**Internet Appendix for: Is that a \$100 bill on the sidewalk?**[1]
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# B Omitted proofs

**Proof of Proposition 4:** Denote $\psi = \frac{Q_g}{Q_b}$, and denote by $\psi_0$ the value of $\psi$ prior to any parameter changes. The equilibrium condition is

$$\frac{\psi p_g \pi_g + p_b \pi_b}{\psi p_g + \frac{p_b}{\epsilon_b}} = \kappa. \tag{B-1}$$

If $p_g$ remains unchanged and $\pi_g$ and/or $\pi_b$ increase then it is immediate that $\psi$ decreases and hence (by Lemma A-2) that $\alpha$, $Q_g$ and $Q_b$ all increase.

Next, consider the case in which $p_g$ increases. From (B-1), and using $p_b = 1 - p_g$,

$$\left(\frac{\partial \psi}{\partial p_g} p_g \pi_g + \frac{\partial \left(\psi_0 p_g \pi_g + p_b \pi_b\right)}{\partial p_g}\right)\left(\psi_0 p_g + \frac{p_b}{\epsilon_b}\right) - \left(\frac{\partial \psi}{\partial p_g} p_g + \psi_0 - \frac{1}{\epsilon_b}\right)\left(\psi_0 p_g \pi_g + p_b \pi_b\right) = 0,$$

i.e.,

$$\begin{aligned}\frac{\partial \psi}{\partial p_g} &= \frac{\left(\psi - \frac{1}{\epsilon_b}\right)\left(\psi_0 p_g \pi_g + p_b \pi_b\right) - \frac{\partial(\psi_0 p_g \pi_g + p_b \pi_b)}{\partial p_g}\left(\psi_0 p_g + \frac{p_b}{\epsilon_b}\right)}{p_g \pi_g \left(\psi_0 p_g + \frac{p_b}{\epsilon_b}\right) - p_g \left(\psi_0 p_g \pi_g + p_b \pi_b\right)} \\ &= \frac{\left(\psi - \frac{1}{\epsilon_b}\right)\left(\psi_0 p_g \pi_g + p_b \pi_b\right) - \frac{\partial(\psi_0 p_g \pi_g + p_b \pi_b)}{\partial p_g}\left(\psi_0 p_g + \frac{p_b}{\epsilon_b}\right)}{p_g \frac{p_b}{\epsilon_b} \pi_g - p_g p_b \pi_b}.\end{aligned}$$

Note that $\lim_{\alpha \to 0} \frac{Q_g(\alpha;n)}{Q_b(\alpha;n)} = \frac{1}{\epsilon_b}$, and so $\psi \leq \frac{1}{\epsilon_b}$ by Lemma A-2. Moreover, the equilibrium condition implies $\psi_0 p_g \pi_g + p_b \pi_b > 0$. Hence if $\frac{\partial(\psi_0 p_g \pi_g + p_b \pi_b)}{\partial p_g} \geq 0$ then $\frac{\partial \psi}{\partial p_g} < 0$, implying (by Lemma A-2) that $\alpha$, $Q_g$ and $Q_b$ are all higher.

Finally, the statement that $\Pr\left(\omega = g | \text{never exploited}\right)$ decreases follows from (19), the fact that $\alpha$ has increased, and the fact that

$$\frac{1 - Q_g}{1 - Q_b} = \left(\frac{1 - \alpha}{1 - \epsilon_b \alpha}\right)^n$$

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is decreasing in $\alpha$. $\square$

**Proof of Proposition 5:** Denote $\phi = \frac{Q_g p_g}{Q_b p_b}$ and $\pi_g = \Delta + \pi_b$. The equilibrium condition is

$$\frac{\phi \pi_g + \pi_b}{\phi + \epsilon_b^{-1}} = \frac{\phi\left(\Delta + \pi_b\right) + \pi_b}{\phi + \epsilon_b^{-1}} = \kappa.$$

