# Transparency and Talent Allocation in Money Management (Online Appendix)

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# Transparency and Talent Allocation in Money Management (Online Appendix)

In this online appendix, we assess the robustness of the countersignaling equilibrium that serves as the basis for the paper's empirical predictions, in section 3. Specifically, we revisit assumptions that define the signaling structure of our main model, and argue that the countersignaling equilibrium is largely unaffected by natural alternatives that one could consider.

## 1. Signaling via Compensation

Our approach to solving for the manager's compensation mirrors that of Berk and Green (2004) in the sense that the manager captures as much surplus as possible from his interactions with investors in each period. The difference is that, in our model, the manager knows his skill (and the information that investors have about it) when he sets $f_n$ at the beginning of period $n$. A natural question, then, is whether the manager can use this quantity, in addition to his fund's transparency, to signal his skill. For example, might it pay off for a high-skill manager to set $f_n$ to a value other than that prescribed in (3) in order to further convince investors of his talent? More specifically, is it possible for a high-skill manager to use his compensation in each period in order to break away from the pooling that Proposition 1 shows as inevitable?

The answer to this last question comes from essentially the same arguments as the proof of Proposition 1: any strategy that a high-type manager may adopt in order to separate can be imitated costlessly by lower types and a separating equilibrium is thus impossible to sustain. In the context of any countersignaling equilibrium that has high- and low-skill managers pool, this means that any departure from (3) adopted by a high-skill manager can and will be adopted by a low-skill manager, and this only leads to a reduction of their expected $N$-period compensation. As the following proposition shows, any alternative sequence of compensation contracts under which the high-type manager's per-period compensation exceeds that of the medium type supports a countersignaling equilibrium but, in all such equilibria, all three types are worse off than in the undefeated countersignaling equilibrium of Proposition 3.

**Proposition B1.** *Take any compensation sequence,* $\{f_n\}_{n=1}^N$*, with* $f_nA_n > \frac{\mu_m^2}{4k_0}$ *for all* $n \in \{1, \ldots, N\}$*. For* $N$ *sufficiently large, this compensation sequence can be adopted by high- and low-type managers to support a countersignaling equilibrium* $\{0, t, 0\}$*, with some* $t > 0$*. If this compensation sequence departs from that derived in Lemma 5 (i.e., if* $f_n \neq \frac{\bar{r}_n}{2}$ *for at least one period* $n \leq N$*), then there is an equilibrium* $\{0, t', 0\}$ *with* $t' < t$ *that makes all three types better off.*

***Proof.*** Because the proof is similar in its steps to that of Proposition 2, we only provide an outline for brevity. First, let us verify that this compensation sequence supports a countersignaling equilibrium $\{0, t, 0\}$ with some $t > 0$. In this equilibrium, the expected $N$-period compensation of a high-skill manager is

$$u_h(0) = \sum_{n=1}^{N} f_n A_n = \sum_{n=1}^{N} f_n \max\left\{0, \frac{\bar{r}_n - f_n}{k_0}\right\}, \tag{B1}$$

while that of a low-skill manager is

$$u_\ell(0) = \sum_{n=1}^{N} p_\ell^{n-1} f_n A_n = \sum_{n=1}^{N} p_\ell^{n-1} f_n \max\left\{0, \frac{\bar{r}_n - f_n}{k_0}\right\}. \tag{B2}$$

Assuming that the medium type chooses his compensation optimally (i.e., $f_n = \frac{\mu_m}{2}$ as prescribed by Lemma 6), then his expected $N$-period compensation is

$$u_m(t) = \frac{N\mu_m^2}{4k_t}. \tag{B3}$$

As before, we need to verify that no type will deviate from these choices of transparency (zero for the high and low types, and $t$ for the medium type). The fact that the high type collects more than what he would by choosing a transparency of $t$ (i.e., $f_nA_n > \frac{\mu_m^2}{4k_0} > \frac{\mu_m^2}{4k_t}$ for all $n$) ensures that he does not deviate. Since $f_nA_n > \frac{\mu_m^2}{4k_0}$, the medium type can also ensure separation from the low type by choosing a transparency level $t$ that satisfies

$$u_\ell(0) \geq \frac{1}{4k_t} \sum_{n=1}^{N} (1-t)^{n-1} \mu_m^2. \tag{B4}$$

Finally, the medium type also prefers not to deviate as doing so gives him an expected $N$-period compensation of

$$\hat{u}_m(0) = \sum_{n=1}^{N} p_m^{n-1} f_n A_n = \sum_{n=1}^{N} p_m^{n-1} f_n \max\left\{0, \frac{\bar{r}_n - f_n}{k_0}\right\}, \tag{B5}$$

which, when $N$ is large, is smaller than $\frac{N\mu_m^2}{4k_t}$. The fact that all three types are better off in the equilibrium of Proposition 3 is immediate. Indeed, in such an equilibrium, each term in the summations of (B1) and (B2) is larger as $f_n$ is then chosen to maximize $f_n A_n$ in each period. This also implies that (B4) can be satisfied with a lower $t$, improving the expected $N$-period compensation of the medium-skill manager in the process. □

The intuition for the result is simple. Because imitation is free, high types cannot separate from low types by simply choosing a compensation sequence that fails to maximize $f_n A_n$ in each period. Instead, this only serves to reduce the compensation that both high- and low-type managers can expect to receive over $N$ periods. This in turn affects the medium types who wish to separate. Indeed, the lower compensation in opaque funds makes it more attractive to deviate by increasing transparency and be identified as a medium type, as such managers still receive $\frac{\mu_m^2}{4k_t}$ per period, as derived in Lemma 6. To reduce the attractiveness of their fund and thereby keep low types away, medium types must therefore increase their choice of transparency. The resulting equilibrium is one in which all types are worse off: high and low types keep pooling but do so with suboptimal wages, while medium types incur higher transparency costs. It is then straightforward to show that such an equilibrium is defeated by the original countersignaling equilibrium in which managers of opaque funds choose $f_n$ according to (3) in every period $n$. In short, signaling via compensation choices never achieves the desired result for high types.

Notice that Proposition B1 allows for $f_n$ to be smaller or larger than that prescribed in Lemma 2. In particular, this includes strategies that set compensation low at the beginning and higher later, once the low types have been eliminated through bad performance. In this light, the result simply points out that compensation does not accelerate the investors' sorting of managers, just what these managers collect in the interim.

## 2. Separation of High-Type Managers

Our analysis so far has been conducted under the assumption that transparency can only help identify low-type managers. In particular, since $t \leq 1-\varepsilon$ under Assumption 2, the public strategy signal $\tilde{\imath}_n$ cannot be used by investors to discriminate between the other two manager types. In what follows, we relax this assumption and demonstrate that our analysis is robust to a broader definition of transparency that allows investors to also distinguish between high-type and medium-type managers.

Our discussion in Section 2.2 shows that Assumption 2 is not required to establish the existence of a countersignaling equilibrium. However, as demonstrated in Proposition 1, this assumption proves useful in eliminating equilibria in which high-type managers separate from the other two types. The adoption of a more discerning signal structure may thus expand the set of signaling equilibria. In particular, there may exist semi-separating equilibria $\{t', t, t\}$, $t' > 1-\varepsilon$, in which low- and medium-type managers pool by choosing a low transparency level $t$, and high-type managers separate by choosing a higher transparency level $t' > t$.

A high-type manager benefits from signaling his type to investors by raising investors' expectations about his fund's return (and thus attracting more money). At the same time, a higher transparency level also increases the cost of managing the fund. In the long run, therefore, separation is sustainable only if the difference in cost between the transparency levels $t$ and $t' > 1-\varepsilon$ is not too large. Indeed, if $\frac{k_{1-\varepsilon}}{k_t}$ exceeds $\left(\frac{\mu_h}{\mu_m}\right)^2$, the cost increase outweighs the benefit from separating. In this case, the high-type manager prefers to deviate to $t$ even though he will be considered a medium-type manager at best by investors.

