Audit Partner Identification, Assignment, and the Labor Market for Audit Talent

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Abstract

Conventional wisdom suggests that partner identification disclosure can improve audit quality, because it may enhance transparency and individual accountability. Building on a two-period matching model, we argue that the disclosure may distort partner-client assignment–which affects audit quality and/or audit fees–because the disclosure can inform the labor market for audit talent. In a centralized assignment in which an audit firm assigns partners to clients, we find that with the disclosure, audit firms may distort partner assignment–at the expense of lower audit quality–in order to dampen partners' career advancement. In a decentralized assignment in which partners directly bid for clients, the disclosure gives rise to low-balling in the first-period, because partners aggressively lower the audit fees to maximize their career advancement. Our findings identify unintended consequences of audit partner identification disclosure and provide economic reasons for the mixed empirical findings.

Keywords: audit partner identification, assignment, audit quality, audit fee.

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1 Introduction

Audit engagement partner identification has been available in a few countries, such as the UK, Sweden, China, and recently the U.S.[1] Conventional wisdom suggests that disclosing partner identification may enhance the transparency and accountability of engagement partners. Transparency is improved, because the identification disclosure establishes the link between the reputation of engagement partners and realized audit outcomes. With that information, investors may learn and access the abilities of audit partners and thereby make capital investment decisions efficiently. Accountability is improved because investors are able to hold the engagement partner accountable for an audit. In the presence of investors' assessments, audit partners are incentivized to build their reputations, thereby improving the quality of audit services. These potential benefits are the fundamental grounds of audit engagement partner identification.[2]

This line of arguments focuses on the effect of partner identification on the capital market (investors). However, partner identification disclosure also informs the labor market for audit talent about the engagement partners' performance. The disclosure may in turn increase competition among audit firms and make it harder to retain audit talent. In the presence of this externality, audit firms and partners may strategically respond to the imposed regulation, which may not guarantee the aforementioned benefits. In this paper, we study how partner identification affects audit quality and audit fees by analyzing the behaviors of audit firms and partners in the presence of the labor market. Specifically, our research question is, what is the impact of audit partner identification on partner-client matching, audit quality, and audit fees when the identification disclosure also informs the labor market for auditors?

To answer this question, we build a two-period partner-client assignment model consisting of two risk-neutral partners and two risk-neutral clients. Following the audit practice, we analyze two types of pairing between a client and a partner: (1) a centralized regime in which the headquarters of an audit firm assigns two partners to two clients and (2) a decen-

[1] Effective January 31, 2017, a PCAOB registered public accounting firm must use Form AP to disclose engagement partner identity to the public in the U.S.

[2] Audit tasks require a great deal of professional judgment and the expertise of engagement partners (Causholli and Knechel 2012). As PCAOB (2015) points out, collecting information about the skills and competencies of engagement partners could be useful for the users of financial statements.

tralized regime in which two individual partners directly bid for two clients. There are two types of clients (complex or simple) and two types of partners (high ability or low ability). We assume that, whereas the client characteristics that determine the difficulty of the audit task are observable, the partners' abilities that determine an audit outcome are unknown to everyone. The key assumption is that, whereas realized audit outcomes are observable, only the audit firm and partners can correctly link audit outcomes to partners; without the identification disclosure, the labor market cannot distinguish each partner's performance. We further assume that audit partners do not shirk or misreport audit reports, due to ethical considerations and reputation concerns. This assumption is made to highlight the idea that although the disclosure may improve transparency and prevent auditors from shirking and lying, the regulation may also result in partner-client assignment distortion and thus impair audit quality.

Partner identification disclosure may enhance audit partners' reputations and their potential career opportunities. We define auditor reputation as the belief in an audit partner's ability. With the disclosure, the market can link the audit partner's identity with audit outcomes and thus attach its updated belief to individual partners correctly. As a higher reputation implies a better audit performance, a partner with a higher reputation will have more outside job opportunities and hence a higher reservation wage. While auditors switch their employers just as lawyers and doctors switch,[3] their potential job opportunities are much broader. Unlike their counterparts in law or medical fields, auditors do not restrict their careers to the same industry and may move to a consulting firm or serve as top executives in corporate sectors.[4] Based on this feature of the labor market for auditors, we assume that upon a successful audit for a complex client (a more challenging task), the partner may receive an outside job offer that increases his reservation wage, if his identity is publicly disclosed. In the model, we call the increase in a partner's reservation wage (due to his outside job offer) career advancement. When a partner accepts an outside offer, a departing auditor

[3]According to LinkedIn Talent Solutions, the talent turnover rate in professional services (such as, law and accounting firms) in 2017 was 11.4%, which is greater than that of healthcare and pharmaceutical, 9.4%. Moreover, the professional accountant turnover rate was 12.4% in 2017, according to the Inside Public Accounting National Benchmarking Report.

[4]In 2017, Dentons, an international law firm, announced that Beth Wilson, a former partner at KPMG, was appointed as the CEO of Dentons Canada LLP in 2017. Two years later, Dentons selected Andrea Nicholls, a CPA and 13-year PwC veteran, as Dentons Canada's CFO.

may bring his engaged clients to the new audit firm he joins (Knechel, Mao, Qi, and Zhuang 2019), which causes the existing audit firm to lose both the audit talent and the audit fee revenues in the future. Or, the audit firm may have to incur search costs to find another auditor to replace the departing one. In this situation, retaining audit partners is crucial for the audit firm, and partner identification disclosure makes the retention costlier because of partners' potential career advancement.

We first consider the centralized regime in which the headquarters assigns partners to clients and bids audit fees on behalf of the partners. The headquarters bids audit fees that cover at least the expected audit liability and the engagement partners' wages. Because the market (outsiders) cannot access individual partners' performance without partner identification disclosure, the audit firm has monopsony power over partners' perceived abilities (i.e., reputation) and enjoys information rent (Waldman 1984; Acemoglu and Pischke 1998). In this case, we show that the audit firm assigns partners to clients efficiently in order to minimize expected liability (thus maximize audit quality) in both periods.

By contrast, under the identification disclosure, the audit firm loses its monopsony power over partners' reputations and begins to be concerned about audit talent retention. The disclosure makes partners' career advancement more likely and induces the audit firm to share the information rent with partners. When assigning clients to audit partners, the audit firm considers the effects of the partner assignment on both the audit quality in the current period and the partners' career advancement in the subsequent period. When the partner assignment is distorted, it may limit the partners' career advancement opportunities, thereby making the retention of talented auditors less costly. However, distorted (inefficient) partner assignment gives rise to lower audit quality, resulting in higher audit liability and audit fees.[5] We show that with this economic trade-off, the audit firm may distort the partner-client assignment when the partners' career advancement is highly likely (thus, the retention cost is significantly costly).[6]

We then consider the decentralized regime in which the partners directly bid for audit

[5]This finding is consistent with the credence attributes of an audit service (Causholli and Knechel 2012; Causholli, Knechel, Lin, and Sappington 2013).

[6]In practice, partners may have different equity stakes and compensation schemes. However, our results do not depend on partners' various incentives schemes because of risk neutrality.

engagements and then share audit fees and liabilities with each other. Given a sharing contract, each individual partner bids audit fees to ensure his reservation wage. In contrast to the audit firm, which intends to reduce the partners' career advancement, the partners aim to expand their career advancement. Without the disclosure, individual partners bid for audit engagement in order to minimize expected audit liability (thus maximize audit quality). But, with the disclosure, partners underbid audit fees aggressively, hoping to engage with a complex client, which improves their opportunities for career advancement in the subsequent period. Because of the reputation improvement, they will be able to charge higher fees in the second period. Thus, under the decentralized regime, partner identification intensifies competition between partners, which distorts audit fees.

More specifically, the decentralized assignment may give rise to low-balling in the first period. When receiving partners' bids, each client selects the partner based on the expected net surplus from the audit. Holding the expected audit quality constant, the complex client may select the partner who offers the underbid audit fee. As a result, the high reputation partner has to reduce the audit fee (even below the audit firm's break-even price) so that the complex client will not take the low reputation partner's underbid offer. While in equilibrium, the high reputation partner audits the complex client and the low reputation partner audits the simple client (i.e., there is no mismatch and audit quality is not impaired), the high reputation partner must underbid (a lower audit fee) due to the low reputation partner's aggressive bidding for the complex client.

Despite the low-balling in the first period, the total audit fees over two periods with partner identification disclosure are always higher than the total audit fees without disclosure. To illustrate the intuition, the expected benefit from career advancement is greater for the partner with the higher reputation, because he has a higher likelihood of audit success (and a lower likelihood of audit failure). Both partners are willing to low-ball audit fees in the first period up to their expected benefit from career advancement. On one hand, the partner with the lower reputation wants to low-ball the audit fee for the complex client, but the fee discount must be smaller than the expected career advancement opportunity, because given his lower ability, he bears an incremental liability to audit the complex client. On the other hand, the partner with the higher reputation offers a smaller fee discount to the complex client than the counterpart, because the client correctly anticipates that the former will deliver a higher audit quality. We therefore obtain the following order: high reputation partner's fee discount < low reputation partner's fee discount < low reputation partner's expected benefit from career advancement < high reputation partner's expected benefit from career advancement. Taken together, the fee discount in the first period is always smaller than the expected increase in audit fee due to the partner's career advancement opportunity in period two. Thus, the net impact of the partner identification disclosure on the total audit fees over two periods is always positive.

