe $y_{it}$ perfectly in every period. The ability of outsiders to observe $y_{it}$ depends on the employer’s disclosure policy.

Wage Setting. We place two restrictions on wage setting behaviour. First, neither employer can condition wage offers on future project outcomes (i.e. $y_{it}$ is not verifiable). Second, employers differ in their ability to condition on past project outcomes. At the start of every period $t$, $P_m$ makes the agent a wage offer $w_{mt}$ equal to its expectation of her future productivity conditional on her observable history $H_t$. In contrast, any offer that $P_g$ makes in period 1 must also be made future periods. Normalising the market’s valuation of success to 1 and failure to 0, we therefore have

$$w_{mt} = \Pr(y_t = s | H_t) \quad \text{and} \quad w_{gt} = \bar{w} \forall t.$$  

Since the agent has no history in period 1, the market’s initial offer is just the unconditional probability of success. To ease notation we will denote this initial offer by $w_0$ and subsequent offers by $w(H_t)$.

Sector Choices. The agent is risk neutral and motivated purely by pecuniary gain. In each period $t$ she chooses a sector $c_t \in \{g, m\}$ to maximise her expected future (undiscounted) stream of future income. We will refer to the former choice as ‘going public’ and the latter as ‘going private’.

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6 Note that the two projects are therefore equally difficult but not necessarily identical. We will suppress the index $i$ where there is no danger of confusion. The assumption that $\theta_h = 1$ eases the exposition by ensuring that failure is perfectly informative. We discuss the implications of relaxing this assumption in Section 6.

7 This assumption is intended to reflect the fact that (for a variety of reasons) public sector pay responds less to performance than private sector pay. We consider alternative (public and private) wage setting behaviour in Section 6.
The agent’s period 1 strategy simply maps from $P_g$’s choice of disclosure policy $d \in D$ and her initial wage offers $\{\bar{w}, w_0\}$ into a probability of ‘going public’. By period 2, however, she holds two pieces of information: her initial sector choice $c_1$ and her initial performance $y_1$. Similarly, by period 3, each of these endogenous types hold two further pieces of information: their period 2 sector choice $c_2$ and their period 2 performance $y_2$. Let $A$ denote an agent in period 1, $A_{\tau_2}$ a ‘career and performance’ type of agent in period 2, where $\tau_2 \in T_2 = \{g,m\} \times \{s,f\}$ and $A_{\tau_3}$ a ‘career and performance’ type of agent in period 3, where $\tau_3 \in T_3 = T_2 \times \{g,m\} \times \{s,f\}$. A (behavioural) strategy for $A$ can then be defined as the triple $(\sigma, \sigma_{\tau_2}, \sigma_{\tau_3})$, where

$$
\begin{align*}
\sigma &: D \times \{\bar{w}, w_0\} \to [0, 1] \\
\sigma_{\tau_2} &: D \times T_2 \times \{\bar{w}, w(H_2)\} \to [0, 1] \\
\sigma_{\tau_3} &: D \times T_3 \times \{\bar{w}, w(H_3)\} \to [0, 1].
\end{align*}
$$

More intuitively, $\sigma$ is the probability that $P_g$ is able to hire $A$ given her choice of disclosure policy $d$ and level of public sector pay $\bar{w}$, likewise $\sigma_{\tau_2}$ is $P_g$’s chances of hiring $A_{\tau_2}$ and $\sigma_{\tau_3}$ $P_g$’s chances of hiring $A_{\tau_3}$.

**Disclosure Policies.** Given our assumption that public sector pay is independent of past project outcomes, we focus on $P_g$’s choice of disclosure policy. To fix ideas, we initially assume that disclosure must be truthful (i.e. that $P_g$ can either reveal her information over $y_t$ to $P_m$ or stay silent) and symmetric (i.e. that the same amount of information must be revealed in every period). In short, we restrict the set of all possible disclosure policies to two regimes: ‘transparency’ ($P_g$ publishes $y_t$ at the end of period $t$) and ‘confidentiality’ ($P_g$ always stays silent). Denoting this choice by $d \in \{T, C\}$, $P_g$ solves

$$
\max_{\bar{w},d} E[V(\bar{w}, d)] = \sigma^o(\bar{w}, d; \theta_1) (\Pr(y_1 = s) \alpha - \bar{w}) + \\
\sum_{y_1} \Pr(y_1) \sigma_{y_1}(\bar{w}, d; \theta_1) (\Pr(y_2 = s | y_1) \alpha - \bar{w}) + \\
\sum_{y_1} \sum_{y_2} \Pr(y_1, y_2) \sigma_{y_1y_2}(\bar{w}, d; \theta_1) (\Pr(y_3 = s | y_1, y_2) \alpha - \bar{w}).
$$

where $\alpha$ parameterises the value $P_g$ attaches to the agent’s output (equivalently the project value) and $o$ denotes an equilibrium value.
Timing. The order of play is as follows.

Period 0. Nature chooses the agent’s ability $\theta \in \{\theta_l, \theta_h\}$. $P_g$ commits to a disclosure policy $d$ and a level of public sector pay $\overline{w}$.

Period $t = 1, 2, 3$

Stage 1 $P_g$ and $P_m$ respectively offer the agent $\overline{w}$ and $w_{mt}$.

Stage 2 The agent makes a sector choice $c_t \in \{g, m\}$. The project outcome $y_{c_t} \in \{s, f\}$ is realised and the agent receives $w_{c_t}$.

We begin our analysis by solving for the agent’s optimal strategy $(\sigma^o, \sigma^o_{\tau_2}, \sigma^o_{\tau_3})$ as a function of $\overline{w}$, taking $P_g$’s disclosure policy $d$ as given.

4 The Sorting Effects of Public Sector Pay

Employers are interested in the agent’s sector choices only insofar as they carry information on past project outcomes. For this reason we introduce the notion of ‘performance’ types. Let $A_s$ denote an agent whose project (in any given sector) was a success in period 1, and $A_f$ an agent whose project was a failure. Similarly, let $A_{ss}$ denote an agent with two project successes, $A_{ff}$ an agent with two project failures and $A_{sf}$ an agent with mixed fortunes.\(^8\) Our aim in this section is to establish how $P_g$’s ability to recruit and retain each of these performance types varies with the disclosure policy.

Before doing so it will prove helpful to note that the agent must weigh up two incentives when contemplating whether to work in the public sector in any period. The first is what we term a current pay incentive: will ‘going public’ maximise my current income? The second is what we term a future pay incentive: will ‘going public’ maximise my future income?

This distinction immediately reveals that the final (period 3) problem is trivial: under any disclosure policy $A_{\tau_3}$ simply chooses a sector on the basis of her current pay incentive. To solve for $\sigma^o_{\tau_2}(\overline{w}, d)$ and then $\sigma^o(\overline{w}, d)$, however, we must consider each policy in turn.