**Lemma B1.** *Suppose that* $\frac{k_{1-\varepsilon}}{k_{\hat{t}}} > \left(\frac{\mu_h}{\mu_m}\right)^2$ *for some* $\hat{t} > 0$. *Then, for* $N$ *sufficiently large, any semi-separating equilibrium* $\{t', t, t\}$ *must have* $t > \hat{t}$.

***Proof.*** Proposition 1 implies that a semi-separating equilibrium $\{t', t, t\}$ with $t' > t$ can only exist if $t'$ exceeds $1-\varepsilon$ (that is, if Assumption 2 does not hold). The expected per-period compensation of a high-type manager in such an equilibrium can thus not exceed $\frac{\mu_h^2}{4k_{1-\varepsilon}}$. If a high-type manager deviates to choosing transparency $t$, he will be considered at best a medium-type manager by investors. However, since he picks a winning strategy in each period, his expected per-period compensation converges to $\frac{\mu_m^2}{4k_t}$, the compensation of a manager known to be of medium type. Thus, for $N$ sufficiently large, the expected compensation of a high-type manager from deviating to $t$ exceeds his equilibrium compensation if $\frac{\mu_m^2}{k_t} > \frac{\mu_h^2}{k_{1-\varepsilon}}$. If this condition holds for some $\hat{t} > 0$, a semi-separating equilibrium does therefore not exist for any $t \leq \hat{t}$, since $k_t$ is strictly increasing in $t$. □

Although semi-separating equilibria may exist for high enough transparency levels $t$, they are typically defeated by the countersignaling equilibrium $\{0, \bar{t}(0), 0\}$. Not surprisingly, high-type managers are better off in the long run when they choose zero transparency: the manager's benefit from signaling his high ability to investors diminishes over time as investors observe more return realizations, whereas the increased cost of transparency leads to a permanent reduction in the manager's expected compensation. High-type managers therefore receive a higher payoff in the countersignaling equilibrium than in the semi-separating equilibrium if $N$ is sufficiently large.

Interestingly, low-type managers may prefer the countersignaling equilibrium as well. Although low-type managers are less likely to mimic the performance of high-type managers than the performance of medium-type managers, they benefit more from pooling with highly skilled managers in terms of the performance that investors expect them to achieve. Intuitively, the latter effect dominates if the population of high-type managers is large and if the expected return of high-type managers is large compared to that of medium-type managers (that is, if $\frac{\omega}{\varepsilon}$ is small). If this is the case, it is straightforward to show that the countersignaling equilibrium $\{0, \bar{t}(0), 0\}$ defeats any semi-separating equilibrium $\{t', t, t\}$ with $t' > t > 0$. The following proposition provides sufficient conditions for this result.

**Proposition B2.** *Suppose that* $\frac{\omega}{\varepsilon} < \frac{\lambda_h}{\lambda_h + \lambda_\ell}$. *Then, for* $N$ *sufficiently large, the countersignaling equilibrium* $\{0, \bar{t}(0), 0\}$ defeats *the semi-separating equilibrium* $\{t', t, t\}$, *for all* $t' > t > \frac{1-\omega}{2}$.

***Proof.*** The definition of the Mailath, Okuno-Fujiwara and Postlewaite (1993) refinement can be found in the proof of Proposition 3.

Let $\mathcal{T}_c$ denote the countersignaling equilibrium $\{0, \bar{t}(0), 0\}$ and $\mathcal{T}_s$ denote the semi-separating equilibrium $\{t', t, t\}$, where $t' > t > 0$. Condition (i) of the equilibrium refinement is satisfied for the transparency level 0 and $K = \{h, \ell\}$.

In the countersignaling equilibrium $\mathcal{T}_c$, the expected $N$-period compensation of a high-type manager is $u_h(0)$, where $u_h(t)$ is defined in (10). An analogous argument to that in the proof of Proposition 2 shows that because $k_0 < k_{t'}$, $u_h(0)$ exceeds $N\mu_h^2/(4k_{t'})$, the expected compensation of a high-type manager in the semi-separating equilibrium $\mathcal{T}_s$, if $N$ is sufficiently large.

The expected compensation of a low-type manager in the countersignaling equilibrium $\mathcal{T}_c$ is $u_\ell(0)$, where $u_\ell(t)$ is defined in (11). In contrast, his expected compensation in the semi-separating equilibrium $\mathcal{T}_s$ cannot exceed

$$\frac{1}{4k_t}\sum_{n=1}^{N}(1-t)^{n-1}\left(\frac{\lambda_m\mu_m}{\lambda_m+\lambda_\ell(1-t)^{n-1}}\right)^2 \equiv \bar{u}_\ell^s(t), \tag{B6}$$

since a low-type manager is identified as such with probability $t$ in each period through the public strategy signal $\tilde{\imath}_n = 0$. Comparing the expressions in (11) and (B6) reveals that $u_\ell(0)$ exceeds $\bar{u}_\ell^s(t)$ if $t > \frac{1-\omega}{2}$ and $\bar{r}_n > \mu_m$ for all $n = 1, \ldots, N$. As demonstrated in the proof of Proposition 2, this latter condition holds if $\frac{\omega}{\varepsilon} < \frac{\lambda_h}{\lambda_h+\lambda_\ell}$. Thus, under these parameter restrictions, both high-type and low-type managers are strictly better off in the countersignaling equilibrium $\mathcal{T}_c$, compared to the semi-separating equilibrium $\mathcal{T}_s$, if $N$ is sufficiently large. This means that condition (ii) of the equilibrium refinement is satisfied as well.

Condition (iii) requires the beliefs $\beta_s(\tau|t)$ for the out-of-equilibrium transparency level $t = 0$ in the semi-separating equilibrium to differ from the equilibrium beliefs in the countersignaling equilibrium, that is,

$$\beta_s(h|0) \neq \frac{\lambda_h}{\lambda_h+\lambda_\ell} \quad \text{or} \quad \beta_s(\ell|0) \neq \frac{\lambda_\ell}{\lambda_h+\lambda_\ell}. \tag{B7}$$

This must be the case in equilibrium $\mathcal{T}_s$. If it were not, the semi-separating equilibrium could not be sustained because high-type or low-type managers would strictly prefer the out-of-equilibrium strategy $t = 0$ to their respective equilibrium strategy. This proves that, for $N$ sufficiently large, the countersignaling equilibrium $\mathcal{T}_c$ defeats the semi-separating equilibrium $\mathcal{T}_s$ under the above parameter restrictions. □

Proposition B2, together with Lemma B1, implies that if $\frac{\omega}{\varepsilon} < \frac{\lambda_h}{\lambda_h+\lambda_\ell}$, which ensures the existence of a countersignaling equilibrium for large $N$ (Proposition 2), any semi-separating equilibrium is defeated by the countersignaling equilibrium $\{0, \bar{t}(0), 0\}$ provided that the cost of transparency increases sufficiently rapidly: if $k_{1-\varepsilon} > k_{\frac{1-\omega}{2}} \left(\frac{\mu_h}{\mu_m}\right)^2$, any semi-separating equilibrium $\{t', t, t\}$ must have $t > \frac{1-\omega}{2}$ according to Lemma B1 and thus is defeated by the countersignaling equilibrium $\{0, \bar{t}(0), 0\}$ according to Proposition B2.

# 3. Continuous Distribution of Types

In this section, we consider a version of the model with a continuous distribution for manager types. As we show, the paper's main result, that there exists a countersignaling equilibrium, continues to hold. However, because the continuous distribution of types renders the analysis less tractable, the main paper uses only three types. In particular, with continuous distributions, it is impossible to accommodate more than two periods, and some of the results can only be established numerically.

## 3.1 Model setup

Consider a two-period version of our main model. We make two assumptions that serve to simplify the analysis while preserving the essential economic forces of our main model. First, we assume that, in each period $n \in \{1, 2\}$, a manager of skill $\tilde{\tau} = \tau \in [0, 1]$ (which we also refer to as his *type*) generates an excess return of $\tilde{r}_n = r_{\mathrm{G}} = r > 0$ with probability $\frac{1+\tau}{2}$ or $\tilde{r}_n = r_{\mathrm{B}} = -r < 0$ with probability $\frac{1-\tau}{2}$. Thus, the expected excess return of a manager of type $\tau$ is $\mathbb{E}\left[\tilde{r}_n \,|\, \tilde{\tau} = \tau\right] = \tau r \geq 0$. The manager knows his own type at the outset, but investors only know that the manager's type $\tilde{\tau}$ is distributed according to a continuous distribution with full support on $[0, 1]$ and a probability density function $g(\tau)$.