Our findings suggest that the rationale behind audit partner identification disclosure and its intended benefits may backfire. Though the disclosure may help outsiders to learn an individual partner's ability better, the change in information environment can be useful not only for client firms and investors but also for the potential employers of auditors.[7] Thus, exactly because of such learning by the public, an audit firm and/or individual partners respond to the policy by distorting audit engagements or audit fees, thereby making the information content in partner identification disclosure endogenous. Not only can this policy limit the information content of disclosure, but it can also cause a lower audit quality, higher audit fees, and inefficient competition among partners. These unintended consequences cast doubts on the net benefits of engagement partner identification.

This paper is the first theoretical paper analyzing audit partner-client matching, to the best of our knowledge. Our model builds on Waldman (1984) and Acemoglu and Pischke (1998), which also posit that a current employer has superior information about its workers' abilities relative to that of outsiders.[8] However, these studies take information about the workers' abilities as exogenously given, regardless of the employer's decision. With the assumption that a task assignment and workers' wages are publicly available, Waldman (1984) shows that there may exist an inefficient task assignment, since the task assignment with

[7] In principle, there could be other ways to identify engagement partners' identities even without disclosure, particularly, in small markets. However, in large markets, as in the U.S., acquiring information about engagement partners across different firms and across different years can be costly for individual users of financial statements (PCAOB 2015).

[8] Apart from these papers, numerous studies in labor economics have relied on the assumption that a current employer is better informed about an employee's ability. See for instance, Greenwald (1986), Lazear (1986), Milgrom and Oster (1987), Costa (1988), and Gibbons and Katz (1991), among others.

wages can signal the ability of the workers to outsiders, thereby lowering the current employer's monopsony power. There are two key differences between Waldman (1984) and ours. First, in his model, the employer learns the ability of workers regardless of his task assignment. In ours, the audit firm must learn the partners' abilities through the assignment (information about the partners' abilities is not exogenously given); thus, any distortion made by the audit firm hinders not only outsiders' learning but also the audit firm's learning. Second, in our model, the partners strategically react to the identification disclosure policy, whereas in Waldman's model, the workers have no strategic incentives. In the context of job training provided by the employer, Acemoglu and Pischke (1998) highlight the current employer's trade-off between monopsony power over the workers' abilities and its incentive to offer general training, which can be useful for other firms. However, the employer's learning about the workers' abilities does not depend on the employer's choice of training, whereas in our model, the audit firm's learning depends on its choice of assignment. Basically, departing from these studies, we highlight the impact of the information environment (partner identification disclosure) on the audit firm's and partners' strategic incentives.

To promote better policies, it is crucial to understand potential economic consequences and analyze the net benefit to society. We identify a latent aspect of the disclosure policy by highlighting potential distortions in partner-client engagement through the labor market channel. Based on our plausible assumption that partner identification, by helping outsiders to assess audit partners' perceived abilities, may expand partners' outside options, we derive conditions under which unintended consequences take place due to this policy. In particular, as the demand for audit talent increases (the probability of career advancement increases) and/or as the remuneration for such an outside job offer increases, the distortion is more likely. When individual partners bring and engage with clients on their own, some partners (with high reputation) may have to reduce audit fees due to peer pressure from other partners' aggressive bidding, hoping for career advancement. Whether it is the audit firm's decision or partners' strategic behaviors, one obvious byproduct of partner identification is the increased pay disparity among partners. Understanding these latent consequences in conjunction with informational benefits will produce a cost-benefit efficient outcome, thereby helping us to progress towards better audit regulations.

Our paper contributes to the literature examining the effect of audit partner identification on audit quality. There are two theory working papers analyzing this effect: Lee and Levine (2016) and Basu and Shekhar (2019). Lee and Levine (2016) consider the trade-off between individual partners' incentives to provide high quality audits and the partnerships' incentives to reduce good internal controls. Basu and Shekhar (2019) show that while higher reputation incentives can improve audit quality, partners have a lower incentive to monitor other partners under partner identification. In analyzing the impact of partner identification, both studies highlight a team problem, whereas our study highlights the labor market for audit talent.

Moreover, our finding in the decentralized regime identifies another source of low-balling in audit fees (DeAngelo 1981). We show that low-balling in the first period for a complex client can occur because partners can enjoy career advancement in the subsequent period when their identities are disclosed rather than quasi-rents rising from transaction costs due to auditor changes. Essentially, partner identification disclosure makes partners willing to reduce the concurrent audit fees for their own benefit of expanding career advancement, as the disclosure allows the labor market to learn partners' abilities better.

A few empirical papers are related to ours. Using data from China, Gul, Wu, and Yang (2013) find that individual auditors have significant effects on audit quality; Aobdia, Lin, and Petacchi (2015) find correlations between a measurement of partner quality and the reliability of earnings measurement. Using data from Sweden, Knechel, Vanstraelen, and Zerni (2015) show that aggressive or conservative audit reporting is a systematic partner attribute and that such differences can have economic consequences for a client. These results suggest that disclosure of the engagement partner may provide useful information to the users of financial statements. Using data from the UK, Carcello and Li (2013) show that the number of qualified audit reports increased and abnormal accruals declined after partner identification disclosure. Using U.S. audit partner data, Abbott, Boland, Buslepp, and McCarthy (2018) document a reduction in the propensity to issue a going concern modification in the disclosure regime, and Burke, Hoitash, and Hoitash (2018) find that the disclosure requirement has a positive association with audit quality and audit fees and a negative association with audit delay. However, Cunningham, Li, Stein, and Wright (2019) do not find consistent evidence of a change in audit quality or fees following mandatory partner identification. Our paper provides a potential reason that there might not be consistent findings on audit quality and fees following partner identification disclosure. Moreover, our results imply that it is important to consider both partner-client matching and legal liability regimes for an empirical identification.

The paper proceeds as follows. Section 2 presents the structure and ingredients of the model. Section 3 and Section 4 establish the equilibrium under a centralized assignment and a decentralized assignment, respectively. Section 5 provides empirical implications. Section 6 concludes. We present all the proofs in the Appendix.

2 Model

Our model builds on a two-period (repeated) assignment problem (Waldman 1984) with the introduction of an audit production technology (Liu and Simunic 2005) and of partners' unknown types.

Economy. We consider a two-period model where two audit partners provide an audit service for two audit client companies in each period. The two partners belong to the same audit firm (headquarters). For convenience, we refer to the headquarters as "she" and each partner as "he." All players are risk neutral and do not discount future cash flows. The partners $i \in \{1, 2\}$ are endowed with either high (h) or low (l) ability (type). The true ability is unknown to all players, including the partners themselves. All players have an identical prior belief about the partners' ability: with a probability $\gamma_i \in (0, 1)$, partner i is of high ability for $i \in \{1, 2\}$. We call the probability γ_i the reputation of partner i. Without loss of generality, we assume that partner 1 has a higher reputation than partner 2 ($\gamma_1 > \gamma_2$). Let $\omega(\gamma_i)$ represent the reservation wage as an auditor for the audit partner with reputation γ_i. The reservation wage is what a partner would receive in the labor market for audit talent.[9] It is intuitive that the reservation wage increases with the reputation, $\omega(\gamma_1) > \omega(\gamma_2)$. For

[9] In our paper, audit performance (and perceived audit talent) affects partners' wages. Consistent with this idea, Gipper, Hail, and Leuz (2018) find that low quality audits give rise to early engagement partner rotations and have career consequences for partners (which affects their reservation wages).

simplicity, we assume that $\omega(\gamma_i) = \omega \times \gamma_i$, $\omega > 1$. We posit that the amount that the headquarters pays each partner is unobservable to outsiders.[10] Consistent with the prior literature (e.g., Simunic 1980; Magee and Tseng 1990; Lu and Sapra 2009; Deng, Melumad, and Shibano 2012; Ye and Simunic 2013; Chen, Jiang, and Zhang 2019), we assume the audit market is competitive in the sense that the headquarters under the centralized regime (and partners under the decentralized regime) breaks even in equilibrium.[11]

Clients. In each period, shareholders of the client companies are endowed with investment projects. We use the term "client" to represent shareholders of the company or the company. At the beginning of each period, the clients decide whether to continue investing in, or to liquidate, the projects. The clients are differentiated by two dimensions: the complexity of the audit engagement and the financial condition (i.e., type). First, the complexity of the audit engagement is either simple (s) or complex (c) denoted by $j \in \{s, c\}$. The complexity of the audit engagement is publicly observable. Second, depending on their financial conditions, the client companies are either a good company (G) or a bad company (B). With a probability $p \in (0, 1)$, a client company is a good company and is worth $V > 0$ if shareholders liquidate it now, or is worth $V' > V$ if the investment is continued until the end of the period. In contrast, if a client company is a bad company, its value is worth $I > 0$ if shareholders liquidate it now, or is worth zero if the investment is continued. We assume that the expected return from continuing investment is greater than that from immediate liquidation of the company, that is, $pV' > pV + (1-p)I$, so that shareholders would continue investing without knowing the type, but would liquidate the company if they know it is bad. We assume the parameter space is such that the value of an audit from either partner is strictly positive, so clients prefer receiving an audit service to none. We derive a condition for this assumption in the Appendix. A client accepts an audit engagement offer only if the audit service generates a per-period payoff higher than a reservation utility pV' that the client would enjoy without audit service. Otherwise, a client rejects the audit engagement

[10] This assumption is consistent with the audit practice that audit partner compensation is not public. We use this assumption to focus on the role of partner identification in revealing information about a partner's reputation. If the wage payment is observable, this can also provide information about partners.

[11] Simunic (1980) documents no evidence of Big N premium and does not reject the hypothesis that price competition prevails throughout the market for audits of publicly held companies in the US.

and the game ends.[12] If a client receives multiple audit engagement offers (from the headquarters or two partners), the client accepts the audit engagement offer that generates the maximum per-period payoff.

