What's in a Name?

Reputation and Monitoring in the Audit Market

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Online Appendix

This online appendix serves to show that the results in the main body of the paper are robust to certain model alterations. In particular, in section 2 we show that even if monitoring came via an Engagement Quality Reviewer (as is common in many audit firms), our results would stand. In section 3 we consider a multitasking model and argue that this model will also give results similar to ours. Before we look into these two alterations however, first we provide a little more context to our analysis.

1 History and Context

Unlike several other jurisdictions such as the EU countries and Australia, in the U.S.A., the name of the lead audit partner is not disclosed to investors and other users of financial statements of publicly traded companies. We have pointed out some criticisms for this in the introduction. In response to a recommendation by the U.S. Department of Treasury, the Public Company Accounting Oversight Board (PCAOB) issued a *Concept Release Requiring the Engagement Partner to Sign the Audit Report* (No. 2009-005 – Concept Release). Greater transparency and higher accountability of individual auditors were the two main goals this new standard aimed to achieve. The proposed rule was strongly opposed by the major accounting firms (Deloitte, Ernst & Young, KPMG, PricewaterhouseCoopers) who were of the opinion that given the nature of checks and balances existing in most audit firms, the signature requirement would be irrelevant to audit quality and

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would subject engagement partners to additional liability risks. Moreover, they felt that this additional exposure would lead to inefficiently high levels of effort by partners trying to play it safe. Investors, on the other hand, supported the proposal and argued that greater transparency would enhance audit quality by increasing the engagement partner's sense of accountability to financial statement users. After four rounds of public comments, in December 2015, the PCAOB approved the new rule which mandates that the lead engagement partner's name be disclosed in the new PCAOB Form AP, Auditor Reporting of Certain Audit Participants. The PCAOB believes that this approach will achieve the objectives of transparency and accountability of the audit while appropriately addressing concerns regarding liability of the auditor (PCAOB, 2015). The Securities and Exchange Commission (SEC) approved this rule in May 2016 and the new rule for engagement partner name disclosure will apply to auditor reports issued on or after January 31, 2017.

2 Engagement quality reviewer (EQR)

In this subsection, we consider a variation of our model and show that even if monitoring is done via an EQR (instead of partner rotation) we will still obtain the result that the monitor will be less inclined to report under the disclosure regime. This will serve as a robustness check for our result that audit quality may go down when the regime changes from a non-disclosure regime to a disclosure regime due to the lower incentives to monitor in the latter environment. To analyze the incentives of an EQR as a monitor partner, we incorporate the following changes in our baseline model.

In this extension to our baseline model, the audit firm receives the audit fee in each period and partners get their payoffs upfront in every period. In the first period, the random assignment rule decides which partner is assigned to the issuer. The other partner, who serves on project 2, also serves as an EQR for the issuer's project. With probability $1 - \gamma$ the engagement quality reviewer learns about the signals and actions of the engagement partner. With probability γ, he does not observe the signal obtained by the engagement partner. If he observes that the partner played A, he decides whether to report against the partner or not. The cost of reporting is as before. If the engagement partner is fired then a new partner becomes the engagement partner in period 2, whereas, if the EQR is fired[1], then the new partner takes charge of project 2 and the EQR position in period 2. If the EQR reports a partner and an investigation ensues, the true signal of the engagement partner is reported to the investor, else the engagement partner's original report is announced. We assume that the following is not possible - the EQR changes the signal but does not report the partner. In the second period, the EQR's actions do not affect the payoff of the partners. So, to simplify our analysis, we assume away the

[1] for wrongful reporting, for example

EQR's action stage in period 2.

The payoff-structure is the same as that described in the model in our paper. The partner assigned to project 2 does not get any additional payoffs for his role as an EQR. In contrast to the partner rotation model, in this model, the engagement partner in the first period is assumed to continue with the issuer in the second period if the EQR does not report against the engagement partner. If the engagement partner is fired, he is replaced by a new partner who is randomly selected (thus with reputation p_h) and then assigned to the issuer. The big distinction in this section is that we assume that the investor does not observe if an engagement partner is fired. In the disclosure regime, the investor knows the name of the engagement partner so he can infer that the first partner must have been fired if he observes a change in partner. However, he is unable to do this in the non-disclosure regime. Moreover, the investor cannot distinguish between a report with the signal b issued by the engagement partner playing NA and a report with the same signal which is issued when the EQR discovered that the engagement partner had played A and a corrected report was issued thereafter. Therefore, in the non-disclosure regime, if the investor observes the signal g and learns that the state was B, he may believe that with positive probability the partner played A and this was undetected by the EQR. However, if, in the same regime, the investor observes the signal b and learns that the state was B, he may believe that with positive probability the partner played NA in period 1 and is therefore more likely to be R type. This gives the intuition for our result. From the EQR's point of view, he faces a cost of reporting and his benefit from reporting comes from the increase in his wages due to the increased reputation of the engagement partner. When the EQR learns that the audit report does not match the signal, he has the following incentives to report under the two regimes. In the non-disclosure regime, a report followed by a change in signal would lead to the history b, B. Since the investor does not observe the firing, he places positive beliefs on the event that the partner played NA. In all other events possible under the same history, the reputation of the engagement partner in period 2 is at least p_h[2]. This leads to the revised reputation being above p_h. However, in the disclosure regime, since the investor can infer a change in partner, the maximum reputation for this partner can be p_h (obtained when the EQR reports the partner and a new partner joins the firm as engagement partner in period 2). Thus, the gain from reporting for the EQR is higher in the non-disclosure regime and therefore if the cost of reporting is positive but not very high, the EQR will only report in the non-disclosure regime. Under such conditions, we have higher quality of audits under the non-disclosure regime.