For use below, note that certainly

$$\phi \pi_g + \pi_b > 0. \tag{B-2}$$

Differentiating with respect $\pi_g$ yields

$$\left(\frac{\partial \phi}{\partial \pi_g}\pi_g + \phi\right)\left(\phi + \epsilon_b^{-1}\right) - \left(\phi \pi_g + \pi_b\right)\frac{\partial \phi}{\partial \pi_g} = 0,$$

and hence

$$\frac{\partial \phi}{\partial \pi_g} = -\frac{\phi\left(\phi + \epsilon_b^{-1}\right)}{\pi_g\left(\phi + \epsilon_b^{-1}\right) - \left(\phi \pi_g + \pi_b\right)} = -\frac{\phi\left(\phi + \epsilon_b^{-1}\right)}{\epsilon_b^{-1}\pi_g - \pi_b}.$$

Similarly, differentiating with respect to $\pi_b$ (holding $\Delta = \pi_g - \pi_b$ fixed) yields

$$\left(\frac{\partial \phi}{\partial \pi_b}\pi_g + \phi + 1\right)\left(\phi + \epsilon_b^{-1}\right) - \left(\phi \pi_g + \pi_b\right)\frac{\partial \phi}{\partial \pi_b} = 0$$

and hence

$$\frac{\partial \phi}{\partial \pi_b} = -\frac{\left(\phi + 1\right)\left(\phi + \epsilon_b^{-1}\right)}{\pi_g\left(\phi + \epsilon_b^{-1}\right) - \left(\phi \pi_g + \pi_b\right)} = -\frac{\left(\phi + 1\right)\left(\phi + \epsilon_b^{-1}\right)}{\epsilon_b^{-1}\pi_g - \pi_b}.$$

The derivative of the Sharpe ratio (24) with respect to $\pi_g$ is

$$\phi^{\frac{1}{2}}\left(\pi_g - \pi_b\right)^{-1} + \frac{\partial \phi}{\partial \pi_g}\frac{1}{2}\left(\phi^{-\frac{1}{2}}\pi_g - \phi^{-\frac{3}{2}}\pi_b\right)\left(\pi_g - \pi_b\right)^{-1} - \left(\phi^{\frac{1}{2}}\pi_g + \phi^{-\frac{1}{2}}\pi_b\right)\left(\pi_g - \pi_b\right)^{-2} \tag{B-3}$$

which has the same sign as (multiplying by $\phi^{\frac{3}{2}}\left(\pi_g - \pi_b\right)^2$)

$$\phi^2\left(\pi_g - \pi_b\right) - \left(\phi^2 \pi_g + \phi \pi_b\right) - \frac{\phi\left(\phi + \epsilon_b^{-1}\right)}{\epsilon_b^{-1}\pi_g - \pi_b}\frac{1}{2}\left(\phi \pi_g - \pi_b\right)\left(\pi_g - \pi_b\right)$$

and hence the same sign as (dividing by $-\pi_b$)

$$\phi\left(\phi + 1\right) - \frac{\left(\phi + \epsilon_b^{-1}\right)}{-\epsilon_b^{-1}\frac{\pi_g}{\pi_b} + 1}\frac{1}{2}\left(-\frac{\phi \pi_g}{\pi_b} + 1\right)\left(-\frac{\phi \pi_g}{\pi_b} + \phi\right)$$

and hence the same sign as (multiplying by $2\left(-\epsilon_b^{-1}\frac{\pi_g}{\pi_b}+1\right)$)

$$2\left(\phi+1\right)\left(-\epsilon_b^{-1}\frac{\phi\pi_g}{\pi_b}+\phi\right)-\left(\phi+\epsilon_b^{-1}\right)\left(-\frac{\phi\pi_g}{\pi_b}+1\right)\left(-\frac{\phi\pi_g}{\pi_b}+\phi\right). \tag{B-4}$$

From (B-2), $-\frac{\phi\pi_g}{\pi_b}>1$. To establish the comparative static in $\pi_g$ I show that (B-4) is negative if $-\frac{\phi\pi_g}{\pi_b}>1$ and $\epsilon_b^{-1}<9$. Evaluated at $-\frac{\phi\pi_g}{\pi_b}=1$, expression (B-4) equals 0. Consider

$$2\left(\phi+1\right)\left(\epsilon_b^{-1}z+\phi\right)-\left(\phi+\epsilon_b^{-1}\right)\left(z+1\right)\left(z+\phi\right). \tag{B-5}$$