Audit technology. The audit technology is characterized by the probability that the partners correctly attest to the client company's real financial conditions. Denote $r \in \{g, b\}$ by the partner's report where g represents a good report and b represents a bad report. We assume there is no type I error. Given that the client's type is good (G), the partner correctly reports g regardless of the partner's ability (h or l) and the complexity of the audit engagement $j \in \{s, c\}$: $\Pr(g|G, i, j) = 1$ for $i \in \{1, 2\}$. Given that the client's financial condition is bad (B), the partner can correctly issue a bad report with probabilities $\Pr(b|B, h, j) = 1 - \mu(h, j)$ if the partner's ability is high and $\Pr(b|B, l, j) = 1 - \mu(l, j)$ if the partner's ability is low, where $1 > \mu(l, j) > \mu(h, j) > 0$. Here, $\mu(h, j)$ and $\mu(l, j)$ represent the probability of a type II error given the partner's ability (h and l, respectively) for client j. Since each partner's type is unknown, when a partner with reputation γ audits client j, then his expected probability of a type II error denoted as $\mu(\gamma, j)$ is given by:

$$\mu(\gamma, j) \equiv \gamma\mu(h, j) + (1 - \gamma)\mu(l, j).$$

We define audit quality by $1-\mu(\gamma, j)$. For notational convenience, we denote audit outcomes by $X_j \in \{S_j, F_j, \phi\}$, where $S_j = (B, b)$ and $F_j = (B, g)$ denote, respectively, audit success and failure for client $j \in \{s, c\}$, which provides information about audit partners' unknown abilities. By contrast, $\phi = (G, g)$ does not generate any information, as both types of partners can report $r = g$ in case of G for both client $j = s$ and $j = c$. Depending on the realized audit outcomes, the two partners' reputations are updated. We present the Bayesian updating formula for a partner's reputation in the Appendix.

Intuitively, audit failure is more likely, when the client characteristic is complex than it is simple: $\mu(h, s) < \mu(h, c)$ and $\mu(l, s) < \mu(l, c)$. Without loss of generality, we assume that the difference between a high-type partner and a low-type partner in audit failure is greater

[12] This setting is consistent with the auditing literature (Dye 1995, Liu and Simunic 2005).

for a complex client than for a simple client: $\mu(l,s)-\mu(h,s)<\mu(l,c)-\mu(h,c)$[13]; that is, our audit technology follows supermodularity. Thus, with the audit technology, it is efficient to assign partner 1 (partner 2) to a complex (simple) client.[14] As in Liu and Simunic (2005), we consider a strict liability rule. When audit failure occurs and shareholders suffer from a loss, the audit firm must pay a fixed payment $L>0$ to the client companies.

Partner-Client Assignment. We consider two regimes: a centralized assignment and a decentralized assignment. First, under the centralized assignment, the headquarters assigns audit partners to clients and submits audit fee bids directly to the clients in period one and two on behalf of the audit partners to maximize the audit firm's payoff. In equilibrium, the profit-maximizing headquarters pays each partner the minimum necessary payment, that is, his reservation wage as an audit partner. Second, under the decentralized assignment, audit partners have full autonomy in bidding and winning clients. In other words, the partners will gain clients by bidding competitive audit fees. Each partner bids audit fees to maximize his individual payoff. The partners within the audit firm will share audit fees and audit liability following a profit sharing contract. Since the nature of the economic problems of the headquarters and partners differs, we discuss details about assignment decisions and audit fees in each assignment regime.

Key Assumptions. There are two main assumptions in our model. First, the headquarters knows the partner's reputation by linking the audit outcome with the partner, whereas the labor market cannot access that information unless the audit partner's identity is disclosed. In practice, the headquarters can learn an auditor's reputation through gathering information on this auditor as his career progresses from a junior auditor to a partner within the firm. Therefore, it is plausible to assume that the current employer is better informed about the employee's abilities than outsiders (Waldman 1984; Acemoglu and Pischke 1998). Second, we assume that if partner i obtains an audit success from a complex client and outsiders know this, then partner i will receive a career advancement opportunity with

[13]We label client characteristics as either simple or complex for expositional convenience. As long as one characteristic (in our model, a complex characteristic) separates high ability from low ability more efficiently than the other characteristic (simple), then any labels can serve our purpose.

[14]Becker (1973) shows that when the matching production exhibits supermodularity, it is efficient to assign the highest type to the highest type and the lowest type to the lowest type.

probability $u \in [0,1]$. For instance, reputable partners can be hired by an affiliated consulting branch, by another audit firm, or by a corporate sector as a top executive, with better compensation. Auditing a simple client will not gain the partner any such opportunities, even if the audit is successful. We assume that the new job opportunity pays the partner i compensation $\lambda(\gamma_i)$, where $\lambda(\gamma_i) > \omega(\gamma_i)$ for any γ_i. For simplicity, let $\lambda(\gamma_i) = \lambda \times \gamma_i$, where $\lambda > \omega > 1$. Hereafter, we call the incidence of $\lambda(\gamma_i)$ the engaged partner's career advancement and the parameter λ represents the sensitivity of the career advancement to partner reputation.

Other Assumptions. We posit that clients cannot communicate with outsiders (such as other audit firms, consulting firms, or other companies) about their engaged partners' identities. Moreover, if the reputable partner leaves the audit firm, the headquarters may lose the engaged client (loss of fee revenue)[15] or must incur search cost to replace the departing partner. We do not distinguish between these two sources of costs for the headquarters. Instead, we posit that our parameter values are such that the headquarters always wants to retain partners to continue her audit business. We assume that a partner's wage is agreed on up front and paid at the end of each period. When the audit outcomes are realized, a partner can negotiate the second period wage, but cannot renegotiate his wage in the past period. We also assume that partners stay as long as they receive payoffs greater than or equal to their reservation wages,[16] and clients stay as long as 1) the previously engaged partner remains at the audit firm and 2) they receive an expected per-period payoff greater than or equal to the surplus they would have received without an audit, that is, pV'.[17] Lastly, we impose a feasibility assumption that the headquarters (in the centralized regime) and partners (in the decentralized regime) cannot bid audit fees lower than their break-even prices, and that each partner's wage must be greater than or equal to his reservation wage (which is based on the market's belief).

We start from our equilibrium analysis for a centralized assignment in Section 3. We

[15] As Knechel et al. (2019) show, the engaged client may follow the departing partner in case the partner moves to another audit firm.

[16] We abstract away from a partner's threat to quit (as a signaling device), as it would make the main economic force less transparent without affecting the result qualitatively.

[17] Since clients extract all the audit surplus in our model, imposing reservation utility greater than pV' does not qualitatively change our result.

analyze audit engagement assignment, audit quality, and audit fee under the two partner identification disclosure policies (either disclosure or non-disclosure) in the following section. Based on the same structure, we then conduct our analysis for a decentralized assignment in Section 4. We release the formal definition of an assignment equilibrium to the appendix, as it involves additional notations that we do not use in the main analysis.[18]

Timeline. The sequence of events in each period is summarized as follows.

- The headquarters engages with one complex client and one simple client.
- Under the centralized assignment, the headquarters bids an audit fee for each client and assigns one audit partner i to one client j. Under the decentralized assignment, each auditor $i \in \{1, 2\}$ bids an audit fee for each client $j \in \{s, c\}$.
- The auditors perform the audits and issue an audit report $r \in \{g, b\}$ for each client.
- The values of the clients $\{G, B\}$, audit outcomes X_j, and payoffs are realized.
- Partner i's γ_i is updated. With engagement audit partner identification disclosure, each partner's identity is revealed to the market. Under the non-disclosure regime, each partner's identity is not revealed.

3 The Centralized Assignment Problem

Assignment and Fees. Denote by $a_t(i) : \{1, 2\} \to \{s, c\}$ an invertible assignment function in period $t = 1, 2$ that assigns partner i to client j. Denote by $f_t^{HQ}(i, j)$ the audit fee in period $t = 1, 2$ bid by headquarters on behalf of its partner i for the client j to maximize the audit firm's expected payoff. To streamline the analysis, we assume the only relevant resource cost is the wage payment to the partners. If the market can distinguish the partners, then partner i's reservation wage (i.e., his outside option) depends correctly on his

[18]The concept of our equilibrium is based on the notion of stability (Gale and Shapely, 1962). In the centralized regime, we will solve for the headquarters' optimal assignment problem given that such an assignment is feasible. Whereas, under the decentralized regime, based on a partner-proposing deferred acceptance algorithm as in Gale and Shapely (1962), we will constructively find a stable matching between partners and clients.

reputation γ_i. If the market cannot distinguish the partners (i.e., non-disclosure), then the market has to rely on the headquarters' reputation $\gamma_{HQ} = (\gamma_1 + \gamma_2)/2$. Under the feasibility assumption, the headquarters will not bid below her break-even audit fee; that is, the audit fee must be greater than or equal to the expected liability plus any resource costs that the headquarters must bear. Thus, when the headquarters assigns partner i to client j in period t, the corresponding audit fee must satisfy:

$$f_t^{HQ}(i, a_t(i)) \geq L(1-p)\mu(\gamma_i, a_t(i)) + \omega(\gamma_i), \tag{1}$$

where the right hand side represents the expected liability and wages, $\mu(\gamma, j)$ is the probability of a type II error, and $a_t(i) = j$ is the assignment rule for partner i in period t. If the market cannot distinguish the partners, $\omega(\gamma_i)$ is replaced with $\omega(\gamma_{HQ})$.