Next, we will show that the incentives to report are stronger for the EQR in the non-disclosure regime. Then we provide a more formal analysis describing the equilibria possible in the EQR model under the two

[2]Either the first partner reported b (always more likely from the R type partner since the R type always reports correctly) or the first partner reported g incorrectly. In the latter case, the EQR must have gotten the first partner fired before changing the report, thereby making the reputation of the new partner p_h.

regimes.

Consider equilibria where the EQR always reports and in equilibrium the F type partner plays A in period 1 with probability x. $\phi(x) = P(R|b, B)$ and $\phi'(x) = P(R|g, B)$ are the reputation of the engagement partner assigned to the issuer at period 2. Then:

In case of a conflict, the engagement partner's payoff from playing A in period 1 is

$$\alpha_1 W p_h + \alpha_2 X p_h + \delta(\gamma[\alpha_1 W \phi'(x) + \alpha_2 X p_h] + (1-\gamma)v_f)$$

In case of a conflict, payoff from playing NA is

$$\alpha_1 W p_h + \alpha_2 X p_h + \delta(\gamma[\alpha_1 W \phi(x) + \alpha_2 X p_h] + (1-\gamma)[\alpha_1 W \phi(x) + \alpha_2 X p_h])$$

The EQR's payoff at time t depends on the reputation of the engagement partner in the following way.

$$EQR\ payoff = \beta_1(W R_t) + \beta_2(X p_h) - I_r.c$$

where R_t is the reputation of the engagement partner at time t, I_r is an indicator function which takes the value one if the EQR chooses to report[3]. If the EQR reports against the engagement partner, the history that the investor observes changes from (g, B) to (b, B). If he does not report, the history observed by the investor is (g, B). Thus the EQR reports if and only if

$$\beta_1 \delta W(\phi(x) - \phi'(x)) \geq c \tag{1}$$

Under the disclosure regime, the investor also observes if the engagement partner is reassigned to the issuer. In case of a conflict, if the partner plays A and the EQR fails to detect it, then the relevant history to the investor is (g, B, nf) under the disclosure regime.

In the disclosure regime, if the EQR reports against the engagement partner, the history the investor observes changes from (g, B, nf) to (b, B, f). Notice that, $R_t = p_h$ following the history (b, B, f). If he does not report, the history observed by the investor is (g, B, nf) and $R_t = \phi'$.The reputation following (g, B) in the non-disclosure regime is the same as the reputation of the engagement partner after the history (g, B, nf) in the disclosure regime because the history (g, B) implies no firing in the non-disclosure regime[4].

[3]We know that the EQR does not misreport in equilibrium so we don't consider that possibility here

[4]Firing could have happened only if the EQR reported the engagement partner. However, then the EQR would have changed the

Thus the EQR will report if and only if

$$\beta_1 \delta W(p_h - \phi') \geq c \tag{2}$$

Since $\phi(x) > p_h$ for all $x \in (0, 1)$, comparing (1) and (2), we observe that the EQR has higher incentives to report under the non-disclosure regime than in the disclosure regime.

Now we give a more formal analysis of the equilibria possible under the two regimes in the EQR model.

2.0.1 Non-disclosure regime:

In this section we look for the equilibrium behavior of the engagement partner and the EQR when the name of the engagement partner is not disclosed to the investor. Suppose that, in equilibrium, the probability that the F partner announces g when he actually got the signal b is $x \in [0, 1]$. Then,

$$Pr(R|b, B) = \phi(x) = \frac{p_h[1 + (1 - p_h)x(1 - \gamma)]}{p_h + (1 - p_h)(x(1 - \gamma) + (1 - x))} \tag{3}$$

and

$$Pr(R|g, B) = \phi'(x) = \frac{\epsilon p_h}{\epsilon p_h + (1 - p_h)(\epsilon + (1 - \epsilon)x\gamma)} \tag{4}$$

$\phi(x)$ captures the probability that the partner assigned to the issuer in period 2 is of type R, given the history (b, B). Since the identity of the engagement partner is not observed by the investor, $\phi(x) \in (p_h, 1)$ for all $x \in (0, 1]$. Similarly, $\phi'(x)$ gives the probability that the partner assigned to the issuer is of type R, given the history (g, B). Notice that the history (g, B) implies that the engagement partner assigned to the issuer in the first period is also assigned to the issuer in the second period[5]. The history can be observed if the assigned partner is of type R and gets the wrong signal in the first period, or the assigned partner is of type F and gets the wrong signal, or the assigned partner is of type F who plays A and the EQR does not detect the unsupported opinion. Thus, $\phi'(x) < p_h$ for all $x \in (0, 1]$.