This is a concave quadratic in $z$. So to establish that (B-4) is negative it suffices to show that the derivative of (B-5) with respect to $z$ is negative when evaluated at $z=1$, i.e.,

$$2\left(\phi+1\right)\epsilon_b^{-1}-\left(\phi+\epsilon_b^{-1}\right)\left(z+\phi\right)-\left(\phi+\epsilon_b^{-1}\right)\left(z+1\right)\Big|_{z=1}<0,$$

i.e.,

$$2\left(\phi+1\right)\epsilon_b^{-1}-\left(\phi+\epsilon_b^{-1}\right)\left(1+\phi\right)-2\left(\phi+\epsilon_b^{-1}\right)<0,$$

i.e.,

$$-\phi^2-\phi\left(3-\epsilon_b^{-1}\right)-\epsilon_b^{-1}<0. \tag{B-6}$$

If $\epsilon_b^{-1}\leq 3$ then the proof is complete. If instead $\epsilon_b^{-1}>3$, note that the determinant of this quadratic (B-6) is

$$\left(3-\epsilon_b^{-1}\right)^2-4\epsilon_b^{-1}=\epsilon_b^{-2}-10\epsilon_b^{-1}+9=\left(\epsilon_b^{-1}-9\right)\left(\epsilon_b^{-1}-1\right).$$

Hence for $\epsilon_b^{-1}\in(1,9)$ the quadratic in (B-6) is negative for all $\phi$, completing the proof of the comparative static in $\pi_g$.

Finally, the derivative of the Sharpe ratio (24) with respect to $\pi_b$, holding $\Delta=\pi_g-\pi_b$ fixed, has the same sign as

$$\phi^{\frac{1}{2}}+\phi^{-\frac{1}{2}}+\frac{1}{2}\frac{\partial\phi}{\partial\pi_b}\left(\phi^{-\frac{1}{2}}\pi_g-\phi^{-\frac{3}{2}}\pi_b\right)$$

which has the same sign as (multiplying by $2\phi^{\frac{3}{2}}$)

$$2\phi\left(\phi+1\right)-\frac{\left(\phi+1\right)\left(\phi+\epsilon_b^{-1}\right)}{\epsilon_b^{-1}\pi_g-\pi_b}\left(\phi\pi_g-\pi_b\right)$$

which has the same sign as (multiplying by $\frac{\epsilon_b^{-1}\pi_g - \pi_b}{\phi+1}$)

$$2\left(\phi\epsilon_b^{-1}\pi_g - \phi\pi_b\right) - \left(\phi + \epsilon_b^{-1}\right)\left(\phi\pi_g - \pi_b\right) = \left(\epsilon_b^{-1} - \phi\right)\left(\phi\pi_g + \pi_b\right). \tag{B-7}$$

By Lemma A-2, $\phi = \frac{Q_g}{Q_b}\frac{p_g}{p_b} < \epsilon_b^{-1}\frac{p_g}{p_b}$. Combined with (B-2) this establishes that (B-7) is positive if $p_g \leq p_b$. $\square$

# C Comparisons to benchmark cases

## C.1 Preliminary: Generalizing the baseline model to allow for false negatives

For expositional transparency I have written the main model without false negatives, i.e., have assumed that $\Pr\left(\sigma_i = b | \omega = g\right) = 0$. None of the results in the main text depend on this assumption. But the comparison between the main model and the case in which investors know their place in the sequence (see C.2 below) does depend on the possibility of false negatives. As such, I start this appendix with the generalization of the main model to allow

$$\Pr\left(\sigma_i = b | \omega = g\right) = \epsilon_g \geq 0.$$

To ensure that a signal $\sigma_i = g$ raises an investor's posterior that $\omega = g$, assume

$$\epsilon_g < 1 - \epsilon_b.$$

Assumption (2) is replaced by its generalization

$$\left(1 - \epsilon_g\right) p_g \pi_g + \epsilon_b p_b \pi_b - \kappa > \max\left\{0, p_g \pi_g + p_b \pi_b\right\}. \tag{C-1}$$