When the headquarters makes bidding for clients, each client can correctly anticipate the headquarters' assignment, thus forming the expected payoff correctly. Specifically, anticipating $a_t(i) = j$, client j accepts the headquarters' audit fee $f_2^{HQ}(i, j)$ if the payoff from the audit service is greater than or equal to its expected payoff without an audit (i.e., pV').[19] Client j's expected payoff from receiving the audit service from partner i in period t is

$$\begin{aligned} & pV' + (1-p)\left[(1-\mu(\gamma_i, j))I + \mu(\gamma_i, j)L\right] - f_t^{HQ}(i, j), \\ & = pV' + (1-p)\left[I - \mu(\gamma_i, j)(I - L)\right] - f_t^{HQ}(i, j). \end{aligned} \tag{2}$$

The client company j will receive V' with probability p when the company is good. With probability $(1-p)$, the client is bad and the audit partner detects the true type with probability $1 - \mu(\gamma_i, j)$, and the client will discontinue investment and receive I; and with probability $\mu(\gamma_i, j)$, the auditor fails to discover the true type and will pay liability L to the client. The last item is the audit fee the client has to pay.

[19] While clients correctly conjecture which partner will audit them, they will not receive audit fees below the headquarters' break-even prices, due to the feasibility assumption.

3.1 No Partner Identification Disclosure

We analyze the repeated assignment in two periods by backward induction. We first analyze the headquarters' partner assignment problem in period two. Taking into account the period two game, we solve the headquarters' partner assignment problem in period one. Without partner identification, partners' identities are not revealed, thereby blocking their career advancement. In this case, there is no interaction between two periods, and the potential career advancement of partners has no economic consequence for partner-client assignment.

Period Two. At the beginning of period two, the reputation of each partner is updated. Denote by $\gamma_i^{X_j}$ the updated reputation of partner i upon an audit outcome X_j in period one and by $\hat{\gamma}_{HQ}$ the updated reputation of the headquarters. Without partner identification, the true identity of each partner remains unknown to the market in period two. Given the conjectures on headquarters' assignment in period one, the market correctly updates the partners' individual reputation γ_1 and γ_2. That is, the observable audit outcomes are sufficient to correctly form the partners' posterior reputation. However, without revealing partners' identities, the market cannot attach the updated reputation correctly to each partner, and thus the market has to rely on the average of the two posterior reputations, $\hat{\gamma}_{HQ}$. Therefore, in period two, the headquarters compensates each partner by $\omega(\hat{\gamma}_{HQ})$.

The headquarters makes the assignment decision $a_2(i), i = 1, 2$ to maximize her period two payoff Π_2 given as follows:

$$\Pi_2 = \sum_{i=1,2} f_2^{HQ}(i, a_2(i)) - \big(L(1-p)\mu(\gamma_i^{X_j}, a_2(i)) + \omega(\hat{\gamma}_{HQ})\big). \tag{3}$$

On the right-hand side, the first term is audit fee revenue, the second term is expected liability, and the third term is wages for partners. The reason that the second term is based on the individual partners' reputations is that the expected liability must be based on what the headquarters actually knows (i.e., reputation of each partner), whereas the reservation wage is based on the market perception.

The headquarters' maximization problem is solved as follows. Since the partners' wages are agreed on up-front, any associated cost that depends on the assignment in period two is expected liability. Thus, the headquarters determines the optimal assignment rules $a_2(i)$ to minimize the expected liability in this period. Finally, because we assume a competitive audit market, the equilibrium audit fee is determined by the headquarters' zero-profit condition: the equilibrium audit fee equals the expected audit liability plus the partners' wages so that headquarters breaks even from the audit engagement. Due to supermodularity, the optimal assignment rules are that the high reputation partner audits a complex client and the low reputation partner audits a simple client.

Although we assume that partner 1 initially has a higher reputation than partner 2 ($\gamma_1 > \gamma_2$), whether partner 1's reputation continues to be higher than partner 2's in period two depends on the three factors: the prior reputations, audit engagements in period one, and the realized audit outcomes. Specifically, whether partner 1's prior reputation is sufficiently greater than that of partner 2; whether partner i audits a complex or simple client; and whether the realized outcome is S_j, F_j, or ϕ. In characterizing the two partners' ex post reputation, it is useful to split the model parameters into two: the economic parameters $\gamma_i, i \in \{1,2\}$ that evolve depending on the headquarters' assignment, and the technology parameters $\mu(\gamma_i, j), i \in \{1,2\}, j \in \{c,s\}$ that are independent of the headquarters' decision. Given the audit technology parameters, we characterize conditions with respect to economic parameters under which partner 1's updated reputation remains higher or becomes lower than partner 2's.

Intuitively, when the ex ante difference between the partners' reputations is sufficiently large, then regardless of the audit outcomes in period one, the updated posterior reputation of partner 1 is still greater than the updated posterior reputation of partner 2. As a result, the first-best partner assignment in period two is $\{a_2(1) = c, a_2(2) = s\}$. By contrast, if the ex ante difference between the partners' reputations is not large enough, the updated posterior reputation of partner 1 might be lower than the updated posterior reputation of partner 2; hence, the first-best assignments in period two could be $\{a_2(1) = s, a_2(2) = c\}$. The following lemma summarizes the result.

Lemma 1. *For any audit outcomes in period one, the updated posterior reputation of partner*

1 is greater than the updated posterior reputation of partner 2 if the ex ante difference between the partners' reputations is sufficiently large (i.e., $\gamma_1 - \gamma_2 \geq M$, where $M \in (0, 1-\gamma_2)$). Otherwise, the updated posterior reputation of partner 1 may be less than the updated posterior reputation of partner 2 (i.e., when $\gamma_1 - \gamma_2 < M$). The expression of M is presented in the Appendix.

Because there is no economic tension left, the partner-client assignment is not distorted in period two, regardless of partner identification. Thus, in what follows, we pin down the first-best assignment as $\{a_2(1) = c, a_2(2) = s\}$ in period two by assuming that $\gamma_1 - \gamma_2 \geq M$. This way, we focus on the trade-off between current period audit production efficiency (i.e., period one audit quality) and the partners' outside options (i.e., future career advancement) instead of audit quality in period two.[20]

Assumption 1. *$\gamma_1 - \gamma_2 \geq M$.*

Period One. When making an assignment decision in period one, the headquarters must take into account the potential consequences of her period two payoff. However, we will show in the proof of Lemma 2 that the headquarters' expected liability payments and wages in period two are independent of her assignment decision in period one without partner identification. The intuition is because partners' expected posterior reputations are the same as the current prior reputation and there is no career advancement without partner identification. Therefore, in period one, the headquarters assigns partners to clients to maximize Π_1 given by

$$\Pi_1 = \sum_{i=1,2} f_1^{HQ}(i, a_1(i)) - \big(L(1-p)\mu(\gamma_i, a_1(i)) + \omega(\gamma_{HQ})\big).$$

As in period two, the headquarters determines the optimal assignment rules $a_1(i)$ to minimize the expected liability. That is, in period one, the optimal assignment rule is such that a high reputation partner (partner 1) audits a complex client and a low reputation partner (partner 2) audits a simple client, $a_1(1) = c, a_1(2) = s$. The following lemma summarizes the result.

[20] In case $\gamma_1 - \gamma_2 < M$, the headquarters must consider different assignments in period two depending on audit outcomes in period one. This case neither adds any economic insight nor changes the economic tension qualitatively.

Lemma 2. (No Partner Identification) *The headquarters' assignment problems over two periods are simply a twofold repetition of the partner-client assignment problem: the headquarters assigns a high reputation partner to a complex client and a low reputation partner to a simple client in each period. The presence of career advancement is irrelevant when there is no partner identification.*

3.2 Partner Identification and Career Advancement

Economic Trade-off. In this section, we will demonstrate that the headquarters may distort partner-client assignment in period one. The headquarters faces an economic trade-off between the efficiency of partner-client assignment and the cost of talent retention. On one hand, when partner assignment is distorted, audit failure is more likely to occur, thereby increasing the expected audit liability. On the other hand, assignment may affect the market's posterior belief about the partners' reputation, influencing their outside career advancement opportunities. It is intuitive that this trade-off depends on the magnitude of audit liability and the partners' potential career advancement. We will show that when audit liability is relatively small or when career advancement for partners is likely, partner identification may induce the headquarters to distort partner assignment in period one.

Partner Assignment in Period Two. Given that two partners stay in period two, the headquarters' assignment decision in period two faces the same trade-off as in the non-disclosure regime. That is, the headquarters assigns partners in period two in order to minimize the expected liability. Since we assume that $\gamma_1 - \gamma_2 \geq M$, the headquarters' assignment in period two is $a_2(1) = c$ and $a_2(2) = s$. While the headquarters makes the same assignment decision regardless of the disclosure policy in period two, the headquarters' total expected wage payments in period two under partner identification disclosure are always greater than the total expected wage payments under the non-disclosure. This is because under the disclosure, the partner who was engaged with a complex client in the first period may enjoy career advancement at the beginning of the second period (due to his successful audit in the previous period). The byproduct of such career advancement is an increase in the pay disparity between the partners.

Indeed, the possibility of an outside option creates convexity in partners' expected period two wages because $\lambda(\gamma)$ has a higher slope than $\omega(\gamma)$. Thus, from an ex ante perspective, the headquarters' total expected wages in period two are strictly higher when the identity of each partner is correctly known to the market than when it is unknown.