Investment under the non-disclosure regime:

For all possible histories, the investor's optimal investment i^* (following report g) in the second period is given by the following table.

report. This is because we assume that the EQR cannot change the report without reporting thee engagement partner. Thus, had there been any firing the history would have been (b, B).

[5]Had the partner been fired, it would have to be the case that the partner had played A and was going to report g. However, in this case the final report would have been changed to be b.

History	i^* in NA-Equilibrium	i^* in Mixed Strategy Equilibrium	i^* in A-Equilibrium
g, G	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$
b, G	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$
g, B	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[\phi'(x)\epsilon+(1-\phi'(x))]}$	$\frac{pI}{p+(1-p)[\phi'(1)\epsilon+(1-\phi'(1))]}$
b, B	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[\phi(x)\epsilon+(1-\phi(x))]}$	$\frac{pI}{p+(1-p)[\phi(1)\epsilon+(1-\phi(1))]}$

Given the belief update functions, the engagement partner's incentives to play NA is given by the function $\Pi(x)$.

$$\Pi(x) = \delta\left[\gamma\alpha_1 W(\phi(x) - \phi'(x)) + (1-\gamma)\delta[\alpha_1 W\phi(x) + \alpha_2 X p_h - v_f]\right]$$

Proposition 1. Given $p_h \in (0,1)$ and $c = 0$, there exist $\underline{I} > 0$ and $\overline{I} > \underline{I}$ such that the following strategy profile constitutes an equilibrium.

At $t = 2$, the EQR always reports C. In case of a conflict, $B_2 = 0$ and the assigned partner plays A if his type is F. The investor invests i^* if the audit report is g and does not invest otherwise.

At $t = 1$, in case of a conflict,

a) If $I \leq \underline{I}$, the issuer puts pressure $B_1 = 0$. The engagement partner plays NA. The EQR reports NC if and only if the engagement partner plays A. The investor invests $\frac{Ip}{p+(1-p)\epsilon}$ if the audit report is g and does not invest if the report is b.

b) For each $I \in (\underline{I}, \overline{I})$, there exists $x^* \in (0,1)$ such that the issuer puts pressure $B_1 = \frac{Ip}{p+(1-p)[p_h\epsilon+(1-p_h)\{\epsilon+(1-\epsilon)x^*\}]}$. The engagement partner plays A with probability x^*. The EQR reports NC if and only if the engagement partner plays A. The investor invests $\frac{Ip}{p+(1-p)[p_h\epsilon+(1-p_h)\{\epsilon+(1-\epsilon)x^*\}]}$ if the audit report is g and does not invest if the report is b.

c) If $I \geq \overline{I}$, the issuer puts pressure $B_1 = \delta[\gamma(\alpha_1 W R'_2 h + \alpha_2 X R''_2 h) + (1-\gamma)(\beta_1 W R'_2 h + \beta_2 X R''_2 h) - \gamma(\alpha_1 W R'_2 + \alpha_2 X R''_2) - (1-\gamma)v_f]$ and the assigned partner plays A if his type is F. The investor invests $I * \frac{p}{p+(1-p)[p_h\epsilon+(1-p_h)]}$ if the report is g and does not invest if the report is b. $R'_2 = \frac{\epsilon p_h}{\epsilon p_h+(1-p_h)(\gamma+(1-\gamma)\epsilon)}$, $R''_2 = p_h$, $R'_2 h = \gamma.1 + (1-\gamma)p_h$, and $R''_2 h = \gamma p_h + (1-\gamma).1$.

Proof. Let's prove by backward induction. It is trivial that an F type partner is indifferent between playing A and NA in period 2 in case there is conflict and $B_2 = 0$. If $B_2 > 0$, the partner strictly prefers the action

A. Thus, the issuer has to impose any positive cost on the partner to make him play A. Thus, in equilibrium, the flexible partner will always choose A and the issuer will choose $B_2 = 0$.

Now let's consider the behavior at $t = 1$.

The NA-equilibrium: First, consider the reporting decision of the EQR. The EQR reports against the engagement partner if and only if

$$\beta_1 W(\phi(x) - \phi'(x)) \geq 0$$

In equilibrium, if the engagement partners plays NA with probability 1, $\phi = \phi' = p_h$. That is, the EQR is indifferent between reporting and not reporting against the engagement partner. Thus, reporting against the engagement partner is optimal for the EQR.