In addition, I assume that $\epsilon_g$ is sufficiently small that exploitation following a bad signal is unprofitable,

$$\epsilon_g p_g \pi_g + \left(1 - \epsilon_b\right) p_b \pi_b < 0. \tag{C-2}$$

The equilibrium posterior (17) generalizes to

$$\Pr\left(\omega = g | i \text{ observes opportunity}\right) = \frac{Q_g\left(\alpha; n\right) \frac{p_g}{1-\epsilon_g}}{Q_g\left(\alpha; n\right) \frac{p_g}{1-\epsilon_g} + Q_b\left(\alpha; n\right) \frac{p_b}{\epsilon_b}}. \tag{C-3}$$

and the value of investigation (18) generalizes to

$$v\left(\alpha; n\right) = \frac{Q_g p_g \pi_g + Q_b p_b \pi_b}{Q_g \frac{p_g}{1-\epsilon_g} + Q_b \frac{p_b}{\epsilon_b}}. \tag{C-4}$$

So in particular, the ratio $\frac{Q_g}{Q_b}$ continues to be a sufficient statistic for equilibrium characterization; and moreover, Lemmas A-1 and A-2 generalize straightforwardly, with $\epsilon_b$ replaced by $\frac{\epsilon_b}{1-\epsilon_g}$ in Lemma A-1. Hence Proposition 2 in turn straightforwardly generalizes; in particular, if

$$\frac{p_g \pi_g + p_b \pi_b}{\frac{p_g}{1-\epsilon_g} + \frac{p_b}{\epsilon_b}} < \kappa \tag{C-5}$$

and the number of investors $n$ is sufficiently large then the end-of-game exploitation probability $Q_g^*$ is strictly less than 1. Moreover, the condition (C-5) holds whenever $\epsilon_b$ is sufficiently small.

## C.2 Investors know their place in the sequence

A first benchmark is the case in which investors know their place in the sequence. The equilibrium outcome is almost immediate: By assumption (2) the first investor investigates the opportunity, and exploits if a good signal is observed. If the opportunity remains available then investor $i > 1$ similarly investigates if the expected payoff from doing so exceeds the investigation cost $\kappa$,

$$(1-\epsilon_g) \Pr(\omega = g | \sigma_1 = \ldots = \sigma_{i-1} = b) \pi_g + \epsilon_b \Pr(\omega = b | \sigma_1 = \ldots = \sigma_{i-1} = b) \pi_b \geq \kappa. \tag{C-6}$$

As noted in C.1, the possibility of false negatives, $\epsilon_g > 0$, is important for the case in which investors know their place in the sequence.

From (C-6), the information-cascade effect (Banerjee 1992 and Bikhchandani et al 1992) means that after a sequence of bad signals, which can be inferred from the opportunity remaining available, investors are sufficiently negative about an opportunity's quality that they prefer to save the cost of an investigation and do nothing.

Evaluating,

$$\Pr(\omega = g | \sigma_1 = \ldots = \sigma_{i-1} = b) = \frac{p_g \epsilon_g^{i-1}}{p_g \epsilon_g^{i-1} + p_b (1-\epsilon_b)^{i-1}}$$

and so the equilibrium $m$ is the largest $m$ such that

$$\frac{(1-\epsilon_g) \epsilon_g^{m-1} p_g \pi_g + \epsilon_b (1-\epsilon_b)^{m-1} p_b \pi_b}{\epsilon_g^{m-1} p_g + (1-\epsilon_b)^{m-1} p_b} \geq \kappa.$$

Equilibrium exploitation probabilities are then

$$\begin{aligned} \tilde{Q}_g &= 1 - \epsilon_g^m \\ \tilde{Q}_b &= 1 - (1-\epsilon_b)^m. \end{aligned}$$

The comparison of investor welfare relative to the case in which investors don't know their place in the sequence is immediate from the fact that, in this case, each investor has a zero expected payoff once investigation costs are accounted for:

**Corollary 1.** *Let (C-5) hold, and $n$ be large enough that the equilibrium in the unknown-place-in-sequence setting is interior. Investor welfare is strictly raised if investors observe their place in the sequence.*

While the welfare comparison is straightforward, the comparison of exploitation probabilities is ambiguous.