Lemma 3. *When considered at the beginning of period one, the total expected wage payments in period two under partner identification disclosure are always greater than or equal to the total expected wage payments under non-disclosure. The partner identification disclosure increases the pay disparity between partners.*

Partner Assignment in Period One. While the headquarters wants to minimize the expected liability, the partner identification disclosure may influence how much the headquarters pays the partners in period two, which affects her assignment decision in period one. To formalize the headquarters' cost of audit talent retention, let $q_i(u)$ denote the probability of partner i receiving an outside offer at the beginning of period two if the partner audits a complex client in period one:

$$q_i(u) \equiv (1-p) \times (1-\mu(\gamma_i, c)) \times u,$$

where $p \in (0,1)$ is the probability that a client company is a good company and $u \in [0,1]$ is the probability that partner i receives an outside job offer. We assume that the headquarters cannot affect the probability u, which may represent the career mobility of partners moving from one audit firm to another or to a corporate sector. As long as $u > 0$, the probability of partner i receiving an outside offer is strictly positive ($q_i(u) > 0$). The expected period two reservation wage for partner i when working for a complex client in period one is:

$$q_i(u) \times \left[\lambda(\gamma_i^{S_c}) - \omega(\gamma_i^{S_c})\right] + E[\omega(\gamma_i^{X_c})],$$

where $\gamma_i^{S_c}$ is the updated reputation after having successfully audited the complex client, and $\lambda(\gamma_i^{S_c})$ and $\omega(\gamma_i^{S_c})$, respectively, denote the reservation wage of the partner whether he receives an outside offer or not. Since the expected posterior reputation is the current prior reputation, we have $E[\omega(\gamma_i^{X_c})] = \omega(\gamma_i)$.[21] Thus, the headquarters' expected talent retention cost (due to partner identification) is $q_i(u) \times \left(\lambda(\gamma_i^{S_c}) - \omega(\gamma_i^{S_c})\right)$. We denote this cost by $T(u,i)$. Clearly, the headquarters' talent retention cost depends on the probability of a partner receiving an outside offer u, the potential outside offer λ, the audit technology $\mu(i,j)$, and a partner's reputation. For instance, when $u = 0$, $T(0,i) = 0$. In Proposition 1, we analyze the headquarters' expected talent retention cost.

Proposition 1. (Talent Retention Cost) *Let $T(u,i)$ denote the expected talent retention cost under partner identification disclosure for partner i. For $u \in (0,1]$, the expected talent retention cost is always greater for partner 1 than for partner 2: $T(u,1) > T(u,2)$. Moreover, the expected talent retention cost increases as*

- *the probability of career advancement increases ($\frac{\partial T(u,i)}{\partial u} > 0$); or*
- *the career advancement is more sensitive to a partner's reputation ($\frac{\partial T(u,i)}{\partial \lambda} > 0$); or*
- *a high-type partner's type II error for a complex client decreases ($\frac{\partial T(u,i)}{\partial \mu(h,c)} < 0$); or*
- *the reputation of partner i increases ($\frac{\partial T(u,i)}{\partial \gamma_i} > 0$).*

Proposition 1 shows how the headquarters' talent retention cost changes with respect to other parameters. Intuitively, the expected retention cost increases as the probability of turnover increases or the career advancement is high-powered. Moreover, as a high type partner's ability to detect financially bad conditions for a complex client increases (i.e., decrease in $\mu(h,c)$), the probability of career advancement is also high, which increases the retention cost. The retention cost increases with the partner's initial reputation, as his reputation represents the probability that the partner is indeed a high type.

In Proposition 2, we identify the conditions with respect to audit liability L and the value of the liquidation of a bad company I such that 1) the headquarters strictly prefers the distorted assignment in period one, and 2) the headquarters' distorted partner-client assignment in period one is accepted by the clients. While our variable of interest is L because it drives the headquarters' incentive to distort the assignment, the liquidation value

[21] We show this in the proof of Lemma 2.

I matters, as it determines whether such a distorted assignment is accepted by the clients (i.e., the value of the audit).[22]

Proposition 2. (Partner Identification) *There exist thresholds of audit liability L^{HQ} and the liquidation value $\overline{I} \in R_+$ such that*

- *if $L \geq L^{HQ}$ or $I < \overline{I}$, then, there is no distortion in audit engagement; or*
- *if $L < L^{HQ}$ and $I \geq \overline{I}$, then, the headquarters implements the assignment rule by which the high reputation partner 1 audits a simple client and the low reputation partner 2 audits a complex client ($a_1(1) = s$ and $a_1(2) = c$) in period one.*

Under the distorted assignment in period one, the aggregate audit quality decreases and audit fees increase. The expressions of L^{HQ} and $\overline{I}$ are presented in the Appendix.

When the partner assignment is distorted, the audit quality for the complex (simple) client decreases (increases) and the audit fee for the complex (simple) client increases (decreases). Although the audit fee for the simple client decreases (due to the decrease in expected liability), the audit fee for the complex client increases more than the audit fee reduction for the simple client, thereby leading to the increase in the total audit fees in period one. It is worth discussing that when $u = 0$, there is no distortion, regardless of disclosure policies. Intuitively, when there is no career advancement, the talent retention cost is zero (the same as the non-disclosure regime). Thus, without the labor market channel, partner identification is of no economic consequence for partner-client assignment.[23]

For $u > 0$, the headquarters' trade-off depends on several economic forces. First, if the partner is more likely to receive an outside offer, then the expected retention cost is higher and hence the headquarters is more willing to distort the assignment ($\partial L^{HQ}/\partial u > 0$). When the career advancement is more promising, the headquarters' expected retention cost is greater,

[22] In this centralized assignment, the clients either accept the headquarters' offer or reject (and continue the investment without receiving the audit). Thus, as I is greater, the value of receiving the audit is greater, thereby making the clients more likely to accept the distorted offer instead of rejecting it.

[23] The formal analysis is available upon request.

thereby making the marginal benefit of a distorted assignment larger ($\partial L^{HQ}/\partial\lambda > 0$).[24] Neither u or λ affects the value of the audit directly; thus, the client's acceptance decision does not change.

Second, contrary to u and λ, the impact of $\mu(h,c)$ on the headquarters' assignment decision is ambiguous: it increases both L^{HQ} and $\overline{I}$. When a high type partner's type II error increases, then the incremental audit liability due to distortion decreases: neither a high type nor a low type is good enough at detecting a financially bad company. Even though the retention cost decreases in $\mu(h,c)$, the change in the incremental liability always dominates the change in the retention cost ($\partial L^{HQ}/\partial\mu(h,c) > 0$). However, as $\mu(h,c)$ increases, the value of the audit decreases; thus, the complex client is likely to reject the distorted engagement ($\partial\overline{I}/\partial\mu(h,c) > 0$). Third, although the client's acceptance decision is affected by γ_i, the headquarters' incentive to distort is independent of the absolute value of γ_i. This is because, in our model, the headquarters' talent retention cost and incremental liability are both linear with the partners' reputation. The following proposition summarizes our discussion.

Proposition 3. *Suppose $L < L^{HQ}$ and $I \geq \overline{I}$ so that the headquarters distorts partner-client assignment in equilibrium under partner identification. The headquarters is more likely to distort partner assignment in period one when*

- *the probability of career advancement increases ($\partial L^{HQ}/\partial u > 0, \partial\overline{I}/\partial u = 0$); or*
- *the career advancement is more sensitive to a partner's reputation ($\partial L^{HQ}/\partial\lambda > 0, \partial\overline{I}/\partial\lambda = 0$).*

However, the impact of a high type partner's type II error for the complex client on the headquarters' assignment decision is ambiguous because both L^{HQ} and $\overline{I}$ increase in $\mu(h,c)$. Any change in partner i's reputation does not affect L^{HQ}, whereas the impact on $\overline{I}$ depends on parameter values.

[24] Clients may threaten to leave the headquarters for the potential distorted assignment. If audit firms are homogeneous (thus, facing the same economic trade-off) or clients must incur sufficiently high switching costs to change audit firms, then the clients' threat will be less credible. If audit firms are heterogeneous (e.g., competition between big 4 and non-big 4) and the switching cost is negligible, then the client's threat can be credible. Introducing additional costs from a client's threat would constitute a digression from the economic force from the labor market for auditors. Nevertheless, incorporating audit firm heterogeneity presents an interesting avenue for future research.

4 The Decentralized Assignment Problem

In practice, partners often directly bid for clients rather than being assigned by the headquarters. Moreover, for a large client, an audit firm may propose a list of partners to the client, in which case the client can choose its engagement partner. In this section, we consider a decentralized assignment in which two partners bid for clients. As we will show, the presence of partner identification disclosure affects partners' bidding strategies and audit fees. Like the headquarters, each partner faces a trade-off between audit liability in period one versus career advancement opportunities in period two. However, a key difference between the headquarters and the partners is that the headquarters wants to reduce the chance of partners' career advancement, whereas the partners want to increase the chance of career advancement.[25]

Assignment and Fees. Let $f_t(i, j)$ denote the bidding price of partner $i \in \{1, 2\}$ for client $j \in \{s, c\}$ in period t. The two partners share the audit fee revenue and audit liability by the sharing rule $(\alpha_i, \beta_i)_t, i \in 1, 2, \alpha_i, \beta_i \in [0, 1]$, where α_i and β_i denote, respectively, an incentive weight on audit fee revenue earned by partner i and an incentive weight on liability incurred by partner i in period t. We maintain the feasibility assumption that each partner will not bid below his break-even audit fee, in the sense that the expected payoff from his bidding audit fee must be greater than or equal to the partner's reservation wage. Without loss of generality, we posit an equal sharing rule in period one (i.e., $\alpha_i = \beta_i = 1/2$ for $i = 1, 2$ in period one) and use the notation (α_i, β_i) for period two.[26]

4.1 No Partner Identification

As in the centralized assignment case, career advancement is of no economic consequence if there is no partner identification disclosure. Partners' bidding consists of simultaneous

[25] Although we label this case as a decentralized regime within an audit firm, this case can also be interpreted as the market for audit service. With this interpretation, each partner represents his audit firm and competes for a client. Our economic trade-off and the distortion therein are applicable to this situation as well.