Next, consider the incentives of the engagement partner to play NA. The engagement partner's incentive to play NA is given by:

$$\Pi(x) = \gamma\alpha_1 W(\phi(x) - \phi'(x)) + (1-\gamma)[\alpha_1 W\phi(x) + \alpha_2 X p_h - v_f]$$

Under the $NA-$equilibrium we have,

$$\Pi(0) = \gamma\alpha_1 W(p_h - p_h) + (1-\gamma)[\alpha_1 W p_h + \alpha_2 X p_h - v_f]$$

$$= (1-\gamma)[\alpha_1 W p_h + \alpha_2 X p_h - v_f]$$

Now let's consider the issuer's incentives to pressure the engagement partner. If the engagement partner plays A and reports g in a conflict situation, the payoff of the issuer is $\frac{pI}{p+(1-p)\epsilon}$. On the other hand, if the partner plays NA and reports b, the investor does not invest in the project, in which event the payoff of the issuer is 0. So the maximum B the manager puts on the partner is:

$$max_B = \frac{pI}{p+(1-p)\epsilon}$$

For the NA-equilibrium to hold we need:

$$\begin{aligned} &max_B < (1-\gamma)(\beta_1 W p_h + \beta_2 X p_h - v_f) \\ \Leftrightarrow \\ &\frac{pI}{p+(1-p)\epsilon} < (1-\gamma)(\beta_1 W p_h + \beta_2 X p_h - v_f) \end{aligned} \tag{5}$$

Now max_B is a linear monotonically increasing function of I and $v_f \leq 0$. Therefore, there exists $\underline{I}$ such that $max_B < (1-\gamma)(\beta_1 W p_h + \beta_2 X p_h - v_f)$ for all $p_h \in (0,1)$. Specifically, $\underline{I} = \frac{p+(1-p)\epsilon}{p} \Pi(0)$.

The A-Equilibrium: Under the A-equilibrium, the EQR reports against the engagement partner if and only if

$$\beta_1 W(\phi(1) - \phi'(1)) \geq 0$$

; where $\phi(1) = \frac{p_h[1+(1-p_h)(1-\gamma)]}{p_h+(1-p_h)(1-\gamma)} > p_h$ and $\phi'(1) = \frac{\epsilon p_h}{\epsilon p_h + (1-p_h)(\epsilon+(1-\epsilon)\gamma)} < p_h$. Therefore, it is a strictly dominant strategy for the EQR to report against the engagement partner.

The engagement partner's incentives to play NA is given by

$$\Pi(x) = \gamma\alpha_1 W(\phi(x) - \phi'(x)) + (1-\gamma)[\alpha_1 W\phi(x) + \alpha_2 X p_h - v_f]$$

Under the $A-$equilibrium we have,

$$\Pi(1) = \gamma\alpha_1 W(\phi(1) - \phi'(1)) + (1-\gamma)[\alpha_1 W\phi(1) + \alpha_2 X p_h - v_f]$$

Now, if the engagement partner plays A and reports g in a conflict situation, the payoff of the issuer is $\frac{pI}{p+(1-p)(p_h\epsilon+(1-p_h))}$. On the other hand, if the partner plays NA and reports b, the investor does not invest in the project, in which event the payoff of the issuer is 0.

So the maximum B the issuer puts on the partner is:

$$max_B = \frac{pI}{p+(1-p)(p_h\epsilon+(1-p_h))}$$

Now max_B is a linear monotonically increasing function of I. Therefore, there exists $\overline{I}$ such that if $I > \overline{I}$ then $max_B > \gamma\alpha_1 W(\phi(1) - \phi'(1)) + (1-\gamma)[\alpha_1 W\phi(1) + \alpha_2 X p_h - v_f]$ for all $p_h \in (0,1)$.

Specifically, $\overline{I} = \frac{p+(1-p)(p_h\epsilon+(1-p_h))}{p}\mathit{\Pi}(1)$.

Mixed Strategy Equilibrium: We first show that $\overline{I} > \underline{I}$.

Notice that for a given I,

$$max_B(x=0) > max_B(x=1) \tag{6}$$

Also, note that,

$$\mathit{\Pi}(x=0) < \mathit{\Pi}(x=1). \tag{7}$$

For the NA- equilibrium to hold we must have,

$$\mathit{\Pi}(x=0) \geq max_B(x=0) \tag{8}$$

On the other hand, for the A- equilibrium to hold we must have,

$$\mathit{\Pi}(x=1) \leq maxB(x=1) \tag{9}$$

Therefore, $\overline{I} > \underline{I}$ follows from (6), (7), (8) and (9).

Let's consider $I \in (\underline{I}, \overline{I})$. Suppose the engagement partner plays A with probability $x \in (0,1)$.

The EQR reports against the engagement partner if and only if

$$\beta_1 W(\phi(x) - \phi'(x)) \geq 0$$

; where $\phi(x)$ and $\phi'(x)$ is given by (3) and (4) respectively.