4.1 Transparency

We begin with the period 2 problem. Under transparency $P_m$ observes the project outcome in every period $t$. Accordingly, $H_2 = (c_1, y_1)$ and $H_3 = (c_1, y_1, c_2, y_2)$. At this point it will be helpful to make two observations. First, $c_1$ cannot carry any information under any disclosure policy since $P_m$ and $A$ are symmetrically informed when it is chosen. Second, $c_2$ cannot carry any information under transparency since both $P_m$ and $A_{\tau_2}$ observe $y_1$ and hence are, again,\(^8\)In the absence of learning $A_{sf}$ and $A_{fs}$ are equally valuable to any employer.
symmetrically informed when it was chosen. Under transparency $P_m$’s wage offers are therefore given by

$$w_{m1} = w_0, \ w_{m2} = w(y_1) \text{ and } w_{m3} = w(y_1, y_2).$$

$A_{\tau_2}$ knows that, irrespective of her sector choice and performance in period 2, she will simply choose the sector currently offering her the highest wage in period 3. Her expected continuation pay-off from ‘going public’ under transparency is therefore given by

$$E[U_{\tau_2}(g)] = \bar{w} + \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\bar{w}, w(y_1, y_2)\},$$

where the expectations operator reflects her uncertainty over her future performance. Likewise, her expected continuation pay-off from ‘going private’ is given by

$$E[U_{\tau_2}(m)] = w(y_1) + \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\bar{w}, w(y_1, y_2)\}. \tag{7}$$

Define $\Delta_{\tau_2}^T$ as the expected net benefit to $A_{\tau_2}$ from choosing to work in the public sector in period 2 under transparency. To solve for $\sigma_{o_{\tau_2}}$ we simply need to establish the sign of $\Delta_{\tau_2}^T$ given $\bar{w}$. Subtracting (7) from (6) yields

$$\Delta_{\tau_2}^T = \bar{w} - w(y_1) + \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\bar{w}, w(y_1, y_2)\} - \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\bar{w}, w(y_1, y_2)\} \tag{8}$$

From (5), $P_m$ offers $w(s)$ to both $A_{gs}$ and $A_{ms}$ and $w(f)$ to both $A_{gf}$ and $A_{mf}$. It therefore follows immediately that $\sigma_{o_{gs}} = \sigma_{o_{ms}}$ and $\sigma_{o_{gf}} = \sigma_{o_{mf}}$ for any $\bar{w}$.

We now turn to the period 1 problem. From above, the expected pay-off to $A$ from ‘going public’ under transparency is given by

$$E[U(g)] = \bar{w} + \sum_{y_1} \Pr(y_1) \left[ \sigma_{o_{\tau_1}}^{\bar{w}} + (1 - \sigma_{o_{\tau_1}}^{\bar{w}}) w(y_1) \right] + \sum_{y_1} \sum_{y_2} \Pr(y_1, y_2) \max\{\bar{w}, w(y_1, y_2)\}. \tag{9}$$

Likewise the expected pay-off to $A$ from ‘going private’ under transparency is given by

$$E[U(m)] = w_0 + \sum_{y_1} \Pr(y_1) \left[ \sigma_{o_{\tau_1}}^{\bar{w}} + (1 - \sigma_{o_{\tau_1}}^{\bar{w}}) w(y_1) \right] + \sum_{y_1} \sum_{y_2} \Pr(y_1, y_2) \max\{\bar{w}, w(y_1, y_2)\}. \tag{10}$$
Define $\Delta^T$ as the expected net benefit to $A$ from choosing to work in the public sector in period 1 under a regime of transparency. To solve for $\sigma^o$ we simply need to establish the sign of $\Delta^T$ given $w$. Subtracting (10) from (9) yields

$$
\Delta^T = \overline{w} - w_0 + \sum_{y_1} \Pr(y_1) \left( \sigma^o_{y_1} - \sigma^o_{my_1} \right) (\overline{w} - w(y_1)).
$$

(11)

Since we already know that $\sigma^o_{y_1} = \sigma^o_{my_1}$ for all $y_1$, (11) simplifies to $\Delta = \overline{w} - w_0$. We are now in a position to state our first result.

**Proposition 1 (Transparency)** $P_g$ can hire any performance type of agent at her full information market value (FIMV).

A proof is immediate from (8) and (11). The intuition is simple. Under transparency $P_m$ offers every performance type a wage equal to its expectation of her future productivity conditional on her past performance. This ensures that future wage offers depend on performance but, crucially, not sector outcomes (i.e. the future pay incentive is always zero). Given sector choices are resolved on the basis of current pay incentives, $P_g$ can hire any performance type (with positive probability) if public sector pay is at least as high as the market’s wage offer. For what follows we define such an offer as a performance type’s full information market value (FIMV).

Repeated application of Bayes’s Rule reveals that $w(f) = w(s,f) = w(f,s) < w_0 < w(s) < w(s,s)$. That is, failing at least once reveals the agent as a ‘low-flyer’, while success raises $P_m$’s belief that the agent is a ‘high-flyer’. The sorting effects of public sector pay under transparency - for this set of market offers - are illustrated in Figure 1.
4.2 Confidentiality

Under confidentiality $P_m$ observes $y_1$ if $A$ goes private but, crucially, not if she goes public. Since histories now depend on past sector choices we must solve separately for the choices made by $A_{my_1}$ and $A_{gy_1}$ (i.e. for optimal period 2 sector choices, given each period 1 sector choice).

4.2.1 Private in period 1

Since $A$ went private $P_m$ observes $y_1$. However, $P_m$ observes $y_2$ only if $A_{my_1}$ also goes private. Thus $H_2 = (m, y_1)$ with $H_3 = (m, y_1, m, y_2)$ if $c_2 = m$ but $H_3 = (m, y_1, g)$ if $c_2 = g$. Recall that $c_1$ cannot carry any information under any disclosure policy. Moreover, note that $c_2$ cannot carry any information since, again, $P_m$ and $A_{my_1}$ were symmetrically informed when it was chosen. Under confidentiality $P_m$’s wage offers when $A$ goes private are therefore given by

$$w_{m_1} = w_0, \quad w_{m_2} = w(y_1) \quad \text{and} \quad w_{m_3} = \begin{cases} w(y_1) & \text{if } c_2 = g \\ w(y_1, y_2) & \text{if } c_2 = m. \end{cases}$$

(12)

Again, $A_{my_1}$ knows that, in the final period, she will simply choose the sector offering her the highest wage. Her expected continuation pay-off from ‘going public’ is therefore given by

$$E[U_{my_1}(g)] = \overline{w} + \max\{\overline{w}, w(y_1)\}. \quad (13)$$

Likewise, her expected continuation pay-off from ‘going private’ is given by

$$E[U_{my_1}(m)] = w(y_1) + \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\overline{w}, w(y_1, y_2)\}. \quad (14)$$

Define $\Delta_{my_1}^C$ as the expected net benefit to $A_{my_1}$ from going public under confidentiality. Subtracting (14) from (13) yields

$$\Delta_{my_1}^C = \overline{w} - w(y_1) + \left[ \max\{\overline{w}, w(y_1)\} - \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\overline{w}, w(y_1, y_2)\} \right]. \quad (15)$$

As before, to solve for $\sigma_{\tau_2}^2$ under confidentiality, we simply need to establish the sign of (15) given $\overline{w}$. Doing so yields the following preliminary result.

**Lemma 1** Under confidentiality $P_g$ can (i) only hire $A_{ms}$ at more than her FIMV (i.e. iff $\overline{w} \geq w_{ms}^C > w(s)$) and (ii) hire $A_{mf}$ at her FIMV (i.e. iff $\overline{w} \geq w(f)$).

A proof is given in the Appendix and an illustration in Figure 2. The intuition behind Part (i) is as follows. $A_{ms}$ faces a zero future pay incentive if public sector pay is sufficiently low ($\overline{w} \leq w(s, f)$) or sufficiently high ($\overline{w} \geq w(s, s)$). In the former case this is because she will certainly ‘go private’ tomorrow. Given ‘going private’ today reveals a failed project as well as
Figure 2: $A_{my_1}$’s sector choices under confidentiality

a successful one, both sector choices then yield the same expected future wage, namely $w(s)$.

In the latter case this is because $A_{ms}$ will certainly ‘go public’ tomorrow which, again, ensures that both sector choices yield the same expected future wage, namely $\bar{w}$.

For any other level of public sector pay, however, $A_{ms}$ has a negative future pay incentive. This is because confidentiality gives ‘going private’ today an option value. In the event of further success she can ‘go private’ tomorrow and earn the higher wage $w(s,s)$; in the event of failure she can ‘go public’ and earn $w > w(s,f)$. We term this the option value effect of confidentiality.