For conciseness, for the remainder of this subsection I focus on the leading case in which the signal error rate is independent of the opportunity's quality $\omega$, i.e.,

$$\epsilon_g = \epsilon_b = \epsilon, \tag{C-7}$$

and in which the opportunity is unconditionally unprofitable,

$$p_g \pi_g + p_b \pi_b < 0. \tag{C-8}$$

In this case, only the first investor investigates ($m = 1$); and either that investor observes a positive signal and exploits the opportunity, or observes a negative signal and no future investor finds it worthwhile to investigate. Exploitation probabilities are simply

$$\tilde{Q}_g = 1 - \epsilon \text{ and } \tilde{Q}_b = \epsilon.$$

The reason is that, under (C-7), observing a negative signal and then a positive signal leaves an investor with posterior beliefs that match the prior belief $p_g$, which by (C-8) leads to no-investment.

On the one hand, if the common error rate $\epsilon$ is sufficiently small, the probability that a good project is exploited is raised if investors know their place in the sequence:

**Lemma C-1.** *Let (C-7) and (C-8) hold. If the common error rate $\epsilon$ is sufficiently small and $n$ is sufficiently large then*

$$\tilde{Q}_b < Q_g^* < \tilde{Q}_g.$$

*Moreover, $\tilde{Q}_b < Q_b^*$ if and only if*

$$\frac{(1 - \exp(-1))\, p_g}{(1 - \exp(-1))\, p_g + p_b} \pi_g > \kappa, \tag{C-9}$$

*which holds if a single investor's return to investigation, $\frac{p_g \pi_g}{\kappa}$, is sufficiently large.*

The ordering of exploitation probabilities in Lemma C-1 isn't universal, as illustrated in the following example:

*Example:* Let $p_g = .2$, $\pi_g = 1,000$, $\pi_b = -300$, $\kappa = 6$, $\epsilon_g = \epsilon_b = .4$. If investors know their place in the sequence then $\tilde{Q}_g = .6$ and $\tilde{Q}_b = .4$. But if investors don't know their place in the sequence then the equilibrium as $n \to \infty$ is $Q_g^* \to .691 > \tilde{Q}_g$ and $Q_b^* \to .543 > \tilde{Q}_b$.[2]

In the example, if investors know their place in the sequence then, as discussed, only the first investor investigates; and because the error rate is high ($\epsilon_g = .4$) the exploitation probability is low. In contrast, if investors don't know their place in the sequence then the expected number of investigations rises, raising the exploitation probability.

Lemma C-1 identifies conditions under which investors knowing their place in the sequence leads to better exploitation outcomes, in the sense that good opportunities are *more* likely to be exploited and worse projects are *less* likely to be exploited, relative to the case of unknown-place-in-sequence. This begs the question of whether the reverse is possible, viz., are there circumstances under which investors knowing their place in the sequence leads to unambiguously *worse* exploitation outcomes? The answer is negative:

**Corollary 2.** *If* $Q_g^* > \tilde{Q}_g$ *then* $Q_b^* > \tilde{Q}_b$.

Corollary 2 is immediate from the fact that (Lemma A-2)

$$\frac{Q_g^*}{Q_b^*} < \frac{1-\epsilon}{\epsilon} = \frac{\tilde{Q}_g}{\tilde{Q}_b}.$$

## C.3 Investors make investigation decisions simultaneously

A second benchmark is that in which all investors make investigation decisions simultaneously, without the opportunity to observe whether or not the opportunity still exists. Equivalently, this benchmark corresponds to investors committing to an investigation strategy before the game begins. If multiple investors investigate and subsequently attempt to exploit then the opportunity is randomly allocated to one of them. Note that this benchmark is closely related to previous analysis of Bertrand competition preceded by a costly entry decision (see references in introduction).