For the mixed strategy equilibrium to hold, the engagement partner must be indifferent between playing A and NA. The issuer should also be indifferent between putting pressure B_2 and not putting pressure. That is, we must have:

$$B_2 = max_B(x)$$

Thus, in equilibrium the following condition has to hold:

$$\mathit{\Pi}(x) = maxB(x)$$

$$\Rightarrow \gamma\alpha_1 W(\phi(x)-\phi'(x))+(1-\gamma)[\alpha_1 W\phi(x)+\alpha_2 X p_h - v_f] = \frac{Ip}{p+(1-p)\left[p_h\epsilon+(1-p_h)\{\epsilon+(1-\epsilon)x\}\right]} \tag{10}$$

Notice that $\phi(.)$ is continuous and monotonically increasing in x. Also, $\phi'(.)$ is continuous and monotonically decreasing in x. Therefore, the left hand side of equation (10) is monotonically increasing in x and right hand side of equation (10) is decreasing in x. Additionally, the following conditions are satisfied: $\varPi(0) < maxB(0)$ and $\varPi(1) > maxB(1)$.

Therefore, for a given $I \in (\underline{I}, \overline{I})$, there exists a unique $x^* \in (0, 1)$ such that equation (10) is satisfied.

□

Using similar arguments as in our main paper (Lemma 3 in the appendix), we can show that the equilibrium described in Proposition 1 is unique.

2.0.2 Disclosure regime:

Under the disclosure regime, along with the history of outcomes, the investor also observes if the engagement partner is reassigned to the issuer. In case of a conflict, if the partner plays A and the EQR fails to detect it, then the relevant history to the investor is (g, B, nf) under the disclosure regime. Suppose that, in equilibrium, the probability that the F partner announces g when he actually got the signal b is $x \in [0, 1]$. Then,

$$Pr(R|b, B) = \phi_d(x) = \frac{p_h}{p_h + (1-p_h)(1-x)} \tag{11}$$

and

$$Pr(R|g, B) = \phi'_d(x) = \frac{\epsilon p_h}{\epsilon p_h + (1-p_h)(\epsilon + (1-\epsilon)x\gamma)} \tag{12}$$

Under the NA- equilibrium, $\phi_d = 1$ and for all $x \in [0, 1]$, $\phi'(x) = \phi'_d(x)$. Given the belief update functions, the engagement partner's incentive to play NA is given by the function $\varPi_d(x)$.

$$\varPi_d(x) = \delta\left[\gamma\alpha_1 W(\phi_d(x) - \phi'_d(x)) + (1-\gamma)[\alpha_1 W\phi_d(x) + \alpha_2 X p_h - v_f]\right]$$

Optimal investment under the disclosure regime:

For all possible histories, the investor's optimal investment rule (following report g) in the second period is given by the following table. In the table S stands for the same partner assigned to the issuer in the second period, while D stands for a different partner being assigned to the issuer.

History	i_d^* in NA-Equilibrium	i_d^* in Mixed Strategy Equilibrium	i_d^* in A-Equilibrium
g,G,S	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$
b,G,S	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	0	0
g,B,S	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[\phi_d'(x)\epsilon+(1-\phi_d'(x))]}$	$\frac{pI}{p+(1-p)[\phi_d'(1)\epsilon+(1-\phi_d'(1))]}$
b,B,S	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[\phi_d(x)\epsilon+(1-\phi_d(x))]}$	$\frac{pI}{p+(1-p)\epsilon}$
g,G,D	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$
b,G,D	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$
g,B,D	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$
b,B,D	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$	$\frac{pI}{p+(1-p)[p_h\epsilon+(1-p_h)]}$

Proposition 2. Given $p_h \in (0,1)$ and $c = 0$, there exist $\underline{I}_d > 0$ and $\overline{I}_d > \underline{I}_d$ such that the following strategy profile constitutes an equilibrium.

At $t = 2$, the EQR always reports C. In case of a conflict, $B_2 = 0$ and the assigned partner plays A if his type is F. The investor invests i_d^* if the audit report is g and does not invest otherwise.

At $t = 1$, in case of a conflict,

a) If $I \leq \underline{I}_d$, the issuer puts pressure $B_1 = 0$. The engagement partner plays NA. The EQR reports NC if and only if the engagement partner plays A. The investor invests $\frac{Ip}{p+(1-p)\epsilon}$ if the audit report is g and does not invest if the report is b.

b) For each $I \in (\underline{I}_d, \overline{I}_d)$, there exists $x_d^* \in (0,1)$ such that the issuer puts pressure equal to $B_1 = \frac{Ip}{p+(1-p)[p_h\epsilon+(1-p_h)\{\epsilon+(1-\epsilon)x_d^*\}]}$. The engagement partner plays A with probability x_d^*. The EQR reports NC if and only if the engagement partner plays A. The investor invests $\frac{Ip}{p+(1-p)\left[p_h\epsilon+(1-p_h)\{\epsilon+(1-\epsilon)x_d^*\}\right]}$ if the audit report is g and does not invest if the report is b.

c) If $I \geq \overline{I}_d$, the issuer puts pressure $B_1 = \delta\left[\gamma\alpha_1 W(1-\phi'(1)) + (1-\gamma)[\alpha_1 W + \alpha_2 X p_h - v_f]\right]$. The engagement partner plays A if his type is F. The EQR reports NC if and only if the engagement partner plays A. The investor invests $\frac{Ip}{p+(1-p)[p_h\epsilon+(1-p_h)(\epsilon+(1-\epsilon)\gamma]}$ if the audit report is g and does not invest if the report is b.