Given $A$ went private, $P_m$ observes $y_1$ and hence offers $A_{ms}$ her FIMV $w(s)$. This gives $A_{ms}$ the same current pay incentive as under transparency. The presence of the option value effect therefore implies that it is harder for $P_g$ to hire $A_{ms}$ than under transparency. That is, defining $\bar{w}_{ms}^C$ as the wage at which $A_{ms}$’s current pay incentive offsets her negative pay incentive - and hence at which $P_g$ can hire $A_{ms}$ - we have $\bar{w}_{ms}^C > w(s)$.

Turning to Part (ii), recall that failure is perfectly informative. Since $P_m$ observes $y_1$, this implies that ‘going private’ can never have an option value for $A_{mf}$ (i.e. revealing a successful project to the market will not increase her future wage). $A_{mf}$ therefore faces the same current and future pay incentives as under transparency enabling $P_g$ to hire her at her FIMV.

4.2.2 Public in period 1

Since $A$ went public $P_m$ cannot observe $y_1$. Moreover, $P_m$ observes $y_2$ only if $A_{gy_1}$ goes private. Thus $H_2 = (g)$ with $H_3 = (g,m,y_2)$ if $c_2 = m$ and $H_3 = (g,g)$ if $c_2 = g$. Again, recall that $c_1$ cannot carry any information under any informational regime. However, note that $c_2$ can now carry information when $c_1 = g$ because $A_{gy_1}$ has private information over $y_1$ when it was chosen. Let $\bar{\sigma}_{gs}$ and $\bar{\sigma}_{gf}$ denote the strategies that $P_m$ thinks that $A_{gs}$ and $A_{gf}$ are playing.

\footnote{Formally, $A_{my_1}$ and $P_m$ are symmetrically informed which implies $w(y_1) \equiv \Pr(s \mid y_1)w(y_1,s) + \Pr(f \mid y_1)w(y_1,f)$ for any $y_1 = s, f$.}
Likewise, her expected continuation pay-off can therefore be expressed as

\[
\begin{align*}
    w_{m_1} &= w_{m_2} = w_0 \quad \text{and} \\
    w_{m_3} &= \begin{cases} 
    w(g, g) = \Pr(y_1 = s \mid c_2 = g)w(s) + \Pr(y_1 = f \mid c_2 = g)w(f) & \text{if } c_2 = g \\
    w(g, m, y_2) = \Pr(y_1 = s \mid c_2 = m, y_2)w(s, y_2) + \\
    (y_1 = f \mid c_2 = m, y_2)w(f, y_2) & \text{if } c_2 = m
    \end{cases}
\end{align*}
\]  

where

\[
\begin{align*}
    \Pr(y_1 = s \mid c_2 = g) &= \frac{\Pr(c_2 = g \mid y_1 = s)\Pr(y_1 = s)}{\Pr(c_2 = g \mid y_1 = s)\Pr(y_1 = s) + \Pr(c_2 = m \mid y_1 = f)\Pr(y_1 = f)} \\
    &= \frac{\tilde{\sigma}_{gs}\Pr(y_1 = s)}{\tilde{\sigma}_{gs}\Pr(y_1 = s) + \tilde{\sigma}_{gf}\Pr(y_1 = f)} = 1 - \Pr(y_1 = f \mid c_2 = g)
\end{align*}
\]

and

\[
\begin{align*}
    \Pr(y_1 = s \mid c_2 = m, y_2) &= \frac{\Pr(c_2 = m \mid y_1 = s)\Pr(y_1 = s \mid y_2)}{\Pr(c_2 = m \mid y_1 = s)\Pr(y_1 = s \mid y_2) + \Pr(c_2 = m \mid y_1 = f)\Pr(y_1 = f \mid y_2)} \\
    &= \frac{(1 - \tilde{\sigma}_{gs})\Pr(y_1 = s)}{(1 - \tilde{\sigma}_{gs})\Pr(y_1 = s) + (1 - \tilde{\sigma}_{gf})\Pr(y_1 = f)} = 1 - \Pr(y_1 = f \mid c_2 = m, y_2).
\end{align*}
\]

Again, \( A_{gy} \) knows that, in the final period she will simply choose the sector offering her the highest wage. Her expected continuation pay-off from going public under confidentiality is therefore given by

\[
E[U_{gy1}(g)] = \overline{w} + \max\{\overline{w}, w(g, g)\}. \tag{19}
\]

Likewise, her expected continuation pay-off from going private is given by

\[
E[U_{gy1}(m)] = w_0 + \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\overline{w}, w(g, m, y_2)\}. \tag{20}
\]

Subtracting (19) from (20) yields

\[
\Delta_{gy1}^C = \overline{w} - w_0 + \left[ \max\{\overline{w}, w(g, g)\} - \sum_{y_2} \Pr(y_2 \mid y_1) \max\{\overline{w}, w(g, m, y_2)\} \right]. \tag{21}
\]

Note that we must now solve for \( \sigma_{gy}^C \) given \( \tilde{\sigma}_{gs} \) and \( \tilde{\sigma}_{gf} \). Establishing the sign of (21) for any \( \overline{w} \), given the wage offers induced by \( P_m \)'s beliefs \( \tilde{\sigma}_{gs} \) and \( \tilde{\sigma}_{gf} \) yields our second preliminary result.

**Lemma 2** Under confidentiality \( P_g \) can (i) hire \( A_{gs} \) at less than her market value (i.e. iff \( \overline{w} \geq \overline{w}_{gs} \) where \( \overline{w}_{gs} < w(s) \)) and (ii) only hire \( A_{gf} \) at more than her market value (i.e. iff \( \overline{w} \geq \overline{w}_{gf} > w(f) \)).
A proof is given in the Appendix and an illustration in Figure 3. The intuition behind Part (i) is as follows. Suppose that $P_g$ succeeds in hiring $A_{gs}$. $P_m$’s offers are then given by $w(g,g) = w_0$ and $w(g,m,y_2) = w(s,y_2)$.\footnote{To see this, first note that $A_{gf}$ must also ‘go public’. Suppose not, then from (18), $P_m$ must offer $w(g,m,y_2) = w(f)$. It then follows from (21) that, if $\overline{w}$ is high enough to ensure that $A_{gs}$ ‘goes public’, $A_{gf}$ will deviate. Second, note that $A_{gs}$ has more incentive to deviate to ‘going public’ in period 2 than $A_{gf}$ since she attaches a higher probability to future success. Standard refinement techniques then imply that $w(g,m,y_2) = w(s,y_2)$.} $A_{gs}$ therefore faces a negative future pay incentive unless public sector pay is sufficiently high ($\overline{w} \geq w(s,s)$). Again, this is because confidentiality conceals future success and hence creates an option value to ‘going private’. However, confidentiality has a second effect when $A$ has gone public: it conceals past performance. Given $A$ went public, $P_m$ fails to observe $y_1$ and therefore offers $A_{gs}$ less than her FIMV (i.e. $w_0 < w(s)$). We term this the outside offer effect of confidentiality.

$A_{gs}$ therefore has a stronger current pay incentive, but a weaker future pay incentive, than under transparency. The reason that $P_g$ can hire $A_{gs}$ at less than her FIMV is simple: the first (outside offer) effect dominates. To see why, note that observing successive successful projects increases $P_m$’s posterior belief that the agent is a ‘high-flyer’ but at a decreasing rate. Thus, if $P_g$ offers $w(s)$, $A_{gs}$’s positive current pay incentive more than offsets her negative future pay incentive. Defining $\overline{w}^C_{gs}$ as the wage at which these two incentives offset each other - and hence at which $P_g$ can hire $A_{gs}$ - we therefore have $\overline{w}^C_{gs} < w(s)$.