[26] The headquarters may have to change the sharing rule in period two depending on the disclosure rule and the partners' realized posterior reputations. However, regardless of sharing rules, the expected payoff of each partner is his reservation wage.

offers made by each partner to two clients. When partner i decides his bidding strategy, he takes the other partner's bidding price as given. Then, each client compares the bidding prices, if any, and selects the best offer that generates a greater payoff. If the offered price generates a payoff less than the client's reservation utility, the client rejects the offer. If two partners prefer the same client, then the partner who is preferred by the client is assigned to the client, and the remaining partner is assigned to the remaining client.[27]

Period Two. Partner i's bidding price must cover the total expected liability and his reservation wage. Recall that $\hat{\gamma}_{HQ}$ denotes the headquarters' posterior reputation. Since the market cannot identify the partners' identities, they value the partners by $\omega(\hat{\gamma}_{HQ})$. When partner 1 determines the bidding price for the complex client, $f_2(1,c)$, he takes partner 2's price for the simple client, $f_2(2,s)$, as given, and vice versa for partner 2:[28]

$$\alpha_1 f_2(1,c) + (1-\alpha_2) f_2(2,s) - L(1-p)\big(\beta_1 \mu(\gamma_1^{X_j}, c) + (1-\beta_2)\mu(\gamma_2^{X_{j'}}, s)\big) \geq \omega(\hat{\gamma}_{HQ}), \quad (4)$$

$$(1-\alpha_1) f_2(1,c) + \alpha_2 f_2(2,s) - L(1-p)\big((1-\beta_1)\mu(\gamma_1^{X_j}, c) + \beta_2 \mu(\gamma_2^{X_{j'}}, s)\big) \geq \omega(\hat{\gamma}_{HQ}). \quad (5)$$

The inequality (4) is for partner 1 who takes partner 2's price as given, and the inequality (5) is for partner 2 who takes partner 1's price as given. Similar inequalities are constructed for the alternative assignment in which partner 1 bids for the simple client and partner 2 bids for the complex client while taking each other's price as given.[29] Because the reservation wage for each partner is fixed at the beginning of period two, the right hand side of above inequalities (4) and (5) is independent of the audit engagement in period two.

As in the headquarters' assignment problem, partners' bidding is solved by minimizing expected cost (i.e., liability). Because we assume a competitive audit market, the equilibrium audit fee is determined by the partners' break-even conditions: each partner's expected payoff

[27] Similarly, if two clients prefer the same partner, then the client who is preferred by that partner is assigned to the partner, because that partner will bid first for the client that he prefers.

[28] As in the centralized assignment, the clients can conjecture the reputation of the partners based on their bidding prices. However, due to the feasibility assumption, the clients will not receive audit fees below each partner's break-even price.

[29] This case includes a situation where both partners want to bid for the same client because the rejected partner makes another offer for the remaining client. In this case, the bidding price for client j made by partner i is determined by the bidding price for client j' made by partner i', which happens if client j rejects partner i''s offer. See the proof of Proposition 4.

in period two is his reservation wage. Then, client j chooses the partner that maximizes the payoff in period two:

$$pV' + (1-p)\Big(I - \mu(\gamma_i^{X_j}, j)(I-L)\Big) - f_2(i,j). \tag{6}$$

We show in Lemma 4 that the decentralized assignment obtains the first-best assignment that minimizes the expected liability in period two. Intuitively, each partner's reservation wage is fixed at the time of bidding. Hence, both partners prefer the assignment rule that a high (low) reputation partner audits the complex (simple) client to minimize the expected liability.

Period One. As in the centralized regime, we will show in Lemma 4 that there is no direct interaction between the two periods without partner identification. To see the intuition, recall that without partner identification, there is no chance of career advancement. Therefore, when partners bid for the clients in period one, the expected reservation wage in period two remains the same as the current wage ($E[\omega(\hat{\gamma}_{HQ})] = \omega(\gamma_{HQ})$). This suggests that partners' bidding strategies in period one are independent of period two.[30] Thus, partner 1 audits a complex client and partner 2 audits a simple client. This confirms our result in Lemma 2 that career advancement has no economic consequence when there is no partner identification.

Lemma 4. (No Partner Identification) *In each period, under the decentralized assignment, the equilibrium partner-client engagement is that partner 1 audits a complex client and partner 2 audits a simple client to minimize the expected liability.*

4.2 Partner Identification and Career Advancement

Economic Trade-off. With partner identification disclosure, the two partners may strictly prefer auditing for the complex client, in which case the complex client needs to

[30]Formally, for assignment rule $a_1(i)$, the audit fees in period one must satisfy:

$$\frac{1}{2}\Big(f_1(1, a_1(1)) + f_1(2, a_1(2)) - L(1-p)\big(\mu(\gamma_1, a_1(1)) + \mu(\gamma_2, a_1(2))\big)\Big) \geq \omega(\gamma_{HQ}).$$

choose one of the partners. On one hand, if partner assignment is distorted, audit failure is more likely to occur, thereby lowering the benefit of the audit (the second term of (6)). On the other hand, engaging with the complex client increases the chance of the engaged partner's career advancement in period two. The expected future benefit due to the increase in period two career advancement benefits a complex client in period one because the partners are willing to lower the audit fee in period one (the third term of (6)).

Partners' Bidding in Period Two. Because period two is the last period, partners' bidding strategies are to minimize the audit liability. Thus, the audit assignment is not distorted and the audit quality will be the same as in the non-disclosure case. But the audit fees change because of the possibility of career advancement. To understand the intuition, suppose partner 1 receives the outside offer $\lambda(\gamma_1^{S_c})$ after his successful audit outcome for the complex client in period one and that partner 2's audit outcome for the simple client was X_s in period one. Then, when partner 1 bids for the complex client (taking partner 2's equilibrium bidding price $f_2(2,s)$ as given), his audit fee must satisfy:

$$\alpha_1 f_2(1,c) + (1-\alpha_2) f_2(2,s) - L(1-p)\big(\beta_1 \mu(\gamma_1^{S_c}, c) + (1-\beta_2)\mu(\gamma_2^{X_s}, s)\big) \geq \lambda(\gamma_1^{S_c}).$$

By comparison, the reservation wage (the right side of the inequality) is replaced by $\omega(\gamma_1^{S_c})$ in the absence of career advancement. Thus, if one of the partners receives career advancement, then the audit fees are higher than in the non-disclosure case. The client who will be engaged with that partner also has to pay the audit fee that generates the net payoff of $\lambda(\gamma_1^{S_c})$ to that partner since it captures his reputation value. Moreover, because each partner's payoff will be his reservation utility, the pay disparity will be greater under partner identification disclosure (same as in the centralized assignment).

Partners' Bidding in Period One. In period one, each partner considers the potential career advancement when they make a bid for clients. Specifically, when partner i bids for a complex client in period one, the expected period two reservation wage is

$$q_i(u) \times \big(\lambda(\gamma_i^{S_c}) - \omega(\gamma_i^{S_c})\big) + E[\omega(\gamma_i^{X_c})] = T(u,i) + \omega(\gamma_i),$$

where the equality uses the definition of the headquarters' retention cost. In contrast, when a partner bids for a simple client in period one, the expected period two reservation wage is $E[\omega(\gamma_i^{X_s})] = \omega(\gamma_i)$. That is, by bidding for a complex client, partner i can enjoy the increased outside option, $T(u, i)$, which equals the headquarters' retention cost under the centralized assignment.

The presence of the potential career advancement in the second period intensifies the competition for the audit engagement with the complex client in the first period. As both partners strictly prefer audit engagement with the complex client, the partners may bid for the complex client by offering an audit fee discount. While the complex client prefers partner 1 due to the expected high audit quality, the complex client may accept the discounted audit fee from partner 2 if the discounted audit fee is sufficiently low that it outweighs the benefit from the higher audit quality provided by partner 1.

We derive a condition with respect to L such that 1) the two partners lower audit fees to match with the complex client, and 2) the complex client is willing to accept the distorted offer in period one. Contrary to the centralized regime, the decentralized assignment does not require the threshold for I, because the lost benefit from the high audit quality for the complex client will be offset by the discount of audit fees made by partners.[31] The following proposition summarizes our result.

Proposition 4. (Partner Identification) *In period one, partner 1 audits a complex client and partner 2 audits a simple client. There exists a threshold $L^P \in R_+$ such that*

- *if $L \geq L^P$, then, there is no distortion in audit fees; or*
- *if $L < L^P$, then partners always underbid due to their potential career advancement.*

The total expected audit fees over two periods under the partner identification disclosure (even with aggressive underbidding) are always greater than the total expected audit fees under the non-disclosure. The thresholds L^P is specified in the Appendix.

[31]The difference between the centralized and decentralized regimes is the competition between partners. When the headquarters bids for each client, she assigns one partner to one client; thus, the client's choice is to either accept or reject the offer. In contrast, under the decentralized regime, the complex client may receive two (discounted) offers from both partners, thus enjoying a benefit from the competition.

When a partner has promising career advancement,[32] then the decentralized assignment faces a potential distortion in which partners aggressively underbid for clients. In particular, when partner 2 is willing to lower the audit fee for the complex client, partner 1 has to reduce his audit fee in order to match with partner 2's bidding offer. This can be interpreted as another source of low-balling (DeAngelo 1981). Clearly, the complex client enjoys the audit fee discount because of the low-balling in the first period, although the client may face the increase in audit fee in the subsequent period.