Second, to capture and highlight the idea that investment performance affects subsequent compensation, we assume that the compensation that the manager generates in the second period is infinitely more important than his compensation in the first period. Specifically, we assume that the funds under management consist of zero dollars in the first period, and one dollar in the second period.[1] This means that the fund manager's total compensation is only that he receives in the second period, which is itself based on his performance in the first period and the updated views of investors about his skill. In fact, as before, we assume that the manager captures the entire surplus from his relationship with investors; here, this simply means that his second-period compensation is proportional to $\mathbb{E}\big[\tilde{r}_2 \,|\, \mathcal{F}_2\big] = r\,\mathbb{E}\big[\tilde{\tau} \,|\, \mathcal{F}_2\big] \geq 0$, where $\mathcal{F}_2$ is the information that is publicly available to investors at the beginning of period 2.

At the outset, the manager can make his fund opaque or transparent; we denote this by $t = \textsc{op}$ or $t = \textsc{tr}$.[2] With an opaque fund, only the manager's first-period performance is observable by investors at the time that his second-period compensation is negotiated; that is, $\mathcal{F}_2 = \{t = \textsc{op}, \tilde{r}_1\}$, which we denote by $\{\textsc{op}, \tilde{r}_1\}$ for short, and the manager's compensation is $\tilde{w}_{\textsc{op}} = \mathbb{E}\big[\tilde{r}_2 \mid \textsc{op}, \tilde{r}_1\big] = r\,\mathbb{E}\big[\tilde{\tau} \mid \textsc{op}, \tilde{r}_1\big]$. The transparent fund comes with two features. One, transparency costs a fraction $k \in (0,1)$ of the fund's expected excess returns (via strategy leaks, reporting costs, and so on). Two, in addition to the fund's first-period return, investors potentially have access to a second signal $\tilde{\imath}_1$ about the manager's type before they negotiate his second-period compensation. Specifically, the skill of a manager of type $\tau \in [0,1]$ is perfectly revealed with probability $m(\tau) \in [0,1]$ at the end of period 1, where $m(0) = 1$, $m(1) = 0$, and $m(\tau)$ is (weakly) decreasing in $\tau$. That is, $\mathcal{F}_2 = \{\textsc{tr}, \tilde{r}_1, \tilde{\imath}_1\}$, where

$$\tilde{\imath}_1 = \begin{cases} \tilde{\tau}, & \text{prob. } m(\tilde{\tau}) \\ \varnothing, & \text{prob. } 1 - m(\tilde{\tau}). \end{cases} \tag{B8}$$

In short, lower-skilled managers of transparent funds face a larger probability of having their skill revealed. This captures the idea, as in our main model, that their investment strategies are more likely to reveal their lack of skill when they are more closely investigated. In short, when a manager makes his fund transparent, his second-period compensation is $\tilde{w}_{\textsc{tr}} = (1-k)\,\mathbb{E}\big[\tilde{r}_2 \mid \textsc{tr}, \tilde{r}_1, \tilde{\imath}_1\big] = (1-k)\,r\,\mathbb{E}\big[\tilde{\tau} \mid \textsc{tr}, \tilde{r}_1, \tilde{\imath}_1\big]$.

[1] The more general assumption that a fund's NAV changes with its performance produces similar but less tractable results.

[2] To simplify the analysis, we assume that transparency can only take two forms (vs. the continuum that we allow for $t$ in the main model).

## 3.2 Skill updating, expected wage, and equilibrium

Investors use the public information that is available to them to learn about the manager's type. This information includes the transparency chosen by the manager, the first-period performance of his fund and, in the case of transparent funds, the additional information about his type that $\tilde{\imath}_1$ might convey.

Let us denote by $\mathcal{O} \in [0,1]$ the set of types who, in equilibrium, choose to operate opaque funds, and by $\mathcal{T} = [0,1] \setminus \mathcal{O}$ those who choose to operate transparent funds. For example, a countersignaling equilibrium would have $\mathcal{O} = [0,\bar{\tau}) \cup [\underline{\tau},1]$ and $\mathcal{T} = [\underline{\tau},\bar{\tau})$ for some $\{\underline{\tau},\bar{\tau}\} \in (0,1)^2$ with $\underline{\tau} < \bar{\tau}$. Of course, $\mathcal{O}$ is the result of a fixed point: intuitively, if investors anticipate the managers of type $\tau \in \mathring{\mathcal{O}}$ to operate opaque funds (and others to operate transparent funds), then it will be the case that the managers who choose to operate opaque funds is some set $\hat{\mathcal{O}}$ of types; $\mathcal{O}$ is an equilibrium if $\mathcal{O} = \mathring{\mathcal{O}} = \hat{\mathcal{O}}$.

To decide on whether to operate an opaque or transparent fund, the manager must calculate the wages that he will receive in period 2 depending on the various period-1 outcomes, and their probability. Since investors perfectly learn the skill of a transparent fund's manager whenever $\tilde{\imath}_1 = \tilde{\tau}$, we have $\mathbb{E}\big[\tilde{\tau} \mid \tilde{r}_1, \tilde{\imath}_1 = \tau\big] = \tau$ in that event, and so the manager can then expect to receive $\tilde{w}_{\text{TR}} = (1-k)r\tau \equiv W_\tau$ in period 2. When $\tilde{\imath}_1 = \varnothing$, however, the manager's compensation in period 2 is determined by the probability updating of investors based on his first-period performance. Let us denote by $\mathring{P}_{\text{G}}^{\text{TR}}$ ($\mathring{P}_{\text{B}}^{\text{TR}}$) the probability that, from the investors' perspective, the manager who operates a transparent fund generates a positive (negative) return in period 1 and $\tilde{\imath}_1 = \varnothing$. Similarly, let us denote by $\mathring{P}_{\text{G}}^{\text{OP}}$ ($\mathring{P}_{\text{B}}^{\text{OP}}$) the probability that, from the investors' perspective, the manager who operates an opaque fund generates a positive (negative) return.[3] These probabilities are calculated in the following lemma.

**Lemma B2.** *Suppose that investors anticipate the managers of type $\tau \in \mathring{\mathcal{O}}$ to operate opaque funds,*

[3] Recall that it is always the case that $\tilde{\imath}_1 = \varnothing$ for an opaque fund.

*and those of type* $\tau \in \mathring{\mathcal{T}} = [0,1] \setminus \mathring{\mathcal{O}}$ *to operate transparent funds. Then*

$$\mathring{P}_{\mathrm{G}}^{\mathrm{TR}} = \int_{\tau\in\mathring{\mathcal{T}}} \frac{1+\tau}{2} \big[1 - m(\tau)\big]\, g(\tau)\, d\tau, \tag{B9}$$

$$\mathring{P}_{\mathrm{B}}^{\mathrm{TR}} = \int_{\tau\in\mathring{\mathcal{T}}} \frac{1-\tau}{2} \big[1 - m(\tau)\big]\, g(\tau)\, d\tau, \tag{B10}$$

$$\mathring{P}_{\mathrm{G}}^{\mathrm{OP}} = \int_{\tau\in\mathring{\mathcal{O}}} \frac{1+\tau}{2}\, g(\tau)\, d\tau, \qquad \textit{and} \tag{B11}$$

$$\mathring{P}_{\mathrm{B}}^{\mathrm{OP}} = \int_{\tau\in\mathring{\mathcal{O}}} \frac{1-\tau}{2}\, g(\tau)\, d\tau. \tag{B12}$$

Upon observing a particular return from the manager of a transparent or opaque fund, investors assess the likelihood that it came from each manager type. Given this likelihood, they can calculate the expected type of the manager and the excess performance they can expect from his fund in period 2. Since all economic surplus ends up in the hands of managers, this last quantity becomes the manager's compensation in period 2.