Turning to Part (ii), we already know that $P_g$ can hire both types for any $\overline{w} \geq \overline{w}^C_{gs}$. If $P_g$ fails to hire $A_{gs}$, however, $P_m$ offers $w(g,g) = w(f)$ and $w(g,m,y_2) \in \{w(y_2), w(s,y_2)\}$ depending on $\overline{\sigma}_{gf}$. This implies that ‘going private’ also has an option value for $A_{gf}$. Moreover, note that $P_m$’s failure to observe $y_1$ ensures that it offers $A_{gf}$ more than her FIMV (i.e. $w_0 > w(f)$). The reason that $P_g$ can only hire $A_{gf}$ at more than her FIMV is then simple: the option value and outside offer effects combine. Defining $\overline{w}^C_{gf}$ as the wage at which $A_{gf}$’s current pay incentive offsets her negative pay incentive - and hence at which $P_g$ can hire $A_{gf}$ - we therefore have $\overline{w}^C_{gf} > w_0$.\footnotetext{10}{To see this, first note that $A_{gf}$ must also ‘go public’. Suppose not, then from (18), $P_m$ must offer $w(g,m,y_2) = w(f)$. It then follows from (21) that, if $\overline{w}$ is high enough to ensure that $A_{gs}$ ‘goes public’, $A_{gf}$ will deviate. Second, note that $A_{gs}$ has more incentive to deviate to ‘going public’ in period 2 than $A_{gf}$ since she attaches a higher probability to future success. Standard refinement techniques then imply that $w(g,m,y_2) = w(s,y_2)$.}
4.2.3 Period 1 problem

We now turn to the period 1 problem. From above, the expected pay-off to $A$ from ‘going private’ under confidentiality is given by

$$E[U(m)] = w_0 + \sum_{y_1} \Pr(y_1) \left[ \sigma^o_{my_1} \bar{w} + (1 - \sigma^o_{my_1}) w(y_1) \right] + \sum_{y_1, y_2} \Pr(y_1, y_2) \left[ \sigma^o_{my_1} \max\{\bar{w}, w(y_1)\} + (1 - \sigma^o_{my_1}) \max\{\bar{w}, w(y_1, y_2)\} \right].$$ (22)

While, the expected pay-off to $A$ from ‘going public’ is given by

$$E[U(g)] = \bar{w} + \sum_{y_1} \Pr(y_1) \left[ \sigma^o_{gy_1} \bar{w} + (1 - \sigma^o_{gy_1}) w_0 \right] + \sum_{y_1, y_2} \Pr(y_1, y_2) \left[ \sigma^o_{gy_1} \max\{\bar{w}, w(g, g)\} + (1 - \sigma^o_{gy_1}) \max\{\bar{w}, w(g, m, y_2)\} \right].$$ (23)

Define $\Delta^C$ as the expected net benefit to $A$ from choosing to work in the public sector in period 1 under confidentiality. As before, to solve for $\sigma^o$ we need to establish the sign of $\Delta^C$ given $\bar{w}$. Subtracting (22) from (23) yields

$$\Delta^C = \bar{w} - w_0 + \sum_{y_1} \Pr(y_1) \left[ \left( \sigma^o_{gy_1} \bar{w} + (1 - \sigma^o_{gy_1}) w_0 \right) - \left( \sigma^o_{my_1} \bar{w} + (1 - \sigma^o_{my_1}) w(y_1) \right) \right] + \sum_{y_1, y_2} \Pr(y_1, y_2) \left[ \left( \sigma^o_{gy_1} \max\{\bar{w}, w(g, g)\} + (1 - \sigma^o_{gy_1}) \max\{\bar{w}, w(g, m, y_2)\} \right) - \left( \sigma^o_{my_1} \max\{\bar{w}, w(y_1)\} + (1 - \sigma^o_{my_1}) \max\{\bar{w}, w(y_1, y_2)\} \right) \right].$$ (24)

Establishing the sign of (24) for any $\bar{w}$, given the wage offers induced by $P_m$’s beliefs, yields our second result.

**Proposition 2 (Confidentiality)**

(i) Recruitment: $P_g$ can only hire $A$ at more than her FIMV (i.e. iff $\bar{w} \geq \bar{w}^C > w_0$);

(ii) Retention: $P_g$ can hire $A_s$ and $A_{ss}$ at less than their FIMVs (i.e. iff $\bar{w} \geq \bar{w}^C_{gs}$, where $\bar{w}^C_{gs} < w(s)$) and all other performance types at their FIMVs.
Figure 4: Sorting under confidentiality

A proof is given in the Appendix and an illustration in Figure 4. Comparing Propositions 1 and 2 we see that a regime of confidentiality worsens recruitment but improves retention. The intuition follows directly from the effects identified above.

**Recruitment.** In period 1 $A$ has future, but no past, performances to take into account. Confidentiality therefore creates an option value effect but no outside offer effect. This makes it unambiguously harder for $P_g$ to hire $A$ than under transparency.

To see this more clearly, note that $A$ has a zero (period 2 and period 3) future pay incentive if public sector pay is sufficiently low ($w \leq w(f)$) or sufficiently high ($w \geq w(s,s)$). Paraphrasing from above, in the former case this is because $A$ knows that she will certainly ‘go private’ in periods 2 and 3. Thus, given ‘going public’ today reveals a failed project as well as a successful, both sector choices then yield the same expected period 2 and 3 wages, namely $w_0$. In the latter case this is because $A$ knows that she will certainly ‘go public’ in periods 2 and 3 which, again, ensures that both sector choices yield the same expected period 2 and 3 wages, namely $w$. In the remaining case, however, $A$ has either a negative period 2 or 3 future pay incentive. This is because ‘going private’ today gives $A$ the option to earn a higher wage ($w(s)$ in period 2, $w(s,s)$ in period 3) if she is successful, safe in the knowledge that she can earn $w$ if she fails.

We therefore know that $P_g$ must offer $A$ more than her FIMV $w_0$. But exactly how much does $P_g$ need to pay? Suppose that $w_{gf}^C \leq w \leq w_{gs}^C$. We know from Lemma 2 that $A_{gs}$ will ‘go private’, while $A_{gf}$ will ‘go public’. Period 2 sector choices therefore reveal period 1 performance, ensuring that $A$ faces a zero period 3 future pay incentive. But this ensures that it must indeed be easier to hire $A$ than $A_{gs}$. Both performance types receive the same outside
offer from $P_m$ (i.e. $w_0$) but $A_{gs}$ has already tasted success, giving ‘going private’ greater option value. Likewise, it must indeed be harder to hire $A$ than $A_{gf}$. It therefore follows that there must exist a wage, $\bar{w}^C \in (\bar{w}_{gf}^C, \bar{w}_{gs}^C)$ such that $A$’s positive current pay incentive exactly offsets her negative period 2 future pay incentive and hence at which $P_g$ can hire $A$.

Retention. We know from above that $A$ goes public for some $\bar{w} < \bar{w}_{gs}^C$. It therefore follows from Lemma 2, that $P_g$ can hire $A_s$ at less than her FIMV. That is, if public sector pay is sufficiently high to induce $A_s$ to ‘go public’ then it must also have been sufficiently high to induce $A$ to ‘go public’. But then, given $A$ went public, $A_s$ receives a lower outsider from $P_m$ which ensures she is willing to stay in the public sector at a wage less than her FIMV.

Now turn to $A_{ss}$. Clearly, there can be no option value to ‘going public’. Moreover, if $P_g$ offers $\bar{w} > \bar{w}_{gs}^C$ we know that $A_s, A_f$ and $A$ will all have chosen to work in the public sector. This mutes $P_m$’s (outside) offer and hence ensures that $P_g$ can hire $A_{ss}$ at a wage less than her FIMV. Note that, if $\bar{w} \leq \bar{w}_{gs}^C$, $A_s$ ‘goes private’ and $A_{ss}$ receives an offer of $w(s,s)$.