Proof. Let's prove by backward induction. It is clear that since period two is the last period, the issuer will choose $B_2 = 0$ and the partner will acquiesce in any equilibrium.

Now let's consider the behavior at $t = 1$.

The NA-Equilibrium: First, consider the reporting decision of the EQR. The EQR reports against the engagement partner if and only if

$$\beta_1 W(\phi_d(x) - \phi'_d(x)) \geq 0$$

In equilibrium, if the engagement partner plays NA with probability 1, $\phi_d = \phi'_d = p_h$. That is, the EQR is indifferent between reporting and not reporting against the engagement partner. Thus, reporting against the engagement partner is weakly optimal for the EQR.

Next, consider the incentives of the engagement partner to play NA. The engagement partner's incentive to play NA is given by:

$$\Pi_d(x) = \gamma\alpha_1 W(\phi_d(x) - \phi'_d(x)) + (1-\gamma)[\alpha_1 W\phi_d(x) + \alpha_2 X p_h - v_f]$$

Under the $NA-$equilibrium we have,

$$\Pi_d(0) = \gamma\alpha_1 W(p_h - p_h) + (1-\gamma)[\alpha_1 W p_h + \alpha_2 X p_h - v_f]$$

$$= (1-\gamma)[\alpha_1 W p_h + \alpha_2 X p_h - v_f]$$

Now, let's consider the issuer's incentives to pressure the engagement partner. If the engagement partner plays A and reports g in a conflict situation, the payoff of the issuer is $\frac{pI}{p+(1-p)\epsilon}$. On the other hand, if the partner plays NA and reports b, the investor does not invest in the project, in which event the payoff of the issuer is 0. So, the maximum B the manager puts on the partner is:

$$max_B = \frac{pI}{p+(1-p)\epsilon}$$

For the NA-equilibrium to hold we need:

$$max_B < (1-\gamma)(\beta_1 W p_h + \beta_2 X p_h - v_f)$$

$$\Leftrightarrow$$

$$\frac{pI}{p+(1-p)\epsilon} < (1-\gamma)(\beta_1 W p_h + \beta_2 X p_h - v_f) \quad (13)$$

Now max_B is a linear monotonically increasing function of I and $v_f \leq 0$. Therefore, there exists $\underline{I}_d$ such that $max_B < (1-\gamma)(\beta_1 W p_h + \beta_2 X p_h - v_f)$ for all $p_h \in (0,1)$. Specifically, $\underline{I}_d = \frac{p+(1-p)\epsilon}{p}\Pi_d(0)$.

The A-Equilibrium: Under the A-equilibrium, the EQR reports against the engagement partner if and only if

$$\beta_1 W(\phi_d(1) - \phi'_d(1)) \geq 0$$

, where $\phi_d(1) = 1 > p_h$ and $\phi'_d(1) = \frac{\epsilon p_h}{\epsilon p_h + (1-p_h)(\epsilon + (1-\epsilon)\gamma)} < p_h$. Therefore, it is a strictly dominant strategy for the EQR to report against the engagement partner.

The engagement partner's incentive to play NA is given by

$$\Pi_d(x) = \gamma\alpha_1 W(\phi_d(x) - \phi'_d(x)) + (1-\gamma)[\alpha_1 W\phi_d(x) + \alpha_2 X p_h - v_f]$$

Under the $A-$equilibrium we have,

$$\Pi_d(1) = \gamma\alpha_1 W(1 - \phi'(1)) + (1-\gamma)[\alpha_1 W + \alpha_2 X p_h - v_f]$$

Now, if the engagement partner plays A and reports g in a conflict situation, the payoff of the issuer is $\frac{pI}{p+(1-p)(p_h\epsilon+(1-p_h))}$. On the other hand, if the partner plays NA and reports b, the investor does not invest in the project, in which event the payoff of the issuer is 0.

So the maximum B the issuer puts on the partner is:

$$max_B = \frac{pI}{p + (1-p)(p_h\epsilon + (1-p_h))}$$

Now max_B is a linear monotonically increasing function of I. Therefore, there exists $\overline{I}_d$ such that if $I > \overline{I}_d$ then $max_B > \gamma\alpha_1 W(\phi(1) - \phi'(1)) + (1-\gamma)[\alpha_1 W\phi(1) + \alpha_2 X p_h - v_f]$ for all $p_h \in (0,1)$. Specifically, $\overline{I}_d = \frac{p+(1-p)(p_h\epsilon+(1-p_h))}{p}\Pi_d(1)$.

Mixed Strategy Equilibrium: We first show that $\overline{I} > \underline{I}$.