Let $\hat{v}(\alpha)$ denote an investor's expected payoff (gross of investigation costs) from investigation if all investors investigate with probability $\alpha$. For any given $\alpha$, the probability that an opportunity of type $\omega$ is exploited by one of the $n$ investors is exactly the same as in the unknown-place-in-sequence case, viz., $Q_\omega(\alpha; n) = 1 - (1 - \Pr(\sigma_i = g|\omega)\alpha)^n$ . The sum of

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[2] Moreover, by Proposition 2 the equilibrium exploitation probabilities $Q_g^*$ and $Q_b^*$ are larger for smaller values of $n$.

$\alpha\hat{v}(\alpha)$ across the $n$ investors must equal the combined payoff of the $n$ investors (excluding investigation costs):

$$n\alpha\hat{v}(\alpha) = \sum_{\omega=g,b} Q_\omega(\alpha)\, p_\omega \pi_\omega, \tag{C-10}$$

When investors move sequentially they draw negative inferences from seeing that the opportunity remains available. This observation might suggest that exploitation probabilities in the simultaneous-move game are higher. In fact, the reverse is the case, and exploitation probabilities are *lower.* Formally, denote by $\hat{Q}_g$ and $\hat{Q}_b$ the equilibrium exploitation probabilities in the simultaneous-move game:

**Lemma C-2.** *The equilibrium of the simultaneous-move game is interior, i.e., $\alpha \in (0,1)$, for all $n$ sufficiently large. Exploitation probabilities satisfy $\hat{Q}_g \leq Q_g^*$ and $\hat{Q}_b \leq Q_b^*$, with both inequalities strict if the equilibrium is interior.*

The economic force behind Lemma C-2 is as follows. Consider the commitment interpretation of the simultaneous-move game: each investor decides on an investigation probability before the game begins, and then the investors investigate and choose whether to exploit in a randomly determined order. When it is an individual investor's turn to move, there are two possibilities: either (i) the opportunity remains available, or (ii) it is already exploited. Case (i) is exactly the situation that arises in the main sequential-move analysis; but case (ii) is strictly worse for an investor, since in this case the investigation cost $\kappa$ yields zero benefit, but the investor is committed to investigate with probability $\alpha$. Consequently,

$$\hat{v}(\alpha) < v(\alpha), \tag{C-11}$$

which indeed can be seen formally by comparing (C-10) to its analogue in the unknown-place-in-sequence case,

$$n\alpha \Pr(i \text{ observes opportunity})\, v(\alpha) = \sum_{\omega=g,b} Q_\omega(\alpha)\, p_\omega \pi_\omega. \tag{C-12}$$

It follows from (C-11) that the equilibrium investigation probability is lower in the simultaneous-move setting, yielding Lemma C-2 (see appendix for details).

While exploitation probabilities are lower in the simultaneous-move game than in the main sequential-move analysis, investor welfare is the same—and equals zero—in the leading case in which the equilibrium is interior in both cases ($\frac{p_g\pi_g + p_b\pi_b}{p_g + \frac{p_b}{\epsilon_b}} < \kappa$ and $n$ sufficiently large.)

It is worth highlighting that the ratio of good to bad opportunities, $\frac{p_g}{p_b}$, plays a different role in the sequential- and simultaneous-move games. This is easiest seen by considering a reduction in $\frac{p_g}{p_b}$ that is accompanied by changes to $\pi_g$ and $\pi_b$ that leave $p_g\pi_g$ and $p_b\pi_b$

unchanged. In the sequential-move game this change lowers equilibrium exploitation probabilities (Proposition 4). Economically, the smaller ratio of good to bad opportunities leads to more negative investor inferences from the observation that the opportunity remains available. In contrast, in the simultaneous-move game this change leaves exploitation probabilities *unaffected.*