5 Choosing Between Disclosure Policies

Propositions 1 and 2 reveal a simple informational trade-off. Publicly disclosing performance information at the end of every period (i.e. what we term transparency) makes it easier for $P_g$ to recruit in period 1 but harder for $P_g$ to retain the best (i.e. the most successful) agents in periods 2 and 3. In this section we ask the obvious question: in the absence of incentive considerations (and given $\theta_h = 1$), will $P_g$ ever choose to use a policy of transparency?

Recall from Section 3 that, at the start of period 1, $P_g$ simultaneously commits to a level of public sector pay $\bar{w}$ and a disclosure policy $d$. Propositions 1 and 2 tell us that the agent’s equilibrium (behavioural) strategy profile $(\sigma^o, \sigma^o_{A_{τ_2}}, \sigma^o_{A_{τ_3}})$ does indeed depend on the disclosure policy. Solving the problem given in (4) for any project value $\alpha$ and talent level of ‘low-flyers’ $\theta_l$ yields our third result.

**Proposition 3** In the absence of (i) incentive considerations and (ii) public sector discounting, $P_g$ weakly prefers confidentiality to transparency for any project value $\alpha$.

A proof is given in the Appendix. The intuition is as follows. $P_g$, effectively, faces a choice between four alternatives. First, she can elect not to hire (call this C1). Second (C2), she can elect to hire agents that have already revealed themselves to be a ‘low-flyer’ - i.e. $A_f$ in period 2 and $A_{sf}$ and $A_{ff}$ in period 3. Third (C3), she can elect to hire agents lacking evidence that they are a ‘high-flyer’ - i.e. $A$ in period 1, $A_f$ in period 2 and $A_{sf}, A_{fs}$ and $A_{ff}$ in period 3. Finally (C4), she can elect to hire every performance type.\(^{12}\)

\(^{11}\)Such a wage is unique because $\Delta^C$ is increasing in $\bar{w}$.

\(^{12}\)Note that choosing to hire $A_s$ but not $A_{ss}$ is only possible under Transparency and is clearly sub-optimal given $\bar{w}_{gs}^C < w(s,s)$.
Clearly, if \( P_g \) plumps for C1, a choice between disclosure policies is irrelevant; i.e. there will be no project outcomes to disclose or reveal. \( P_g \) is also indifferent between disclosure rules if she chooses C2; i.e. she can achieve C2 at least cost by setting public sector pay equal to \( w(f) \) under either disclosure policy. If \( P_g \) elects to go for either C3 or C4, however, disclosure policies matter. The cheapest way to achieve C3 is to offer \( w_0 \) and to use a policy of transparency. In contrast, the cheapest way to achieve C4 is to offer \( w_{gs} \) and to use a policy of confidentiality. Which of these alternatives \( P_g \) actually chooses (and hence her preferred disclosure policy) depends on the value she attaches to a worker’s output (i.e. \( \alpha \)).

Suppose that workers have a lower value in the public sector than the private sector (\( \alpha < 1 \)). Choosing C2 then yields an expected loss since \( P_g \) offers \( A_f, A_{sf} \) and \( A_{ff} \) more than she expects them to produce (i.e. \( w(f) > \Pr(s \mid f)\alpha \)). Similarly, C3 yields an expected loss because (i) \( P_g \) offers A more than she expects her to produce and (ii) \( A_f, A_{sf} \) and \( A_{ff} \) even more than she expects them to produce (i.e. \( w_0 > \Pr(s)\alpha > \Pr(s \mid f)\alpha \)). Finally, C4 yields an expected loss since \( P_g \) hires every performance type, implying that her expected cost exceeds her expected benefit (i.e. \( w_{gs} > \Pr(s)w_0 \)). Accordingly, \( P_g \) cuts her losses by choosing C1.

Alternatively, suppose that workers have a higher value in the public sector than the private sector (\( \alpha > 1 \)). It is then immediate that \( P_g \) prefers C2 to C1 since she now offers \( A_f, A_{sf} \) and \( A_{ff} \) less than she expects to them to produce (i.e. \( w(f) < \Pr(s \mid f)\alpha \)). Whether \( P_g \) will also want to hire A by offering \( w_0 \) (equivalently prefer C3 to C2) depends \( \alpha \). Note that, while \( P_g \) offers A her FIMV, \( A_f, A_{sf} \) and \( A_{ff} \) receive more than their FIMVs. Call the level of \( \alpha \) necessary to compensate for these ‘excessive’ wage offers \( \alpha_A \). Similarly, whether \( P_g \) will want to hire \( A_s \) and \( A_{ss} \) by offering \( w_{gs} \) (equivalently prefer C3 to C4) depends on \( \alpha \). However, there are now two forces at work. On the one hand \( P_g \) offers \( A_s \) and \( A_{ss} \) less than their FIMVs, on the other she offers \( A_f, A_{sf} \) and \( A_{ff} \) even more than their FIMVs. Call the threshold at which the expected benefit from hiring \( A_s \) and \( A_{ss} \) compensates for these wage offers \( \alpha_{As} \). It turns out that the former effect dominates and hence \( \alpha_{As} < \alpha_A \).

Thus, if \( P_g \) values workers sufficiently highly to want to hire A in addition to \( A_f, A_{sf} \) and \( A_{ff} \), it will also want to hire \( A_s \) and \( A_{ss} \). Accordingly, \( P_g \) never prefers transparency to confidentiality: if \( \alpha \) is low, either scheme is optimal; if \( \alpha \) is high confidentiality strictly dominates.
6 Extensions

6.1 Asymmetric Disclosure Policies

In this section we allow for asymmetric disclosure policies. That is, \( P_g \) can now vary the amount of information she discloses in each period. For brevity, we consider two benchmark cases. The first is what we term ‘delayed release’, where the agent’s initial performance is publicly observable after she has made her second sector choice. One could think of such a policy as a decision to allocate new entrants to long term projects. The second is what we term ‘partial release’. Here the agent’s initial performance is never observable; one could interpret this as a decision to allocate new entrants to projects that are (relatively) harder to measure.

6.1.1 Delayed Release

Under ‘Delayed Release’ \( P_g \) publicly discloses the agent’s performance only if she chooses to spend a second, consecutive period in the public sector. Following the steps outlined above (i.e. solving for the optimal period 2 sector choices, given each period 1 choice, and then the optimal period 1 choice, all as a function of \( \bar{\pi} \)) we establish the following result.

Proposition 4 (Delayed Release)

(i) Recruitment: \( P_g \) can only hire \( A \) at more than her FIMV, but at a lower wage than under confidentiality (i.e. iff \( \bar{\pi} \geq \bar{\pi}^D > w_0 \), where \( \bar{\pi}^D < \bar{\pi}^C \));

(ii) Retention: \( P_g \) can hire \( A_s \) at an even lower wage than under confidentiality (i.e. iff \( \bar{\pi} \geq \bar{\pi}^D \), where \( \bar{\pi}^D < \pi^C_g < w(s) \)) and all other performance types at their FIMVs.

A proof is given in the Appendix and an illustration in Figure 6. Comparing this result with Proposition 1 we see that delayed release also worsens recruitment but improves retention. Moreover, comparing this result with Proposition 2 we see that the effect on recruitment is smaller than under confidentiality. The effect on retention effect is, however, ambiguous: delayed release improves medium term retention but at the expense of long term retention.