Due to partners' underbidding, the headquarters suffers. Since the future career advancement benefits the partners (not the headquarters), the underbid audit price is always less than the headquarters' break-even price. Specifically, any discount made to the complex client is the cost to the headquarters. Thus, this distorted equilibrium assignment is never Pareto efficient.

Despite the low balling in period one, the total audit fees over two periods under the partner identification disclosure are always greater than under the non-disclosure regime. The intuition for this surprising result is as follows. Recall that the expected benefit from career advancement is greater for partner 1 than partner 2, because partner 1 has a higher ex ante reputation and lower likelihood of audit failure. The partners are willing to low-ball audit fees in the first period up to their expected benefit from career advancement. On one hand, partner 2 wants to low-ball the audit fee for the complex client, but the fee discount must be smaller than the expected career advancement opportunity, because given his lower ability, he bears incremental audit liability to audit the complex client. On the other hand, partner 1 offers a smaller fee discount to the complex client than partner 2, because the client can correctly anticipate that partner 1 will deliver a higher audit quality. This suggests the following order: partner 1's fee discount < partner 2's fee discount < partner 2's expected benefit from career advancement < partner 1's expected benefit from career advancement. Taken together, the audit fee discount in the first period is always smaller than the expected increase in audit fees due to career advancement in the subsequent period. Thus, the net impact of the partner identification disclosure on the total audit fees over two periods is

[32] As we discussed in the centralized regime, partner identification is of no economic consequence on audit fees when there is no career advancement, $u = 0$. A formal analysis is available upon request.

always positive.

It is worth noting that our result in Proposition 4 remains the same even if the complex client price-protects himself by asking for a greater discount from partner 1. We prove this argument in the proof of Proposition 4. The intuition is as follows. Given that the same complex client interacts with the two partners over two periods, the audit fee discount offered by partners is simply a payoff transfer from the subsequent period. However, as we show in Proposition 4, partner 1 does not need to transfer the entire expected value of career advancement due to his higher audit quality than that of partner 2. Hence, the underbidding may still occur.[33]

As in the centralized assignment, we conduct the comparative statics with respect to $u, \lambda, \mu(h, c)$ and γ_2. Intuitively, as career advancement is more likely (u increases), the partners are more willing to bear the audit liability cost and to lower audit fees. At the same time, the increased audit fee discount in turn makes the complex client willing to accept the distorted offer. The same logic is applied to λ. As the career advancement is higher-powered, the partners' audit fee discount is greater and the complex client's willingness to accept the distorted offer is higher.

When the high type partner's type II error increases, it becomes less costly to distort for both partners and clients (as there exists a smaller difference between the high and low type partners in detecting a financially bad condition), thereby leading to more aggressive underbidding; this underbidding is accepted by the complex client if the lost benefit from the audit service is not too high (not too high I). Lastly, as partner 2's prior reputation increases (i.e., more likely to succeed), the chance of career advancement is greater, thereby leading to partner 2's aggressive bidding.

Proposition 5. *Suppose that $L < L^P$ so that partners underbid in equilibrium under partner identification. The partners' inefficient underbidding for the complex client is more likely when*

[33] Theoretically, the complex client may strategically accept the offer from partner 2 (even without any fee discount) in order to avoid a high audit fee in the subsequent period. This tension is the same as the headquarters' incentive for distortion. Even if this is theoretically possible, such collusion between the less competent partner and the client seems neither realistic nor Pareto-improving (because, it makes the simple client strictly worse off in the subsequent period). Thus, we abstract away from this unrealistic possibility.

- *the probability of career advancement increases* ($\partial L^P/\partial u > 0$)*; or*
- *the career advancement is more sensitive to a partner's reputation* ($\partial L^P/\partial \lambda > 0$)*; or*
- *a high type partner's type II error is greater* ($\partial L^P/\partial \mu(h,c) > 0$) *provided that* I *is not too high, where the condition for* I *is presented in the Appendix; or*
- *partner 2's reputation increases* ($\partial L^P/\partial \gamma_2 > 0$)*.*

5 Empirical Implications

Our theory provides several predictions. If the headquarters assigns clients to partners, then we expect to see a decrease in audit quality but increase in audit fees in the first year of the policy change because the headquarters may distort the partner-client match in order to reduce her talent retention cost.[34] This implies that learning partners' types through assignment is not fully exploited because the possible realizations of a partner's posterior reputation are affected by the distorted assignment. That is, information content in partner identification is endogenous due to the headquarters' cost and benefit from assignment. This in turn implies that the argument that partner identification disclosure will increase audit quality and enable learning about partners' abilities can be limited.[35]

On the other hand, when partners bid for their own clients, audit fees are likely to decrease for complex clients in the first year of the policy adoption because partners have to low-ball due to competition amongst each other. Moreover, audit firms may suffer from this inefficient competition (underbidding behaviors). But we expect to see a significant increase in audit fees over the long term for complex clients because the reputation value of the higher ability partner is higher than the discount he has to offer in the earlier period. Audit fees remain the same for simple clients because there is no incremental competition

[34] The presence of career advancement (regardless of distorted assignment in period one) increases the total expected audit fees in period two. Thus, together with an increase in period one audit fees, the total expected audit fees over two periods are greater under the disclosure regime than under the non-disclosure regime.

[35] We acknowledge that we do not directly model the cost borne by the headquarters from distorted learning. Introducing such a cost would generate the net effect of the partner identification disclosure policy; however, it would not qualitatively change our results.

resulting from the disclosure policy. In addition, we do not expect an audit quality change under the disclosure regime if partners bid clients directly, since partner-client matching is not distorted.

Empirical research has shown mixed results regarding the effect of audit partner identification on audit quality and audit fees. Our theoretical predictions provide reasons that audit fees and audit quality may not consistently increase. Moreover, our results suggest that it is important to consider partner-client matching and legal regimes to better estimate the impact of partner identification.

6 Conclusion

In this paper, we analyze the economic consequences of audit partner identification disclosure on partner-client engagements, audit fees, and audit quality. Although disclosing partners' names provides better information about audit partners' talent to investors, it also provides the same information to the labor market for audit talent, thus affects the partners' career advancement opportunities. We show that partner-client engagements are subject to distortion due to the headquarters' concerns about partner retention and that audit fees are subject to distortion due to the partners' inefficient competition. Such inefficient behaviors of audit firms and partners can also be viewed as signal jamming in the spirit of Holmstrom (1999).

As an extension, one could search for an optimal audit engagement between the centralized and the decentralized regimes. In the model, we take the centralized and decentralized regimes as exogenously given. Will an audit firm or social planner have a preference between the two regimes when there is mandatory partner identification disclosure? Apparently, without the identification disclosure, an audit firm (and social planner) is indifferent between the two regimes, because neither partner assignment nor audit fee is distorted. Because partners' underbidding results in audit fees lower than the headquarters' break-even price, an audit firm may prefer the centralized regime. However, given that the centralized regime faces the lower audit quality and the decentralized regime faces audit fee discounts, it is not clear which regime is socially efficient, as neither regime is Pareto dominant. Understanding an audit firm's preferred assignment and/or analyzing the overall social welfare effect seem to be a natural next step.

Another extension is to incorporate the reputation of audit firms. To simplify the analysis, we assume that with only two partners, an audit firm's reputation is the average reputation of the two partners. When any of its partners fails (succeeds) to identify a client's type correctly in the first period, the audit firm's reputation suffers (improves) as well. One may argue that audit failure can give rise to more damage to an audit firm's reputation on top of audit liability concerns. In this case, we conjecture that an audit firm would distort partner assignment to a lesser extent in the centralized regime under the mandatory identification disclosure.

Our analysis can also be extended to a setting in which partner reputation is partially-revealed. In the model, we assume that the labor market cannot establish the link between an audit partner and an audit outcome without the identification disclosure. However, it is possible that engagement partners could be identified in other ways. For example, even without the identification disclosure, audit partners are periodically copied by name in public correspondence between issuers and the Securities and Exchange Commission, through which audit partner identification may be partially revealed to the labor market (Laurion, Lawrence, and Ryans, 2016).[36] It is intuitive that this potential communication channel reduces the economic effect (information content) of the identification disclosure, because the market has been partially informed about partners' reputation, thereby mitigating the distortion of partner assignment in the centralized regime and the lowballing in audit fees in the decentralized regime.

While the repeated partner-client assignment model we propose invites many directions for extension, we believe our findings provide better understanding of partner identification disclosure, the newly adopted policy for multiple countries, thereby taking a step toward a better assessment of auditing regulation.

[36] Also see Page 45 of PCAOB Release No. 2015-008 "Improving the transparency of audits: rules to require disclosure of certain audit participants on a new PCAOB firm and related amendments to auditing standards."