**Lemma B3.** *Suppose that investors anticipate the managers of type* $\tau \in \mathring{\mathcal{O}}$ *to operate opaque funds, and those of type* $\tau \in \mathring{\mathcal{T}} = [0,1] \setminus \mathring{\mathcal{O}}$ *to operate transparent funds. Then, depending on whether the first-period return is good (G) or bad (B), the second-period compensation of a transparent fund manager with* $\tilde{\imath}_1 = \varnothing$ *is*

$$\mathring{W}_{\mathrm{G}}^{\mathrm{TR}} = \frac{(1-k)r}{\mathring{P}_{\mathrm{G}}^{\mathrm{TR}}} \int_{\tau\in\mathring{\mathcal{T}}} \tau\, \frac{1+\tau}{2} \big[1 - m(\tau)\big]\, g(\tau)\, d\tau, \qquad \textit{or} \tag{B13}$$

$$\mathring{W}_{\mathrm{B}}^{\mathrm{TR}} = \frac{(1-k)r}{\mathring{P}_{\mathrm{B}}^{\mathrm{TR}}} \int_{\tau\in\mathring{\mathcal{T}}} \tau\, \frac{1-\tau}{2} \big[1 - m(\tau)\big]\, g(\tau)\, d\tau. \tag{B14}$$

*Similarly, the second-period compensation of an opaque fund manager is*

$$\mathring{W}_{\mathrm{G}}^{\mathrm{OP}} = \frac{r}{\mathring{P}_{\mathrm{G}}^{\mathrm{OP}}} \int_{\tau\in\mathring{\mathcal{O}}} \tau\, \frac{1+\tau}{2}\, g(\tau)\, d\tau, \qquad \textit{or} \tag{B15}$$

$$\mathring{W}_{\mathrm{B}}^{\mathrm{OP}} = \frac{r}{\mathring{P}_{\mathrm{B}}^{\mathrm{OP}}} \int_{\tau\in\mathring{\mathcal{O}}} \tau\, \frac{1-\tau}{2}\, g(\tau)\, d\tau. \tag{B16}$$

Anticipating the salary he will receive in every scenario, the manager can use his type $\tau$ to calculate the probability of each outcome and decide whether it is beneficial for him to operate a transparent fund or an opaque fund. Specifically, a manager of type $\tau$ who operates a transparent fund knows that he will receive $W_\tau$ with probability $m(\tau)$, $\mathring{W}_{\mathrm{G}}^{\mathrm{TR}}$ with probability $\frac{1+\tau}{2}\big[1-m(\tau)\big]$, and $\mathring{W}_{\mathrm{B}}^{\mathrm{TR}}$ with probability $\frac{1-\tau}{2}\big[1-m(\tau)\big]$. On the other hand, if the same manager chooses to operate an opaque fund, he will receive $\mathring{W}_{\mathrm{G}}^{\mathrm{OP}}$ with probability $\frac{1+\tau}{2}$, and $\mathring{W}_{\mathrm{B}}^{\mathrm{OP}}$ with probability $\frac{1-\tau}{2}$. Thus the set $\hat{\mathcal{O}}$ of manager types who choose an opaque fund is given by

$$\begin{aligned}\hat{\mathcal{O}} = \Big\{\tau \in [0,1] :\ & \frac{1+\tau}{2}\mathring{W}_{\mathrm{G}}^{\mathrm{OP}} + \frac{1-\tau}{2}\mathring{W}_{\mathrm{B}}^{\mathrm{OP}} \geq \\ & m(\tau)W_\tau + \frac{1+\tau}{2}\big[1-m(\tau)\big]\mathring{W}_{\mathrm{G}}^{\mathrm{TR}} + \frac{1-\tau}{2}\big[1-m(\tau)\big]\mathring{W}_{\mathrm{B}}^{\mathrm{TR}}\Big\} \\ = \Big\{\tau \in [0,1] :\ & \frac{1+\tau}{2}\Big(\mathring{W}_{\mathrm{G}}^{\mathrm{OP}} - \big[1-m(\tau)\big]\mathring{W}_{\mathrm{G}}^{\mathrm{TR}}\Big) + \frac{1-\tau}{2}\Big(\mathring{W}_{\mathrm{B}}^{\mathrm{OP}} - \big[1-m(\tau)\big]\mathring{W}_{\mathrm{B}}^{\mathrm{TR}}\Big) \geq m(\tau)W_\tau\Big\},\end{aligned} \tag{B17}$$

and an equilibrium $\mathcal{O}$ must have $\mathcal{O} = \hat{\mathcal{O}} = \mathring{\mathcal{O}}$.

## 3.3 Countersignaling equilibrium

In this section, we show that the countersignaling equilibrium of the paper's main model is not specific to the discrete distribution that we assume for manager types. More precisely, we adopt specific forms for the $g(\tau)$ and $m(\tau)$ functions introduced in section 3.1, and show that countersignaling equilibria prevail. Throughout the section, we assume that $\tilde{\tau}$ is drawn from a uniform distribution on the $[0,1]$ interval, i.e., $g(\tau) = 1$ for all $\tau \in [0,1]$. We also assume that $r = 1$, i.e., excess returns are either $r_{\mathrm{G}} = 1$ or $r_{\mathrm{B}} = -1$.

### 3.3.1 Full or no transparency

Let us initially assume that transparency leads to the sure revelation of low manager types. Specifically, let us assume that

$$m(\tau) = \begin{cases} 1, & \text{if } \tau < \tau_\circ \\ 0, & \text{if } \tau \geq \tau_\circ, \end{cases} \tag{B18}$$

for some $\tau_\circ \in (0,1)$. This assumption means that all managers with types below $\tau_\circ$ who choose to operate a transparent fund will have their type publicly revealed at the end of period 1. The role that transparency plays in this context can be intuitively illustrated by contrasting the compensation that managers can expect in two different pooling equilibria: one in which all managers choose an opaque fund, and one in which they choose a transparent fund.[4]

Let us first consider a pooling equilibrium in opaque funds. Given that transparency plays no role for such funds (i.e., $\tilde{\imath}_1$ is always $\varnothing$), investors can only use the manager's performance to update about his type. We can use (B15) and (B16) to calculate the expected compensation of a manager of type $\tau \in [0,1]$ in this equilibrium, which can be shown to be

$$\mathbb{E}\big[\tilde{w}_{\mathrm{OP}} \mid \tilde{\tau} = \tau\big] = \frac{1+\tau}{2}\mathring{W}_{\mathrm{G}}^{\mathrm{OP}} + \frac{1-\tau}{2}\mathring{W}_{\mathrm{B}}^{\mathrm{OP}} = \frac{1+\tau}{2}\frac{5}{9} + \frac{1-\tau}{2}\frac{1}{3} = \frac{4+\tau}{9}. \tag{B19}$$

The pooling equilibrium in transparent funds differs from that in opaque funds in two respects. First, transparency costs a fraction $k$ of the economic surplus that is available for manager compensation. Second, transparency reveals the type of low-skilled managers (those with $\tau < \tau_\circ$) and so, for them, the expected second-period compensation is simply $(1-k)\tau$. For the managers whose skills $\tau$ are above $\tau_\circ$, we can use (B13) and (B14) to calculate

$$\mathring{W}_{\mathrm{G}}^{\mathrm{TR}} = (1-k)\,\frac{5+5\tau_\circ+2\tau_\circ^2}{3(3+\tau_\circ)} \quad \text{and} \quad \mathring{W}_{\mathrm{B}}^{\mathrm{TR}} = (1-k)\,\frac{1+2\tau_\circ}{3}. \tag{B20}$$

This leads to the following expression for the expected compensation of a manager of type $\tau$ in a pooling equilibrium in transparent funds:

$$\mathbb{E}\big[\tilde{w}_{\mathrm{TR}} \mid \tilde{\tau} = \tau\big] = (1-k) \times \begin{cases} \tau & \text{if } \tau < \tau_\circ \\ \frac{4+\tau+(6-\tau+2\tau_\circ)\tau_\circ}{3(3+\tau_\circ)} & \text{if } \tau \geq \tau_\circ. \end{cases} \tag{B21}$$

To see the role of transparency, let us compare (B19) and (B21). First, it is clear that the very worst managers, namely those with $\tilde{\tau}$ close to zero, always prefer pooling in opaque funds to

[4] Note that a pooling equilibrium always exists as long as the off-equilibrium beliefs are sufficiently negative about the deviating managers' types. For example, the (extreme) assumption that off-equilibrium beliefs are $\tilde{\tau} = 0$ with probability one for any deviating manager is sufficient to implement such an equilibrium.

pooling in transparent funds.[5] Also, as long as $\tau_\circ < \frac{1}{2}$, all managers whose type is below $\tau_\circ$ prefer pooling in opaque funds.[6] That is, hiding is preferable for low-skill managers.