Notice that for a given I,

$$maxB(x=0) > maxB(x=1) \tag{14}$$

Also, note that,

$$\Pi_d(x=0) < \Pi_d(x=1). \tag{15}$$

For the NA- equilibrium to hold we must have,

$$\Pi_d(x = 0) \geq maxB(x = 0) \tag{16}$$

On the other hand, for the A- equilibrium to hold we must have,

$$\Pi_d(x = 1) \leq maxB(x = 1) \tag{17}$$

Therefore, $\overline{I} > \underline{I}$ follows from (14), (15), (16) and (17).

Let's consider $I \in (\underline{I}, \overline{I})$. Suppose the engagement partner plays A with probability $x \in (0, 1)$.

The EQR reports against the engagement partner if and only if

$$\beta_1 W(\phi_d(x) - \phi'_d(x)) \geq 0$$

, where $\phi_d(x)$ and $\phi'_d(x)$ is given by (11) and (12) respectively.

For the mixed strategy equilibrium to hold, the engagement partner must be indifferent between playing A and NA. The issuer should also be indifferent between putting pressure B_2 and not putting pressure. That is, we must have

$$B_2 = maxB(x)$$

Thus, in equilibrium, the following condition has to hold:

$$\Pi_d(x) = maxB(x)$$

$$\Rightarrow \gamma\alpha_1 W(\phi_d(x) - \phi'_d(x)) + (1-\gamma)[\alpha_1 W\phi_d(x) + \alpha_2 X p_h - v_f] = \frac{Ip}{p + (1-p)\left[p_h\epsilon + (1-p_h)\{\epsilon + (1-\epsilon)x\}\right]} \tag{18}$$

Notice that $\phi_d(.)$ is continuous and monotonically increasing in x. Also, $\phi'_d(.)$ is continuous and monotonically decreasing in x. Therefore, the left hand side of equation (18) is monotonically increasing in x and right hand side of equation (18) is decreasing in x with the following conditions being satisfied. First, $\Pi_d(0) < maxB(0)$ and $\Pi_d(1) > maxB(1)$.

Therefore, for a given $I \in (\underline{I}, \overline{I})$, there exists a unique $x^*_d \in (0, 1)$ such that equation (18) is satisfied.

Hence, the proof.

□

Proposition 3. *Given* $p_h \in (0,1)$ *and* $c = 0$, *a)*$\underline{I} = \underline{I}_d$ *b)*$\overline{I}_d > \overline{I}$ *c)*$x^* < x_d^*$

Proof. a) From the proof of lemma 2 and lemma 4 (in the appendix in our paper), we know that, $\underline{I} = \frac{p+(1-p)\epsilon}{p} \Pi(0)$ and $\underline{I}_d = \frac{p+(1-p)\epsilon}{p} \Pi_d(0)$.

Notice that, $\Pi(0) = (1-\gamma)[\alpha_1 W p_h + \alpha_2 X p_h - v_f] = \Pi_d(0)$.

b) From the proof of lemma 2 and lemma 4 (in the appendix in our paper) we know that, $\overline{I} = \frac{p+(1-p)(p_h\epsilon+(1-p_h))}{p} \Pi(1)$ and $\overline{I}_d = \frac{p+(1-p)(p_h\epsilon+(1-p_h))}{p} \Pi_d(1)$.

Now,

$$\Pi_d(1) = \gamma\alpha_1 W(1-\phi'(1)) + (1-\gamma)[\alpha_1 W + \alpha_2 X p_h - v_f]$$

$$> \alpha_1 W(\phi(1) - \phi'(1)) + (1-\gamma)[\alpha_1 W\phi(1) + \alpha_2 X p_h - v_f] = \Pi(1)$$

c) We know that

$$\Pi(x) = \gamma\alpha_1 W(\phi(x) - \phi'(x)) + (1-\gamma)[\alpha_1 W\phi(x) + \alpha_2 X p_h - v_f]$$

and

$$\Pi_d(x) = \gamma\alpha_1 W(\phi_d(x) - \phi'(x)) + (1-\gamma)[\alpha_1 W\phi_d(x) + \alpha_2 X p_h - v_f]$$

Now, $\phi_d(x) = \frac{p_h}{p_h+(1-p_h)(1-x)} > \phi(x) = \frac{(1-\epsilon)p_h+p_h(1-\epsilon)x(1-\gamma)(1-p_h)}{(1-\epsilon)p_h+(1-p_h)[(1-\epsilon)(1-x)+(1-\epsilon)x(1-\gamma)]}$. Hence the proof.

□

Now consider an environment where the cost of reporting c is positive, and an amount $T \geq 0$ can be transferred to the monitor partner when he reports correctly against the engagement partner.

Proposition 4. *Let,* $T = max\{0, c - \beta_1\delta W(\phi(x) - \phi'(x))\}$ *and* $T_d = max\{0, c - \beta_1\delta W(p_h - \phi'(x))\}$. *Then* $T_d \geq T$ *for all* x*, and* $T_d > T$ *for some* x.