## C.4 Exogenous signals

A third benchmark is the case in which acquisition of signals $\sigma_i$ is exogenous. Specifically: Exactly as in the baseline analysis, investors sequentially encounter the opportunity in random order. Different from the baseline: upon encountering the opportunity, an investor $i$ immediately observes a signal $\sigma_i$ of the opportunity's quality. The investor then decides whether to pay a cost $\breve{\kappa}$ in order to exploit the opportunity. Exactly as in the benchmark case of endogenous signal acquisition, in equilibrium an investor only exploits the opportunity following a good signal. The fact that the cost $\breve{\kappa}$ is paid only after observing the signal generates a mechanical advantage to an investor in the exogenous-signal case relative to the endogenous-signal case. In order to avoid this mechanical difference between the cases I assume

$$\breve{\kappa} \sum_{\omega=g,b} p_\omega \Pr\left(\sigma_i = g|\omega\right) = \kappa, \tag{C-13}$$

i.e., the expected cost of exploitation for a single investor is equal across the exogenous- and endogenous-signal settings.

An important first step is to note that if the number of investors $n$ is sufficiently large then it cannot be an equilibrium for an investor to exploit with probability 1 after observing a good signal. The reason is that, in this case, the observation that the opportunity remains available would indicate that all previous investors have observed a bad signal, and this information would overwhelm an investor's single good signal. Accordingly, the equilibrium must take the form of: each investor who observes a good signal exploits the opportunity with probability $\gamma \in (0,1)$. I focus on the case of $n$ sufficiently large for the remainder of the discussion.

Analogous to (15), define $\breve{v}(\gamma)$ as the expected payoff of an investor who observes a good signal, gross of exploitation cost $\breve{\kappa}$. Note that the probability that an opportunity of quality $\omega$ is exploited by some investor is

$$1 - \left(1 - \Pr\left(\sigma_i = g|\omega\right)\gamma\right)^n = Q_\omega\left(\gamma\right).$$

By the same arguments as for (12) and (16),

$$\Pr\left(i \text{ observes opportunity}|\omega\right) = \frac{Q_\omega\left(\gamma\right)}{\Pr\left(\sigma_i = g|\omega\right) n\gamma},$$

and hence

$$\Pr\left(i \text{ observes opportunity and } \sigma_i = g|\omega\right) = \frac{Q_\omega\left(\gamma\right)}{n\gamma}.$$

and hence

$$\check{v}\left(\gamma\right) = \frac{Q_g\left(\gamma\right) p_g \pi_g + Q_b\left(\gamma\right) p_b \pi_b}{Q_g\left(\gamma\right) p_g + Q_b\left(\gamma\right) p_b} = \frac{\frac{Q_g(\gamma)}{Q_b(\gamma)} \frac{p_g}{1-\epsilon_g} + \frac{p_b}{\epsilon_b}}{\frac{Q_g(\gamma)}{Q_b(\gamma)} p_g + p_b} v\left(\gamma\right) > v\left(\gamma\right). \tag{C-14}$$

(For completeness, I have written the (C-14) to allow for false negatives, $\epsilon_g \geq 0$; see C.1 above.) As in the baseline analysis, Lemma A-2 implies that $\check{v}$ is decreasing in $\gamma$, generalizing the above observation that if projects with good signals are exploited with high probability then the observation that the opportunity remains available conveys negative information. The inequality in (C-14) reflects the advantage that an investor enjoys in the exogenous-signal case of choosing whether to pay the exploitation cost only after seeing the signal realization.

More interestingly, the advantage that an investor derives from paying the exploitation cost only after seeing the signal exceeds the increase in investigation costs embodied in (C-13). Consequently, the equilibrium exploitation probability is higher in the case of exogenous signals than in the endogenous signal baseline:

**Lemma C-2.** *$\check{Q}_g \geq Q_g^*$ and $\check{Q}_b \geq Q_b^*$, with both inequalities strict if the equilibrium of the endogenous signal setting is interior.*

The intuition for Lemma C-2 is that (C-13) scales up the cost $\kappa$ using the prior distribution of project quality $(p_g, p_b)$. In contrast, in equilibrium an investor faces an adversely selected pool of projects, making the ability to defer paying the exploitation cost more valuable than implied under the prior distribution.