The high-skill managers face a tradeoff when comparing the two pooling equilibria. On the one hand, because low-kill managers are automatically identified as such in the transparent pool, this pool reduces the possibility that a good return was the product of luck. On the other hand, transparency comes with a loss of economic surplus (through $k$), and this reduces the appeal of the transparent pool, especially for the managers whose type is close to one.

To highlight the beneficial effect of the transparent pool for high-skill managers, let us first assume that $k = 0$. The expected wage of managers with $\tau \geq \tau_\circ$ is then $\mathbb{E}\big[\tilde{w}_{\text{TR}} \mid \tilde{\tau} = \tau\big] = \frac{4+\tau+(6-\tau+2\tau_\circ)\tau_\circ}{3(3+\tau_\circ)}$. It is easy to verify that this quantity increases slower in $\tau$ than (B19) does.[7] That is, because the transparent pool eliminates low types from the return-based updating process, the relationship between performance and compensation is flatter.[8] In other words, investors are then more inclined to attribute bad returns to bad luck, and so do not revise their beliefs about the manager's skill much after a bad performance. This can be shown to benefit all types above $\tau_\circ$; that is $\mathbb{E}\big[\tilde{w}_{\text{TR}} \mid \tilde{\tau} = \tau\big] = \frac{4+\tau+(6-\tau+2\tau_\circ)\tau_\circ}{3(3+\tau_\circ)} > \frac{4+\tau}{9} = \mathbb{E}\big[\tilde{w}_{\text{OP}} \mid \tilde{\tau} = \tau\big]$ for all $\tau \in [\tau_\circ, 1]$. Thus without any cost to transparency (i.e., with $k = 0$), high-skill managers prefer pooling in the transparent fund as this equilibrium offers them a cheap way to capture all the surplus that their skill generates.

When $k > 0$, however, transparency comes with a cost which, since (B21) is increasing in $\tau$, is greater for higher types (as in the paper's main model). Importantly, because the slope of (B21) is smaller than that of (B19) for $\tau \geq \tau_\circ$, this means that the two lines intersect when $k$ becomes sufficiently large. More precisely, the following result obtains.

**Result B1.** *Suppose that $\tau_\circ < \frac{1}{2}$. Then all managers of type $\tau < \tau_\circ$ prefer pooling in the opaque*

[5]To see this, notice that $\mathbb{E}\big[\tilde{w}_{\text{OP}} \mid \tilde{\tau} = \tau\big] = \frac{4}{9}$ at $\tau = 0$, while $\mathbb{E}\big[\tilde{w}_{\text{TR}} \mid \tilde{\tau} = \tau\big] = 0$ at $\tau = 0$.

[6]To see this, notice that $\lim_{\tau\uparrow\tau_\circ} \mathbb{E}\big[\tilde{w}_{\text{OP}} \mid \tilde{\tau} = \tau\big] = \frac{4+\tau_\circ}{9}$ and that $\lim_{\tau\uparrow\tau_\circ} \mathbb{E}\big[\tilde{w}_{\text{TR}} \mid \tilde{\tau} = \tau\big] = (1-k)\tau_\circ$, and that the former is greater than the latter if $\tau_\circ < \frac{1}{2}$.

[7]The slopes are $\frac{1-\tau_\circ}{9+3\tau_\circ}$ and $\frac{1}{9}$, respectively, for the transparent and opaque pools, and the former is smaller than the latter for all $\tau_\circ \in (0, 1)$.

[8]Incidentally, note that the relationship between performance and flows would also be flatter if we were to add the possibility that the fund can attract new investments, as in the paper's main model.

*fund. If it is also the case that*

$$\frac{2\tau_\circ(5+3\tau_\circ)}{3(5+5\tau_\circ+2\tau_\circ^2)} < k < \frac{2\tau_\circ(7+\tau_\circ)}{3(4+7\tau_\circ+\tau_\circ^2)}, \tag{B22}$$

*then there is an* $\bar{\tau} \in (\tau_\circ, 1)$ *such that managers of type* $\tau \in [\tau_\circ, \bar{\tau})$ *prefer the transparent pool while managers of type* $\tau \in [\bar{\tau}, 1]$ *prefer the opaque pool.*

Although this result is the product of a comparison across two different equilibria, it captures the essence of the forces behind the countersignaling equilibrium that we derive below (and behind that of the paper's main model). It says that both the low-skill and high-skill managers dislike transparency, while medium-skill managers welcome it. Low-skill managers avoid transparency as it accelerates the revelation of their skill. While high-skill managers would prefer their skill to be revealed, they dislike the fact that this comes at a particularly high cost to them. Finally, medium-skill managers benefit from transparency that identifies the low types as this allows them to avoid the possibility of being misperceived as low types when their performance is bad. This comparison is illustrated in Figure B1, which shows that, with $\tau_\circ = 0.5$ and $k = 0.3$, the managers whose type is between 0.5 and (roughly) 0.725 prefer pooling in transparent funds, while all the other managers prefer doing so in opaque funds.

Of course, Result B1 is not a countersignaling equilibrium result; it just compares two (pooling) equilibria. To establish the existence of a countersignaling equilibrium, we conjecture that such an equilibrium will have $\mathring{\mathcal{O}} = [0, \tau_\circ) \cup [\bar{\tau}, 1]$ for some $\bar{\tau} \in (\tau_\circ, 1)$. That is, all the managers whose type would get revealed in a transparent fund (i.e., $\tau < \tau_\circ$) as well as all managers whose type is above a certain threshold (i.e., $\tau \geq \bar{\tau}$) choose to operate an opaque fund; others operate a transparent fund. Deriving the equilibrium amounts to verifying two conditions.

(i) The compensation of a manager whose type approaches $\tau_\circ$ from the left is larger in an opaque fund than in a transparent fund, while the opposite holds for the manager of type $\tau = \tau_\circ$.

(ii) The manager of type $\tau = \bar{\tau}$ is indifferent between operating a transparent fund or an opaque fund.

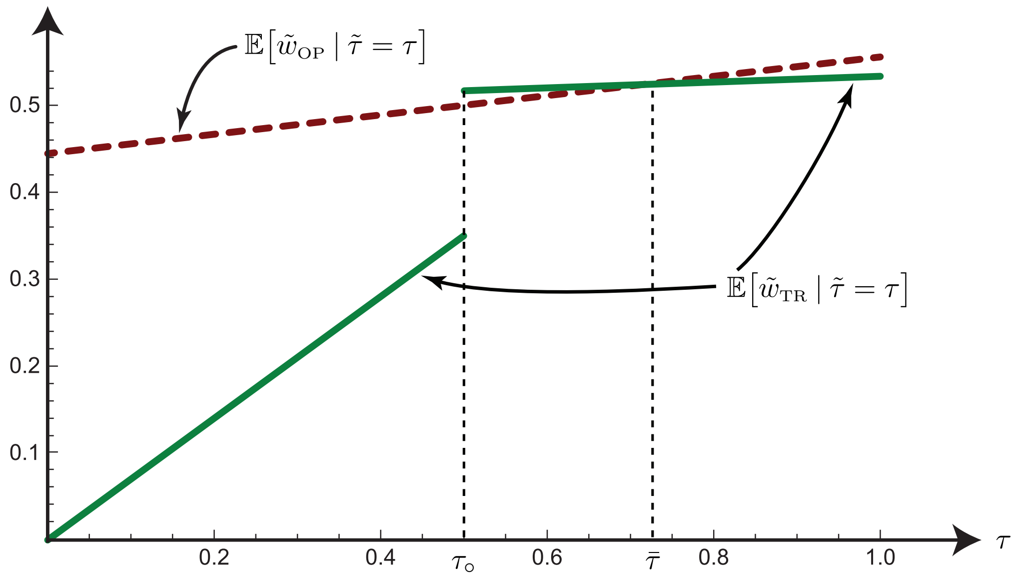


Figure B1: Assuming that $m(\tau)$ is given by (B18), this figure shows the expected compensation of a manager as a function of his type $\tau \in [0, 1]$ in the two pooling equilibria: the transparent pooling equilibrium is shown with the **green** solid line, while the opaque pooling equilibrium is shown with a **red** dashed line. The figure uses $\tau_\circ = 0.5$ and $k = 0.3$.