The intuition is straightforward given our previous results. Delayed release reduces, but fails to remove, the option value to going private in period 1. It is therefore easier to recruit than under confidentiality. However, it also reverses the option value effect in period 2. This new option value effect reinforces the outside offer effect and hence makes it (significantly) easier to retain successful agents in period 2 than under either confidentiality or transparency. The downside is, of course, that there is no longer an outside offer effect in period 3. Final period retention is therefore the same as under transparency.
Figure 5: Sorting under Delayed Release

6.1.2 Partial Release

(To be completed).

7 Conclusion

(To be completed)
References


[7] Financial Times (24/10/02) “So You Really Want to Make a Difference”


Appendix

Proof of Lemma 1.

Part (i). Our aim is to show that, under confidentiality, $P_g$ can only hire $A_{ms}$ at more than her true market value $w(s)$. Recall from (15) that $P_g$ can hire $A_{ms}$ iff

$$\Delta^C_{ms} = \bar{w} - w(s) + \left[ \max \{ \bar{w}, w(s) \} - \sum_{y2} \Pr(y2 \mid s) \max \{ \bar{w}, w(s, y2) \} \right] \geq 0.$$ \hspace{0.5cm} (A1)

Observe from (A1) that: (i) $A_{ms}$ has a negative future pay incentive, weakly so for any $\bar{w} < w(s, f)$ given $w(s) = \Pr(s \mid s)w(s, s) + \Pr(f \mid s)w(s, f)$, as well as for any $\bar{w} \geq w(s, s)$; and (ii) $A_{ms}$ has a negative current pay incentive for any $\bar{w} < w(s)$. This immediately implies that $P_g$ cannot hire $A_{ms}$ for any $\bar{w} \leq w(s)$, but that $P_g$ can hire $A_{ms}$ for any $\bar{w} \geq w(s, s)$. Now suppose that $\bar{w} \in (w(s), w(s, s))$. (A1) simplifies to

$$\Delta^C_{ms} = \bar{w} - w(s) + \left[ \Pr(s \mid s) (\bar{w} - w(s, s)) \right].$$ \hspace{0.5cm} (A2)

Accordingly, $P_g$ can hire $A_{ms}$ iff $\bar{w} \geq \bar{w}^C_{ms} > w(s)$, where $\Delta^C_{ms}(\bar{w}^C_{ms}) = 0$; i.e.

$$\bar{w}^C_{ms} = \frac{1}{1 + \Pr(s \mid s)} w(s) + \frac{\Pr(s \mid s)}{1 + \Pr(s \mid s)} w(s, s).$$ \hspace{0.5cm} (A3)

Part (ii). Our aim is to show that, under confidentiality, $P_g$ can hire $A_{mf}$ at her true market value $w(f)$. Recall from (15) that $P_g$ can hire $A_{mf}$ iff

$$\Delta^C_{mf} = \bar{w} - w(f) + \left[ \max \{ \bar{w}, w(f) \} - \sum_{y2} \Pr(y2 \mid f) \max \{ \bar{w}, w(f, y2) \} \right] \geq 0.$$ \hspace{0.5cm} (A4)

Observe from (A4) that: (i) $A_{mf}$ has a zero future pay incentive for any $\bar{w}$ (following from $w(f) = w(s, f) = w(f, f)$); and (ii) $A_{mf}$ has a weakly positive current pay incentive for any $\bar{w} \geq w(f)$. Accordingly, $P_g$ can hire $A_{mf}$ iff $\bar{w} \geq w(f)$. 

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Proof of Lemma 2.

Part (i). Our aim is to show that, under confidentiality, $P_g$ can hire $A_{gs}$ at less than her true market value $w(s)$. Note that, since $A_{gs}$ moves with private information, we must ensure that her actions are consistent with $P_m$’s beliefs.

There are two possible sets of beliefs consistent with $A_{gs}$ going public: (i) pooling on public ($\sigma_{gs} = \sigma_{gf} = 1$) requiring $\Delta_{gs}^C > 0 \forall y_1$ and (ii) separating with $A_{gs}$ public ($\sigma_{gs} = 1$ and $\sigma_{gf} \in [0,1)$) requiring $\Delta_{gs}^C > 0$ and $\Delta_{gf}^C \leq 0$. From (18), the separating beliefs imply $w(g,g) = w(s)$ and $w(g,m,y_2) = w(f)$. Substituting for these wage offers in (21) yields

$$\Delta_{gs}^C = \bar{w} - w_0 + \left[ \max\{\bar{w}, w(s)\} - \max\{\bar{w}, w(f)\}\right] \forall y_1.$$  

(A5)

Thus, if $\bar{w}$ is sufficiently high to ensure $\Delta_{gs}^C > 0$, we must also have $\Delta_{gf}^C > 0$. Consequently, a separating equilibrium with $A_{gs}$ going public cannot exist for any $\bar{w}$.

This leaves pooling on public as the only equilibrium possibility. From (18), $w(g,g) = w_0$, while $w(g,m,s)$ and $w(g,m,f)$ are off the equilibrium path. Note, however, that $A_{gs}$ has more incentive to deviate to going private than $A_{gf}$ for any $\bar{w} < w(s,s)$ (i.e. she attaches a higher probability to being successful). Thus, applying the Intuitive Criterion (Cho and Kreps (1987)), we have $w(g,m,y_2) = w(s,y_2)$. Substituting for these wage offers in (21) yields

$$\Delta_{gs}^C = \bar{w} - w_0 + \left[ \max\{\bar{w}, w_0\} - \sum_{y_2} \Pr(y_2 | y_1) \max\{\bar{w}, w(s,y_2)\}\right] \forall y_1.$$  

(A6)

Observe from (A6) that: (i) $A_{gs}$ has a negative future pay incentive for any $\bar{w} < w(s,s)$; (ii) $A_{gs}$ has a more negative future pay incentive than $A_{gf}$ for any $\bar{w} < w(s,s)$; and (iii) $A_{gs}$ has a positive current pay incentive for any $\bar{w} > w_0$. This immediately implies that this pooling equilibrium cannot exist for any $\bar{w} \leq w_0$ but must exist for any $\bar{w} \geq w(s,s)$. Now suppose that $\bar{w} \in (w_0, w(s,s))$. (A6) simplifies to

$$\Delta_{gs}^C = \bar{w} - w_0 + \left[ \Pr(s | s) (\bar{w} - w(s,s))\right].$$  

(A7)

Accordingly, the pooling on public equilibrium exists if and only if $\bar{w} \geq \bar{w}_{gs}^C$, where $\Delta_{gs}^C(\bar{w}_{gs}^C) = 0$; i.e.

$$\bar{w}_{gs}^C \equiv \frac{1}{1 + \Pr(s | s)} w_0 + \frac{\Pr(s | s)}{1 + \Pr(s | s)} w(s,s).$$  

(A8)

Note that Bayes’s rule implies that $w(s) - w_0 > w(s,s) - w(s)$. It therefore follows from (A7) that $\bar{w}_{gs}^C < w(s)$. Or, in words, that $P_g$ can indeed hire $A_{gs}$ at a wage less than her true market value.