## C.5 Proofs for Internet Appendix C

**Proof of Lemma C-1:** From Proposition 2, for $\epsilon_b$ sufficiently small $Q_g^*$ remains bounded away from 1 as $n \to \infty$. Since $\tilde{Q}_g \to 1$ and $\tilde{Q}_b \to 0$ as $\epsilon \to 0$, this establishes that $\tilde{Q}_b < Q_g^* < \tilde{Q}_g$. It remains to order $\tilde{Q}_b$ relative to $Q_b^*$.

To do so, use (A-3) to write the equilibrium condition (for $n \to \infty$) in terms of $Q_b$, i.e.,

$$\frac{\left(1-(1-Q_b)^{\frac{1-\epsilon}{\epsilon}}\right)p_g\pi_g + Q_b p_b \pi_b}{\left(1-(1-Q_b)^{\frac{1-\epsilon}{\epsilon}}\right)\frac{p_g}{1-\epsilon} + Q_b \frac{p_b}{\epsilon}} = \kappa.$$

The LHS is decreasing in $Q_b$ (Lemma A-2). Hence $Q_b^* > \tilde{Q}_b$ if and only if the LHS evaluated at $Q_b = \epsilon$ exceeds $\kappa$. Using

$$\lim_{\epsilon \to 0} (1-\epsilon)^{\frac{1-\epsilon}{\epsilon}} = e^{-1},$$

as $\epsilon \to 0$ the LHS evaluated at $Q_b = \epsilon$ approaches

$$\frac{\left(1-e^{-1}\right)p_g}{\left(1-e^{-1}\right)p_g + p_b}\pi_g,$$

completing the proof.

**Proof of Lemma C-2:** Note that

$$\lim_{\alpha \to 0} \frac{Q_\omega(\alpha)}{n\alpha} = \Pr(\sigma_i = g|\omega).$$

Hence by assumption (2),

$$\lim_{\alpha \to 0} \hat{v}(\alpha) > \kappa. \tag{C-15}$$

Moreover, $Q_\omega(1) \to 1$ as $n \to \infty$. So for all $n$ sufficiently large

$$\kappa > \hat{v}(1). \tag{C-16}$$

For all $n$ large enough that (C-16) holds, the equilibrium investigation probability of the simultaneous move game is the unique $\hat{\alpha} \in (0,1)$ that solves

$$\hat{v}(\hat{\alpha}) = \kappa,$$

establishing the first part of Lemma C-2. The second part of Lemma C-2 is immediate from the combination of (C-11) and Lemma (A-2), completing the proof.

**Proof of Lemma C-2:** The equilibrium condition determining $\gamma$ in the exogenous-signal game is $\check{v}(\gamma) \geq \check{\kappa}$, with equality if $\gamma < 1$. By (C-13) and (C-14) the condition is equivalent to

$$((1-\epsilon_g)p_g + \epsilon_b p_b)\frac{\frac{Q_g(\gamma)}{Q_b(\gamma)}\frac{p_g}{1-\epsilon_g} + \frac{p_b}{\epsilon_b}}{\frac{Q_g(\gamma)}{Q_b(\gamma)}p_g + p_b} v(\gamma) \geq \kappa,$$

which is in turn equivalent to

$$\frac{\left(\frac{1-\epsilon_g}{\epsilon_b}p_g+p_b\right)\left(\frac{Q_g(\gamma)}{Q_b(\gamma)}\frac{\epsilon_b}{1-\epsilon_g}p_g+p_b\right)}{\frac{Q_g(\gamma)}{Q_b(\gamma)}p_g+p_b}v\left(\gamma\right)\geq\kappa.$$

Since $\frac{Q_g(\gamma)}{Q_b(\gamma)}$ is less than $\frac{1-\epsilon_g}{\epsilon_b}$ but exceeds 1, the expression multiplying $v\left(\gamma\right)$ lies between 1 and

$$\left(\frac{1-\epsilon_g}{\epsilon_b}p_g+p_b\right)\left(\frac{\epsilon_b}{1-\epsilon_g}p_g+p_b\right)>1.$$

It follows that the equilibrium value of $\gamma$ in the exogenous-signal game exceeds the equilibrium value of $\alpha$ in the endogenous-signal game, with the comparison strict if $\alpha<1$. This completes the proof.