We can use the above conjecture in (B13) and (B14) to show, after tedious but straightforward calculations, that

$$\hat{\mathbb{E}}\big[\tilde{w}_{\rm TR} \mid \tilde{\tau} = \tau\big] = (1-k)\, \frac{\tau_\circ(6 + \tau\tau_\circ - 2\tau_\circ^2) + 2\bar{\tau}\big[3 - \tau_\circ(\tau + 2\tau_\circ)\big] + \bar{\tau}^2(\tau - 4\tau_\circ) - 2\bar{\tau}^3}{3\big[2 - (\bar{\tau} + \tau_\circ)^2\big]} \tag{B23}$$

for $\tau \geq \tau_\circ$, where the $\hat{\mathbb{E}}$ operator denotes the expectation of the manager under the conjectured equilibrium (i.e., we still need to establish that this is an equilibrium). Similarly, we can use (B15) and (B16) to show that

$$\hat{\mathbb{E}}\big[\tilde{w}_{\rm OP} \mid \tilde{\tau} = \tau\big] = \frac{\begin{Bmatrix} (1-\bar{\tau})^3\big[4 + 2\bar{\tau}(\bar{\tau}+3) + \tau(1-\bar{\tau})\big] + 2\big[3 + 2\tau - \bar{\tau}^2(2\tau\bar{\tau} + 3)\big]\tau_\circ \\ +2\big[(1-\bar{\tau})^2(2+\bar{\tau}) - 3\tau(1-\bar{\tau}^2)\big]\tau_\circ^2 + 2\big[2 + 2\tau(1-\bar{\tau}) + \bar{\tau}^2\big]\tau_\circ^3 + \tau\tau_\circ^4 - 2\tau_\circ^5 \end{Bmatrix}}{3\big[(1-\bar{\tau})^3(3+\bar{\tau}) + 8(1-\bar{\tau})\tau_\circ + 2(1+\bar{\tau}^2)\tau_\circ^2 - \tau_\circ^4\big]} \tag{B24}$$

for $\tau \geq \tau_\circ$. If a countersignaling equilibrium exists, it must be the case that (B23) and (B24) are

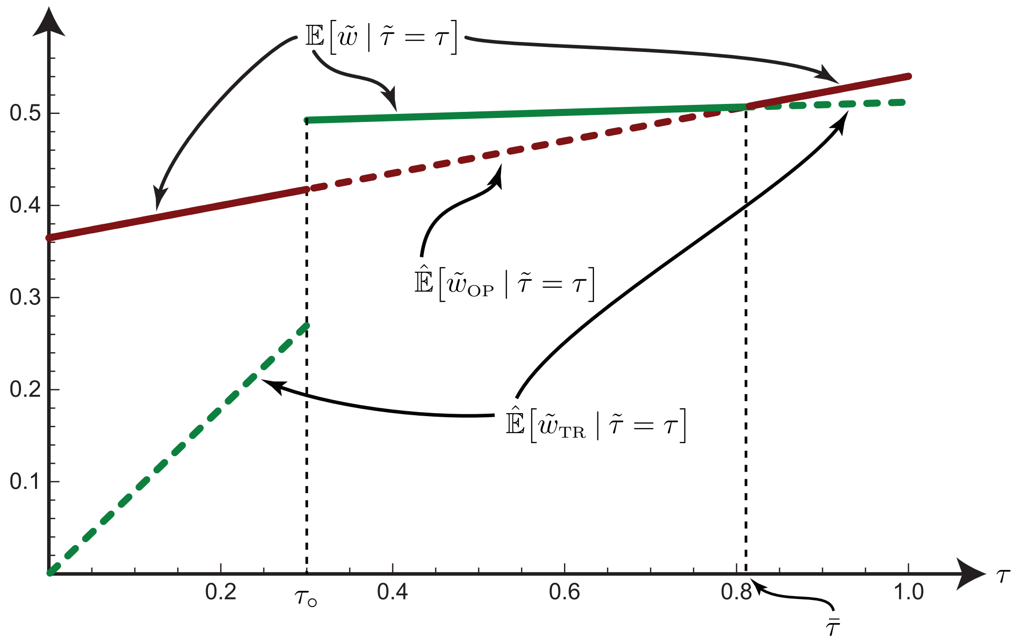


Figure B2: Assuming that $m(\tau)$ is given by (B18), this figure depicts an equilibrium using $\tau_\circ = 0.3$ and $k = 0.1$. The solid line shows the expected compensation of a manager, $\mathbb{E}[\tilde{w} \mid \tilde{\tau} = \tau]$, as a function of his type $\tau \in [0, 1]$ in the countersignaling equilibrium. The dashed **green** line shows the expected compensation of a manager of type $\tau \in [0, \tau_\circ) \cup [\bar{\tau}, 1]$ who would choose to deviate by operating a transparent fund; the dashed **red** line shows the expected compensation of a manager of type $\tau \in [\tau_\circ, \bar{\tau})$ who would choose to deviate by operating an opaque fund.

equal at $\tau = \bar{\tau}$. Clearly, solving for $\bar{\tau}$ in this equality involves finding the solution of a high-order polynomial. As a result, the equilibrium can only be derived via numerical solutions. Figure B2 depicts such an equilibrium in which we have set $\tau_\circ = 0.3$ and $k = 0.1$. Although this figure is similar to Figure B1, it shows something different: in a countersignaling equilibrium, all types between $\tau_\circ = 0.3$ and $\bar{\tau} \approx 0.81$ choose to operate a transparent fund, while all the other types operate an opaque fund.

Figure B3 illustrates how the equilibrium choices of transparency by managers change as we vary $\tau_\circ$ and $k$. In all equilibria, all the managers of type $\tau \in [\tau_\circ, \bar{\tau})$ operate transparent funds, while the other managers operate opaque funds; the figure shows how the marginal type $\bar{\tau}$ varies as a function of $\tau_\circ$ and $k$. We can see that, for this particular parametrization, $\bar{\tau}$ is increasing in $k$ (for a given $\tau_\circ$) and decreasing in $\tau_\circ$ (for a given $k$). The first (second) result says that, as the cost (extent) of transparency increases, more (fewer) high-type managers choose to operate transparent funds. At first sight, both results are somewhat counterintuitive, as more low-cost transparency ends up pushing high-type managers away from transparent funds. Indeed, this result is not general: it depends on the $g(\tau)$ and $m(\tau)$ functions.

The counterintuitive result obtained in Figure B3 simply serves to illustrate that more/cheaper transparency has two effects on the equilibrium. For example, the direct (and intuitive) effect of an increase in $k$ is to lower the expected compensation of managers in transparent funds, which in turn lowers the equilibrium value of $\bar{\tau}$. However, this reduction in $\bar{\tau}$ can have a negative impact on the expected compensation of managers in opaque funds, as more lower types are then included in the set of opaque fund managers.[9] This indirect (and less intuitive) effect leads to an increase in the equilibrium value of $\bar{\tau}$. It turns out that, for $g(\tau) = 1$ and $m(\tau)$ as specified in (B18), the latter effect is stronger than the former effect.