Part (ii). Our aim is to show that, under confidentiality, $P_g$ can only hire $A_{gf}$ at more than her true market value $w(f)$. From Part (i) above we know that $A_{gf}$ goes public for any $\bar{w} > \bar{w}_{gs}^C > w(f)$. It therefore remains to verify whether another equilibrium exists in which $P_g$ can hire $A_{gf}$ at a lower wage.
The remaining beliefs consistent with \( A_{gf} \) going public are separating with \( A_{gs} \) private (\( \sigma_{gs} = 0 \) and \( \bar{\sigma}_{gf} \in (0,1) \)) requiring \( \Delta_{gs}^C < 0 \) and \( \Delta_{gf}^C \geq 0 \). From (18), \( w(g, g) = w(f) \), \( w(g, m, s) = \bar{\sigma}_{gf} w(s, s) + (1 - \bar{\sigma}_{gf}) w(s) \) and \( w(g, m, f) = w(f) \). Substituting for these wage offers in (21) yields

\[
\Delta_{gf}^C = \bar{\sigma}_{gf} - w_0 + \left[ \max\{\bar{\sigma}, w(f)\} - \text{Pr}(s | y_1) \max\{\bar{\sigma}, \bar{\sigma}_{gf} w(s, s) + (1 - \bar{\sigma}_{gf}) w(s)\} - \text{Pr}(f | y_1) \max\{\bar{\sigma}, w(f)\} \right] \forall y_1. \tag{A9}
\]

Observe from (A9) that: (i) for any \( \bar{\sigma}_{gf} \) and \( \bar{\sigma} < w(s, s) \), both \( A_{gs} \) and \( A_{gf} \) have a negative future pay incentive; (ii) for any \( \bar{\sigma}_{gf} \) and \( \bar{\sigma} < w(s, s) \), \( A_{gs} \) has a more negative future pay incentive than \( A_{gf} \); and (iii) \( A_{gf} \) has a positive current pay incentive for any \( \bar{\sigma} > w_0 \). This immediately implies that such an equilibrium exists only if \( \bar{\sigma} > w_0 \) and hence that \( P_g \) must offer more than \( A_{gf} \)'s true market value.

To see exactly how much \( P_g \) must offer, suppose that \( \bar{\sigma}_{gf} \in (0,1) \) requiring \( \Delta_{gf}^C = 0 \). For any \( \bar{\sigma} < \bar{\sigma}_{gf} w(s, s) \), (A9) becomes

\[
\Delta_{gf}^C = \bar{\sigma}_{gf} - w_0 + \left[ \text{Pr}(s | f) (\bar{\sigma}_{gf} w(s, s) - (1 - \bar{\sigma}_{gf}) w(s)) \right]. \tag{A10}
\]

Define \( \bar{\sigma}_{gf}^C \) such that \( \Delta_{gf}^C(\bar{\sigma}_{gf}^C, \bar{\sigma}_{gf} = 1) = 0 \) and \( \bar{\sigma}_{gf}^C \) such that \( \Delta_{gf}^C(\bar{\sigma}_{gf}^C, \bar{\sigma}_{gf} = 0) = 0 \); i.e.

\[
\bar{\sigma}_{gf}^C = \frac{1}{1 + \text{Pr}(s | f)} w_0 + \frac{\text{Pr}(s | f)}{1 + \text{Pr}(s | f)} w(s, s) \tag{A11}
\]

and

\[
\bar{\sigma}_{gf}^C = \frac{1}{1 + \text{Pr}(s | f)} w_0 + \frac{\text{Pr}(s | f)}{1 + \text{Pr}(s | f)} w(s). \tag{A12}
\]

Notice that \( \bar{\sigma}_{gf}^C < \bar{\sigma}_{gf}^C \). It then follows from (A9) that there exists some \( \bar{\sigma}(\bar{\sigma}_{gf}) \in (\bar{\sigma}_{gf}^C, \bar{\sigma}_{gf}^C) \) such that \( \Delta_{gs}^C > 0 \) and \( \Delta_{gf}^C = 0 \). Accordingly, in equilibrium, \( P_g \) can hire \( A_{gf} \) with positive probability for any \( \bar{\sigma} \in [\bar{\sigma}_{gf}^C, \bar{\sigma}_{gf}^C] \) and certainty for any \( \bar{\sigma} > \bar{\sigma}_{gf}^C \).

**Proof of Proposition 2.**

**Part (i) (Recruitment).** Our aim is to show that, under confidentiality, \( P_g \) can only hire \( A \) at more than her true market value \( w_0 \). Recall from (24) that \( P_g \) can hire \( A \) iff

\[
\Delta^C = \bar{\sigma}_{gf} - w_0 + \sum_{y_1} \text{Pr}(y_1) \left[ \sigma_{gy_1} \bar{\sigma}_{gf} w(s, s) + (1 - \sigma_{gy_1}) w_0 - (1 - \sigma_{my_1}) w(y_1) \right] \geq 0.
\]

\[
\sum_{y_1} \sum_{y_2} \text{Pr}(y_1, y_2) \left[ \sigma_{gy_1} \max\{\bar{\sigma}, w(g, g; \sigma_{gy_1})\} - \sigma_{my_1} \max\{\bar{\sigma}, w(y_1)\} + (1 - \sigma_{gy_1}) \max\{\bar{\sigma}, w(g, m, y_2; \sigma_{gy_1})\} - (1 - \sigma_{my_1}) \max\{\bar{\sigma}, w(y_1, y_2)\} \right] \geq 0. \tag{A13}
\]
Suppose that \( \bar{w} \leq w_0 \). From Lemma 1 and 2, for any \( \bar{w} \leq w(f) \), we have \( \sigma_{ms}^o = \sigma_{mf}^o = \sigma_{gs}^o = \sigma_{gf}^o = 0 \) and hence, from (18), \( w(g,m,y_2) = w(y_2) \). (A13) therefore simplifies to
\[
\Delta^C = \bar{w} - w_0 + [w_0 - (\Pr(s)w(s) + \Pr(f)\bar{w})] + [(\Pr(s)w(s) + \Pr(f)\bar{w}) - (\Pr(s,s)w(s,s) + (1 - \Pr(s,s))\bar{w})] \\
= \bar{w} - w_0 < 0. \tag{A14}
\]
Similarly, for any \( \bar{w} \in [w(f), w_0] \), we have \( \sigma_{ms}^o = \sigma_{gs}^o = \sigma_{gf}^o = 0, \sigma_{mf}^o = 1 \) and (A13) simplifies to
\[
\Delta^C = \bar{w} - w_0 + \Pr(f) [w(f) - \bar{w}] + \Pr(f, s) [w(f) - \bar{w}] < 0. \tag{A15}
\]
Thus \( P_g \) cannot hire \( A \) for any \( \bar{w} \leq w_0 \).

To see exactly how much more \( P_g \) needs to offer, suppose that \( \bar{w} > w_0 \). From Lemma 1 and 2, for any \( \bar{w} \geq \bar{w}_{ms}^o \), we have \( \sigma_{ms}^o = \sigma_{mf}^o = \sigma_{gs}^o = \sigma_{gf}^o = 1 \) and hence, from (18), \( w(g,g) = w_0 \). (A13) therefore simplifies to
\[
\Delta^C = \bar{w} - w_0 > 0. \tag{A16}
\]
Given \( \Delta^C \) is strictly increasing in \( \bar{w} \), it therefore follows from (A15) and (A16) that \( \exists \) a unique value of \( \bar{w} \in (w_0, \bar{w}_{ms}^o) \) such that \( \Delta^C = 0 \). From Lemma 1 and 2, for any \( \bar{w} \in [\bar{w}_{gf}^o, \bar{w}_{gs}^o] \), we have \( \sigma_{ms}^o = \sigma_{gs}^o = 0 \) and \( \sigma_{mf}^o = \sigma_{gf}^o = 1 \) and hence, from (18), \( w(g,g) = w(f) \) and \( w(g,m,y_2) = w(s,y_2) \). (A13) therefore simplifies to
\[
\Delta^C = \bar{w} - w_0 + [\Pr(s)(w_0 - w(s))]. \tag{A17}
\]
Define
\[
\bar{w}^C = (1 - \Pr(s))w_0 + \Pr(s)w(s). \tag{A18}
\]
Subtracting (A18) from (A8) yields
\[
\bar{w}_{gs}^C - \bar{w}^C = -\frac{(\theta_l - 1)^3\theta_l}{4(2 + \theta_l + \theta_l^2)} > 0, \tag{A19}
\]
while subtracting (A18) from (A12) yields
\[
\bar{w}_{gf}^C - \bar{w}^C = -\frac{(\theta_l - 1)^4}{4(1 + \theta_l^2)} < 0. \tag{A20}
\]
It therefore follows that \( \Delta^C(\bar{w}_{gf}^C) < 0 \) and \( \Delta^C(\bar{w}_{gs}^C) > 0 \). Accordingly, \( P_g \) can hire \( A \) iff \( \bar{w} \geq \bar{w}^C > w_0 \).
Part (ii) (Retention). Our aim is to show that $P_g$ can hire $A_s$ and $A_{ss}$ at less than their true market values $w(s)$ and $w(s, s)$, and all other performance types at their market values.