Proof. Follows directly from comparing (1) and (2). □

Following the same argument as in section allowing for positive costs in our paper, the above proposition implies that if the cost of reporting is positive and transfers $T = 0$, then in equilibrium, monitoring may be optimal under the non-disclosure regime but not optimal under the disclosure regime. That is, there exist parameter values p_h, c and a range of I such that in equilibrium, there is monitoring under the non-disclosure regime and no monitoring under the disclosure regime. This, in turn, leads to the probability of playing A under the non-disclosure regime being strictly lower than that under the disclosure regime.

3 Multitasking

We describe the multitasking model and its implications next.

Consider an environment where there are two engagement partners and a managing partner in an audit firm. There are two issuers/clients. Each engagement partner is assigned to one issuer and must perform the role of an engagement quality reviewer for the other engagement partner. For the sake of simplicity we abstract away from issues of collusion between partners. Moreover, in this section, the issuer is not able to pressure the engagement partner into announcing favorable reports. However, the engagement partner can make mistakes (announce the wrong signal by mistake) and this affects the quality of the audit. Let's assume that the R type partner never makes a mistake (and always detects if acting as the EQR[6]) and the F type partner can make mistakes with positive probability (may detect with positive probability if EQR). For the flexible type partner, the probability of a mistake depends upon the time spent on that engagement. Each partner is endowed with a fixed amount of time to be allocated between his own engagement and the EQR job. If the EQR finds that the audit opinion is not supported by the signal then he simply changes it to the correct signal. Thus, in this section the EQR acts as a "second pair of eyes". We assume away the role of the EQR as a whistle-blower i.e. there is no reporting and firing of partners. Audit quality of an engagement (probability of no mistake) depends on the time spent by the engagement partner on the engagement and the time spent by the EQR (for that engagement) looking for errors committed by the engagement partner. Suppose the quality of an audit is increasing in the time a partner spends on that engagement. That is, the probability that an engagement partner makes a mistake, declines with the time spent on the engagement. Also, suppose that the probability of finding a mistake as a reviewer is increasing in the time the EQR spends on the job. Therefore, audit quality of an engagement is increasing in time spent by both the engagement partner and the EQR on that particular engagement.

Under the non-disclosure regime, the reputation of both the partners in period 2 depends on the perceived audit quality of the two engagements in period 1. Under the disclosure regime, the investor can observe which partner is with which engagement. Notice that under both regimes, the optimal time allocation for a partner depends on his share of revenue from his own engagement and his share of revenue from the other

[6]Since the R type partner will never make mistakes (independent of the time he chooses to spend on his engagement client), he can choose to spend no time on his engagement project and all his time on the EQR project. This justifies an extremely high likelihood of detecting mistakes. Alternatively, we can think of the R type partner as a very conscientious partner who does each job as well as humanly possible.

engagement. Suppose each partner can only spend a total time of T. Let x, y be the time allocated to one's own engagement and the EQR job respectively such that $x + y \leq T$. Given the other partner's time allocation (a, b), a partner allocates his own time in a way such that the marginal gain from spending time on his own engagement equals the marginal gains from spending additional time on the EQR job.

Suppose both partners are drawn from a distribution where it is much more likely that they are Flexible type[7]. Consider the following kind of symmetric equilibrium in the disclosure regime. The engagement partner puts in a lot of time on the engagement and very little time on the EQR job. This will be an equilibrium for the following reasons. Given that the other partner is not going to put in much effort to review the engagement and that the partner is expected to put in a lot of time in the engagement, the outcome of an engagement is believed to be more heavily influenced by the engagement partner's actions. Thus, the reputation of an engagement partner is closely related to the audit quality of his own engagement and less with his EQR job. Therefore, he puts in a lot of effort towards his own engagement. Also, given that the engagement partner is putting in a lot of time on his engagement, an EQR's incentive to monitor goes down even further since the engagement partner is less likely to make a mistake and therefore it becomes optimal to put in low effort in the EQR job.

A similar equilibrium will exists in the non-disclosure regime. However, from the EQR's point of view, the marginal gains from monitoring are stronger in this regime since his payoff depends upon the collective reputation. So, in a symmetric equilibrium, both partners are likely to spend a little more time on the EQR job (less time on the engagement job) in the non-disclosure regime than in the disclosure regime. If the marginal *gain* in audit quality is sufficiently decreasing in time spent i.e. audit quality is a concave function of time spent in EQR activity then this can lead to a fall in audit quality when one shifts from a non-disclosure regime to a disclosure regime. Obviously, this assumes this kind of equilibrium was being played in both regimes. Another kind of equilibrium where both partners spend most time on EQR activity and very less time on own engagement will not lead to the same result. However, this equilibrium would be unusual in real life as this would be akin to "*I do your work, you do mine*".

[7]If the randomly selected partner is very likely to be R type, then an F type partner would believe that if he makes a mistake, it will be detected with high probability. So he is likely to free ride on this.