The paper's main model shows that the sensitivity of fund flows and manager compensation to past performance is greater for opaque funds than it is for transparent funds. Figure B4 shows that this is the case in this model with continuously distributed types. Specifically, it shows that the compensation that a manager can expect to receive after good (bad) performance is greater (smaller) in opaque funds than in transparent funds. In particular, the most skilled managers do not mind subjecting themselves to the possibility that their compensation will drop as they know that it is unlikely that their performance will dictate such decline in compensation.

### 3.3.2 Linear transparency

The jump specification for $m(\tau)$ in (B18) simplifies the search for a countersignaling equilibrium, as $\tau = \tau_{\circ}$ is a natural lower threshold for types who strictly prefer managing transparent funds versus opaque funds. The equilibrium then simply amounts to finding the upper threshold, namely the type $\tau = \bar{\tau}$ who is indifferent between transparency and opaqueness. However, this specification is not necessary for a countersignaling equilibrium to exist. More generally, if $m(\tau)$ is a continuous

[9] To be more specific, using (B24), it can be shown that the expected compensation of managers in opaque funds is increasing in $\bar{\tau}$ for low values of $\bar{\tau}$ (as managers of below-average quality are being removed) and decreasing in $\bar{\tau}$ for high values of $\bar{\tau}$ (as managers of above-average quality are removed).

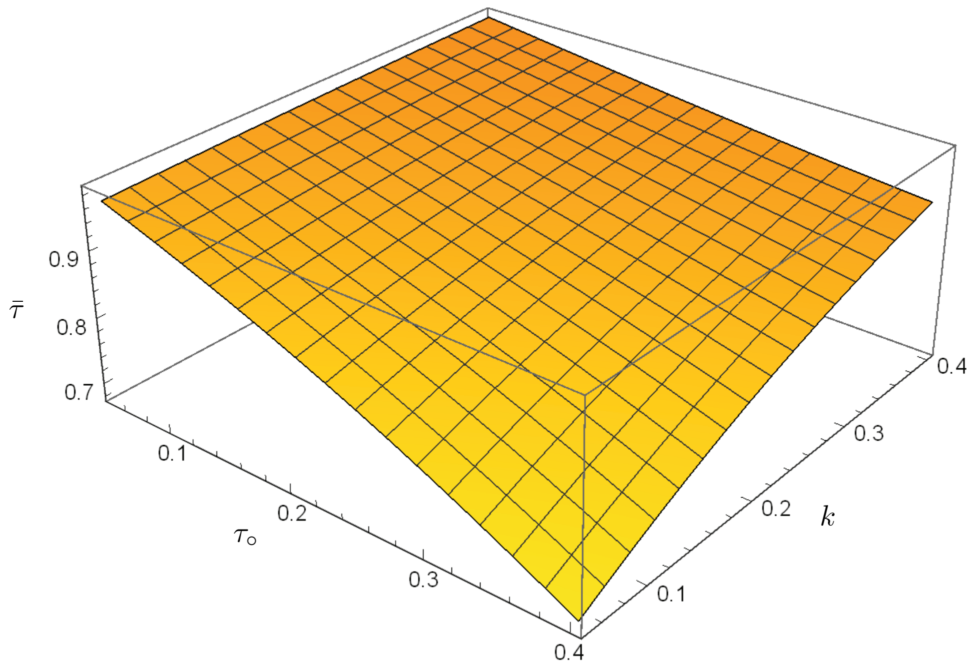


Figure B3: Assuming that $m(\tau)$ is given by the jump function in (B18), this figure shows the equilibrium value of $\bar{\tau}$, the marginal manager type who is indifferent between operating a transparent fund or an opaque fund. As the cost of transparency increases (i.e., as $k$ increases for a given $\tau_\circ$), fewer high-type managers choose to operate opaque funds (i.e., $\bar{\tau}$ increases). As the extent of transparency increases (i.e., as $\tau_\circ$ increases for a given $k$), more high-type managers choose to operate opaque funds (i.e., $\bar{\tau}$ decreases).

function, the search for a countersignaling equilibrium involves the search for two threshold types ($\underline{\tau}$ and $\bar{\tau}$) who are indifferent between transparency and opaqueness; that is, in equilibrium, $\mathbb{E}\left[\tilde{w}_{\text{OP}}|\tilde{\tau} = \tau\right]$ and $\mathbb{E}\left[\tilde{w}_{\text{TR}} \mid \tilde{\tau} = \tau\right]$ intersect twice, with the latter function (of $\tau$) exceeding the former for $\tau \in [\underline{\tau}, \bar{\tau})$.

To illustrate this, let us assume that $m(\tau)$ is linearly decreasing from $m(0) = 1$ to $m(\tau_\circ) = 0$, and that $m(\tau) = 0$ otherwise; that is, let us assume that

$$m(\tau) = \begin{cases} 1 - \frac{\tau}{\tau_\circ}, & \text{if } \tau < \tau_\circ \\ 0, & \text{if } \tau \geq \tau_\circ. \end{cases} \tag{B25}$$

As before, the lowest possible type ($\tau = 0$) is sure to have his lack of skill revealed if he operates a transparent fund. As such, we can already anticipate him to naturally prefer an opaque fund.

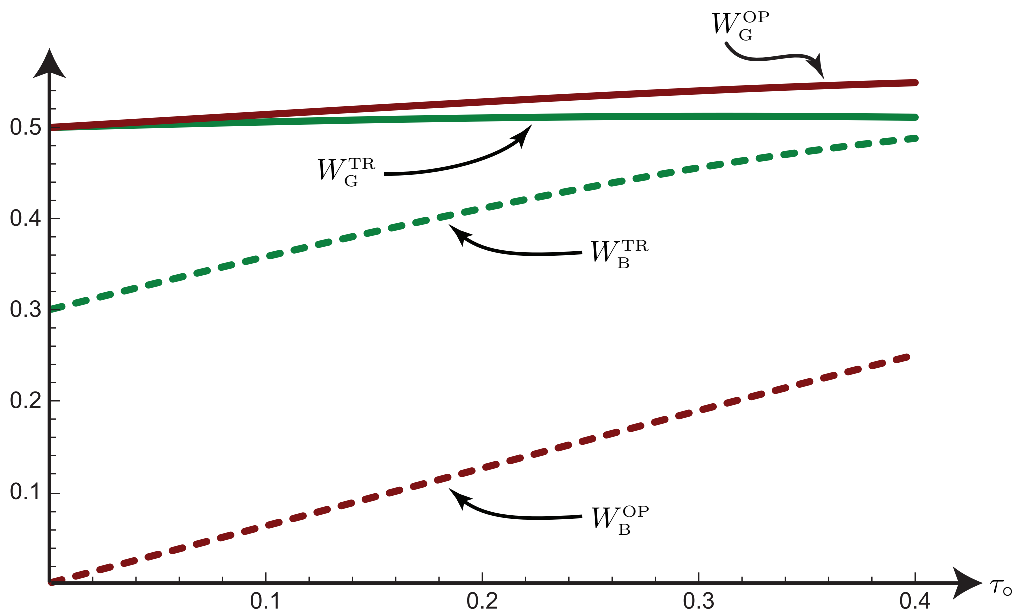


Figure B4: Assuming that $m(\tau)$ is given by the jump function in (B18), this figure shows the equilibrium compensation of the managers in opaque funds (in red) and transparent funds (in green) as a function of $\tau_{\circ}$. The solid lines represent the compensation after a good return in period 1 (i.e., $\tilde{r}_1 = r_{\mathrm{G}}$), while the dashed lines represent the compensation after a bad return in period 1 (i.e., $\tilde{r}_1 = r_{\mathrm{B}}$). The figure uses $k = 0.1$.

However, as in our main model, the probability that transparency reveals a manager's type is now strictly decreasing with his type. As such, the idea of operating a transparent fund becomes less intimidating as $\tau$ increases. The appeal of managing a transparent fund is not monotonic, however, as the cost of such transparency is greater for managers of types close to $\tau = 1$.