We begin with period 2 performance types. Suppose $w < \bar{w}^C$. From Part (i) $A$ goes private. Thus, from Lemma 1, $A_s$ goes private but $A_f$ goes public iff $\bar{w} \geq w(f)$. Alternatively, suppose $w \geq \bar{w}^C$. From Part (i) $A$ now goes public. Thus, from Lemma 2, $A_f$ goes public and $A_s$ goes public iff $\bar{w} \geq \bar{w}_{gs}^C$, where $\bar{w}_{gs}^C < w(s)$.

We now turn to period 3 performance types. Suppose that $w < w(f)$. From above, $A$, $A_s$ and $A_f$ go private. From (12), $P_m$ therefore offers all performance types $w(y_1, y_2)$ and hence they all go private. Alternatively, suppose that $w \in [w(f), \bar{w}^C)$. From above, $A$ and $A_s$ go private but $A_f$ goes public. From (12), $P_m$ therefore offers $w(y_1, y_2)$ to $A_{ss}$ and $A_{sf}$ and $w(y_1)$ to $A_{fs}$ and $A_{ff}$. Accordingly, with the exception of $A_{ss}$, all performance types go public. Now suppose that $w \in [\bar{w}^C, \bar{w}_{gs}^C)$. From above, $A$ and $A_f$ go public but $A_s$ goes private. From (18), $P_m$ therefore offers $w(g, m, y_2) = w(s, y_2)$ to $A_{ss}$ and $A_{sf}$ and $w(g, g) = w(f)$ to $A_{fs}$ and $A_{ff}$. Thus, again, with the exception of $A_{ss}$, all performance types go public. Finally, suppose that $w \geq \bar{w}_{gs}^C$. From above, $A$, $A_s$ and $A_f$ go public. From (18), $P_m$ therefore offers all performance types $w(g, g) = w_0$ and hence they all go public.

Proof of Proposition 3.

We know from Propositions 1 and 3 that $P_g$ effectively faces a choice between four alternatives. She can elect to: (i) not to hire any performance type; (ii) hire $A_f$, $A_{ff}$, $A_{sf}$ and $A_{fs}$; (iii) hire $A$, $A_f$, $A_{ff}$, $A_{sf}$ and $A_{fs}$; and (iv) hire every performance type. (Note that hiring $A_s$ and not $A_{ss}$ is only possible under transparency and is clearly sub-optimal given $\bar{w}_{gs}^C < w(s)$). Recall that $P_g$ chooses between these alternatives by comparing her expected pay-off,

$$E[V(\bar{w}, d)] = \sigma^0(\bar{w}, d) (\Pr(y_1 = s)\alpha - \bar{w}) + \sum_{y_1} \Pr(y_1)\sigma^0_{y_1}(\bar{w}, d) (\Pr(y_2 = s | y_1)\alpha - \bar{w}) + \sum_{y_1} \sum_{y_2} \Pr(y_1, y_2)\sigma^0_{y_1 y_2}(\bar{w}, d) (\Pr(y_3 = s | y_1, y_2)\alpha - \bar{w}).$$ \hspace{1cm} (A21)

We know that $P_g$ can achieve objective (i) under either transparency or confidentiality if she sets $\bar{w} < w(f)$. From (A21), her expected pay-off is then given by

$$E[V(\bar{w} < w(f), d)] = 0 \forall d \text{ and } \alpha.$$ \hspace{1cm} (A22)

Similarly, she can achieve objective (ii) - at least cost - if she chooses either disclosure policy and sets $\bar{w} = w(f)$. Her expected pay-off, for any $d = T, C$ is then given by

$$E[V(w(f), d)] = (\Pr(f) + (1 - \Pr(s, s)) [\Pr(s | f)(\alpha - 1)].$$ \hspace{1cm} (A23)

Moreover, $P_g$ can achieve objective (iii) - at least cost - if she chooses a policy of transparency and sets $\bar{w} = w_0$. Her expected pay-off is then given by

$$E[V(w_0, T)] = \Pr(s)(\alpha - 1) + (\Pr(f) + (1 - \Pr(s, s)) [\Pr(s | f)\alpha - w_0].$$ \hspace{1cm} (A24)
Finally, $P_g$ can achieve objective (iv) - at least cost - if she chooses a policy of confidentiality and sets $\overline{w} = \overline{m}_{gs}^C$. Her expected pay-off is then given by

$$E[V(\overline{m}_{gs}^C, C)] = 3(Pr(s)\alpha - \overline{m}_{gs}^C).$$

(A25)

Note that the sign of (A22)-(A25) depends on $\alpha$. Our aim is to establish that $P_g$ will never choose objective (iii) and hence have a strict preference for transparency.

To do so, define

$$\alpha_A \equiv 1 + \frac{(Pr(f) + (1 - Pr(s, s))) (w_0 - w(f))}{Pr(s)},$$

(A26)

such that $E[V(w(f), d)] = E[V(w_0, T)]$,

$$\alpha_{Af} \equiv \frac{(1 + Pr(s) + Pr(s, s)) \overline{m}_{gs}^C + (1 + Pr(f) + (1 - Pr(s, s))) (\overline{m}_{gf}^C - w(f))}{Pr(s) + Pr(s | s) Pr(s | s) Pr(s | s, s)}$$

(A27)

such that $E[V(w_0, T)] = E[V(\overline{m}_{gs}^C, C)]$. Standard (but long-winded) calculations reveal that

$$1 < \alpha_{As} < \alpha_{Af} < \alpha_A$$

for any $\theta_l \in (0, 1)$.

Case 1 $\alpha < 1$. It follows immediately that (A23) is strictly negative. Moreover, given $Pr(s | f) = w(f) < w_0 = Pr(s) < \overline{m}_{gs}^C$, (A24) and (A25) are also strictly negative. $P_g$ therefore chooses objective (i), leaving her indifferent between disclosure policies.

Case 2 $\alpha \in (1, \alpha_{Af})$. It follows immediately that (A23) is strictly positive, implying that $P_g$ prefers objective (ii) to objective (i). From (A29), we have $\alpha < \alpha_A$. Thus, from (A26) and (A27), $P_g$ must also prefer objective (ii) to objectives (iii) and (iv). $P_g$ therefore chooses objective (ii) which, again, leaves her indifferent between disclosure policies.

Case 3 $\alpha \in (\alpha_{As}, \alpha_A)$. As above, $P_g$ prefers objective (ii) to objective (i). From (A26), $P_g$ also prefers objective (ii) to objective (iii). If $\alpha < \alpha_{Af}$, $P_g$ also prefers objective (ii) to objective (iv), leaving her indifferent between disclosure policies. However, if $\alpha > \alpha_{Af}$, she prefers objective (iv) to objective (ii), giving her a strict preference for confidentiality.

Case 4 $\alpha > \alpha_A$. As above, $P_g$ prefers objective (ii) to objective (i). From (A26), $P_g$ now prefers objective (iii) to objective (ii). However, from (A28), $P_g$ prefers objective (iv) to objective (iii). Thus, again, $P_g$ chooses objective (iv), ensuring that she retains her strict preference for confidentiality.

Proof of Proposition 4.

(TO BE INSERTED).