To provide more intuition for these forces, we start, as in section 3.3.1, by contrasting two pooling equilibria: one in which all types choose to operate an opaque fund, and one in which they all operate a transparent fund. Since the expressions for $\mathbb{E}\big[\tilde{w}_{\mathrm{OP}}\,|\,\tilde{\tau} = \tau\big]$ and $\mathbb{E}\big[\tilde{w}_{\mathrm{TR}}\,|\,\tilde{\tau} = \tau\big]$ are much messier than those in (B19) and (B21), however, analytical results are highly intractable and so we only present numerical and graphical results. In particular, Figure B5 is the analog of Figure B1. It shows that, when $\tau_{\circ} = 0.3$ in (B25) and $k = 0.1$, it is the case that all types between (roughly) 0.28 and 0.79 prefer pooling in transparent funds, while the extreme (low and high) types prefer pooling in opaque funds.

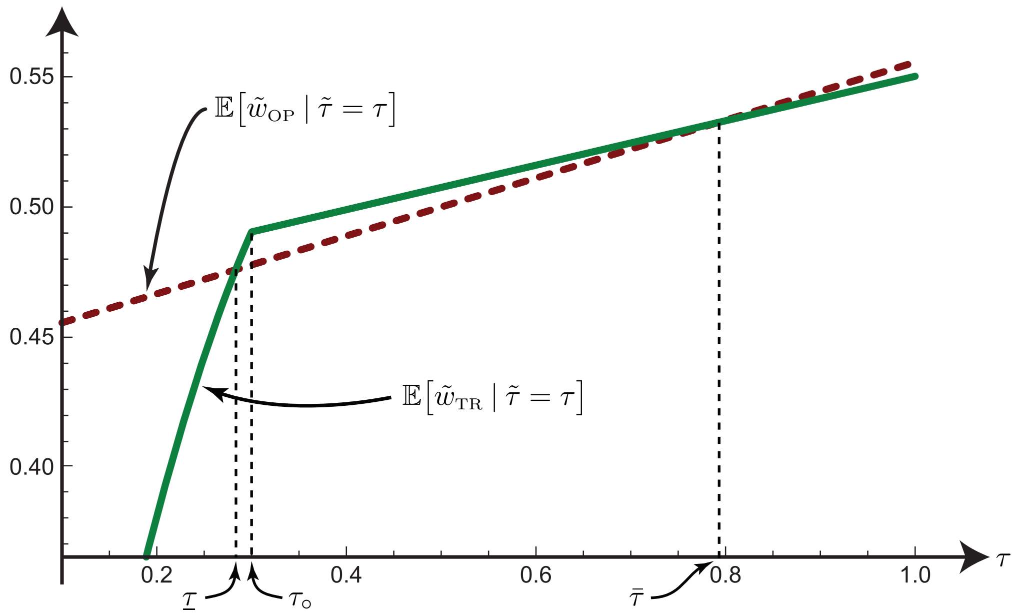


Figure B5: Assuming that $m(\tau)$ is given by (B25), this figure shows the expected compensation of a manager as a function of his type $\tau \in [0,1]$ in the two pooling equilibria: the transparent pooling equilibrium is shown with the green solid line, while the opaque pooling equilibrium is shown with a red dashed line. The figure uses $\tau_\circ = 0.3$ and $k = 0.1$.

The key to this result lies in the slope of $\mathbb{E}[\tilde{w}_{\mathrm{TR}} \mid \tilde{\tau} = \tau]$ with respect to $\tau$: it exceeds (is lower than) that of $\mathbb{E}[\tilde{w}_{\mathrm{OP}} \mid \tilde{\tau} = \tau]$ for $\tau < \tau_\circ$ (for $\tau \geq \tau_\circ$). Because only types below $\tau_\circ$ ever get publicly revealed, the compensation of the managers with $\tau > \tau_\circ$ is not as sensitive to their first-period performance in transparent funds as it is in opaque funds; indeed, the very fact that investors must rely on past performance (as opposed to a public signal) to assess future performance means that the manager's type is unlikely to be low. In contrast, because managers of type $\tau \leq \tau_\circ$ fear the public revelation of their type, their compensation is more sensitive to the information that the first period will reveal.[10] Since $m(0) = 1$ and $m(\tau_\circ) = 0$, this effect is stronger for lower types, making $\mathbb{E}[\tilde{w}_{\mathrm{TR}} \mid \tilde{\tau} = \tau]$ concave in $\tau$.

As before, the comparison between the two pooling equilibria highlights the possibility that a countersignaling equilibrium exists. Figure B6 confirms that this is indeed the case. As shown in this figure, when $\tau_\circ = 0.3$ and $k = 0.1$, a countersignaling equilibrium with $\underline{\tau} \approx 0.19$ and $\bar{\tau} \approx 0.88$

[10]The green solid line in Figure B5 starts at zero for $\tau = 0$.

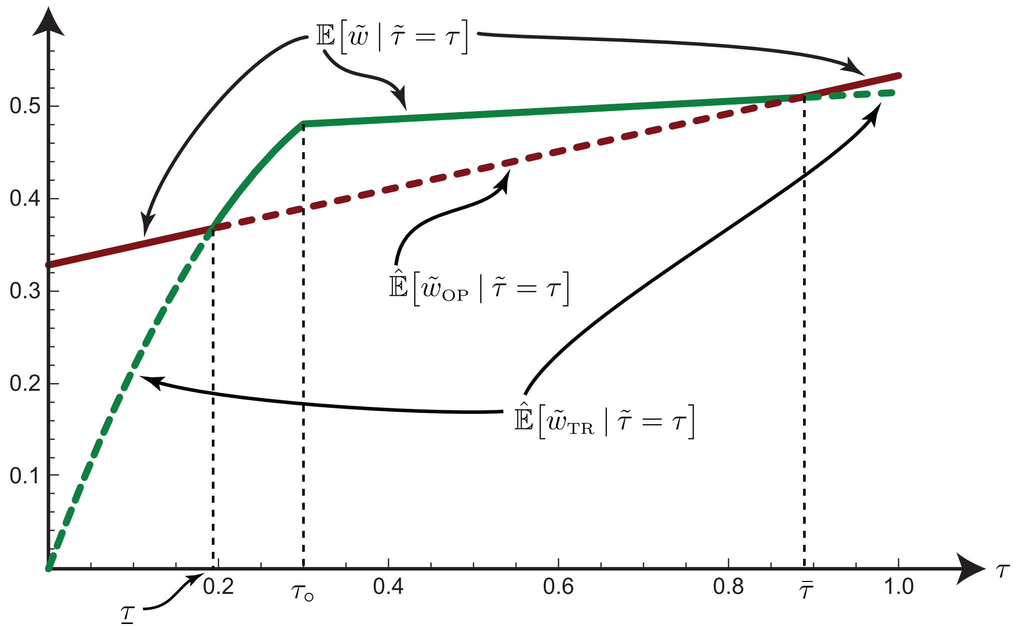


Figure B6: Assuming that $m(\tau)$ is given by (B25), this figure depicts an equilibrium using $\tau_\circ = 0.3$ and $k = 0.1$. The solid line shows the expected compensation of a manager, $\mathbb{E}\left[\tilde{w} \mid \tilde{\tau}=\tau\right]$, as a function of his type $\tau \in [0,1]$ in the countersignaling equilibrium. The dashed green line shows the expected compensation of a manager of type $\tau \in [0, \underline{\tau}) \cup [\bar{\tau}, 1]$ who would choose to deviate by operating a transparent fund; the dashed red line shows the expected compensation of a manager of type $\tau \in [\underline{\tau}, \bar{\tau})$ who would choose to deviate by operating an opaque fund.

prevails: all managers with type $\tau \in [0.19, 0.88)$ operate transparent funds, while the lowest and highest types ($\tau < 0.19$ and $\tau \geq 0.88$) operate opaque funds. As in Figure B5, the result derives from the fact that second-period compensation in transparent funds is less sensitive to first-period outcomes for high types ($\tau \geq \tau_\circ$), while it is more sensitive for low types ($\tau < \tau_\circ$).

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