A Appendix. Proofs

A.1 Value of Audit

For notational convenience, we omit the time subscript t. Without loss of generality, suppose partner i's reservation wage is $\omega(\gamma_i)$. By receiving audit service from partner i, client j's expected payoff is:

$$
\begin{aligned}
& pV^{'} + (1-p)((1-\mu(\gamma_i, j))I + \mu(\gamma_i, j)L) - f(i, j) \\
& = pV^{'} + (1-p)((1-\mu(\gamma_i, j))I + \mu(\gamma_i, j)L) - \big(L(1-p)\mu(\gamma_i, j) + \omega(\gamma_i)\big) \\
& = pV^{'} + (1-p)(1-\mu(\gamma_i, j))I - \omega(\gamma_i).
\end{aligned} \tag{7}
$$

The first equality uses the break-even condition for audit fees. As long as the expression (7) is greater than or equal to the client's expected payoff without audit service, pV', the value of an audit is positive. Formally, client j is strictly better off by receiving audit from partner i if:

$$\omega < \frac{(1-p)(1-\mu(\gamma_i, j))I}{\gamma_i}.$$

When the partners' career advancement is considered, we will have λ as the wage rate. Thus, throughout the paper, we assume that $max\{\omega, \lambda\} = \lambda < min_{i=1,2} \frac{(1-p)(1-\mu(\gamma_i, j))I}{\gamma_i}$. $\square$

A.2 Bayesian Updating Formula

For each client $j \in \{s, c\}$, the possible audit outcomes are $X_j \in \{S_j, F_j, \phi\}$, where $S_j = (B, b)$, $F_j = (B, g)$ and $\phi = (G, g)$. Let γ^{X_j} denote the partner's updated reputation upon the audit outcome X_j, i.e., $\gamma^{X_j} \equiv Pr(h|\gamma, X_j)$. Then,

$$\gamma^{S_j} = \frac{\gamma \times (1-\mu(h,j))}{\gamma \times (1-\mu(h,j)) + (1-\gamma) \times (1-\mu(l,j))} = \frac{\gamma}{\gamma + (1-\gamma) \times \frac{1-\mu(l,j)}{1-\mu(h,j)}} > \gamma,$$

$$\gamma^{F_j} = \frac{\gamma \times \mu(h,j)}{\gamma \times \mu(h,j) + (1-\gamma) \times \mu(l,j)} = \frac{\gamma}{\gamma + (1-\gamma) \times \frac{\mu(l,j)}{\mu(h,j)}} < \gamma,$$

$$\gamma^{\phi} = \frac{\gamma \times p}{\gamma \times p + (1-\gamma) \times p} = \gamma.$$

□

A.3 Definition of an Equilibrium

Let P and J denote, respectively, the set of partners and the set of clients. Let $a : P \rightarrow J$ denote a one-to-one matching function and $f : P \rightarrow J$, an audit fee function. Let $\pi^* : P \rightarrow R_+$ and $v^* : J \rightarrow R_+$ denote, respectively, the payoffs of partners and of clients.

For the centralized regime, the headquarters assigns the partners to clients to minimize the total costs given that such matching is individually rational (Roth and Sotomayor 1990, Chapter 8). The headquarters' equilibrium assignment is optimal if the two conditions are met:

- Individual rationality of (π^*, v^*) with respect to a and f: the matching and audit fee provide to all parties at least their reservation utilities,
- Among all individually rational assignments, a minimizes the total costs the headquarters bears.

Since we assume that partners stay as long as they receive their reservation wages, π^* consists of each partner's reservation wage.

For the decentralized regime, partners and clients are matched in a stable way given that such matching is individually rational (Roth and Sotomayor 1990, Chapter 2). An equilibrium specifies a one-to-one matching function $a : P \rightarrow J$, an audit fee function $f : P \rightarrow J$, and payoff π^* and v^* such that

- Individual rationality of (π^*, v^*) with respect to a and f: the matching and audit fee provide to all parties at least their reservation utilities,

- Stability of a and f with respect to (π^*, v^*): there does not exist $(i,j) \in P \times J$, $\pi^{'}$, $v^{'}$ and $f^{'}$ such that $a(i) \neq j$ and $f^{'} \neq f$, but $\pi^{'} \geq \pi^*$ and $v^{'} \geq v^*$, with at least one inequality strict.

In equilibrium, the audit fee is determined by break even conditions of headquarters (under the centralized regime) or of partners (under the decentralized regime). □

A.4 Proof of Lemma 1

For any audit outcomes, for the updated posterior $\gamma_1^{X_j}$ to be greater than the updated posterior $\gamma_2^{X_{j'}}$, it is sufficient to check the case in which γ_1 obtains failure whereas γ_2 obtains success. Using the Bayesian updating formula we derived,

$$\frac{1}{1+\frac{1-\gamma_1}{\gamma_1}\frac{\mu(l,j)}{\mu(h,j)}} > \frac{1}{1+\frac{1-\gamma_2}{\gamma_2}\frac{1-\mu(l,j')}{1-\mu(h,j')}} \Leftrightarrow \frac{\gamma_1}{\gamma_2}\frac{1-\gamma_2}{1-\gamma_1} > \frac{\mu(l,j)}{\mu(h,j)}\frac{1-\mu(h,j')}{1-\mu(l,j')} \text{ for any } j, j'.$$

Let $m = max_{j,j'}\{\frac{\mu(l,j)}{\mu(h,j)}\frac{1-\mu(h,j')}{1-\mu(l,j')}\}$. Here $m > 1$ because audit failure is more likely under the low type than high type (i.e., $\frac{\mu(l,j)}{\mu(h,j)} > 1$), and audit success is more likely under the high type than low type (i.e., $\frac{1-\mu(h,j')}{1-\mu(l,j')} > 1$).

We derive a condition with respect to $\gamma_1 - \gamma_2$. Let $\gamma_1 = \gamma_2 + z$. Then, the above inequality can be written as:

$$\frac{\gamma_2 + z}{\gamma_2}\frac{1-\gamma_2}{1-\gamma_2-z} > m \Leftrightarrow z > \frac{\gamma_2(1-\gamma_2)(m-1)}{1-\gamma_2+m\gamma_2} \equiv M.$$

We need to check whether M is well-defined, i.e., $M < 1-\gamma_2$, because $\gamma_1 = \gamma_2 + z$ must be less than one. It is straightforward to see that:

$$M < 1-\gamma_2 \Leftrightarrow \frac{\gamma_2(m-1)}{1-\gamma_2+m\gamma_2} < 1 \Leftrightarrow m\gamma_2 - \gamma_2 < 1-\gamma_2+m\gamma_2 \Leftrightarrow 0 < 1,$$

which is always true.

Moreover, M is an increasing function of m:

$$\frac{dM}{dm} = \frac{\gamma_2(1-\gamma_2)}{(1-\gamma_2+m\gamma_2)^2} > 0.$$

Thus, M is well-defined and $\gamma_1 > \gamma_2 + M$ is feasible. Therefore, if $\gamma_1 - \gamma_2 \geq M$, then for any audit outcomes, the updated posterior of partner 1 is greater than that of partner 2. $\square$

A.5 Proof of Lemma 2

The proof consists of two parts. We first show that the headquarters' assignment decision in period one does not affect the headquarters' expected payoff in period two by showing that 1) expected reservation wages in period two are independent of assignment in period one, and 2) so is the expected audit quality in period two given that $\gamma_1 - \gamma_2 \geq M$. We then find the optimal assignment in each period.

Part 1. Let $Pr(X_j;\gamma)$ denote the probability of an audit outcome X_j when partner with reputation γ audits client j. For instance, $Pr(X_j = F_j;\gamma) = \gamma\mu(h,j)+(1-\gamma)\mu(l,j) = \mu(\gamma,j)$. Regardless of assignment in period one, each partner's expected posterior reputation is the same as his prior reputation:

$$\begin{aligned}
E[\gamma^{X_j}] &= Pr(X_j=\phi;\gamma)\gamma^{X_j=\phi} + Pr(X_j=F_j;\gamma)\gamma^{X_j=F_j} + Pr(X_j=S_j;\gamma)\gamma^{X_j=S_j} \\
&= p\gamma + (1-p)\Big(\mu(\gamma,j)\frac{\gamma}{\gamma+(1-\gamma)\frac{\mu(l,j)}{\mu(h,j)}} + (1-\mu(\gamma,j))\frac{\gamma}{\gamma+(1-\gamma)\frac{1-\mu(l,j)}{1-\mu(h,j)}}\Big) \\
&= \gamma\Big(p + \frac{(1-p)\mu(\gamma,j)}{\gamma+(1-\gamma)\frac{\mu(l,j)}{\mu(h,j)}} + \frac{(1-p)(1-\mu(\gamma,j))}{\gamma+(1-\gamma)\frac{1-\mu(l,j)}{1-\mu(h,j)}}\Big) \\
&= \gamma.
\end{aligned}$$

Since $\omega(\gamma) = \omega\times\gamma$, we have $E[\omega(\gamma_i^{X_j})] = \omega(E[\gamma_i^{X_j}]) = \omega(\gamma_i)$ for any $j \in \{c,s\}$. Thus, the expected wages in period two are independent of assignment in period one.

Let $\Delta\mu(j) \equiv \mu(l,j) - \mu(h,j)$. Suppose that partner γ audited client j in period one and received outcome X_j, and audits client j' in period two. Given that $\mu(\gamma^{X_j}, j') = \gamma^{X_j}\mu(h,j')+(1-\gamma^{X_j})\mu(l,j') = \mu(l,j') - \gamma^{X_j}\Delta\mu(j')$, the expected audit quality (the probability of audit failure) in period two is:

$$E[\mu(\gamma^{X_j}, j^{'})] = E[\mu(l, j^{'}) - \gamma^{X_j}\Delta\mu(j^{'})] = \mu(l, j^{'}) - \gamma \times \Delta\mu(j^{'}),$$

where the second equality uses $E[\gamma^{X_j}] = \gamma$. Since we assume that $\gamma_1 - \gamma_2 \geq M$, we have $a_2(1) = c, a_2(2) = s$ regardless of audit outcomes in period one. Thus, the expected probability of audit failure in period two conditional on assignment in period one is:

$$\begin{aligned}
E[\mu(\gamma_1^{X_{a_1(1)}}, c) &+ \mu(\gamma_2^{X_{a_1(1)}}, s)|a_1(1) = s, a_1(2) = c] \\
&= \mu(l, c) - E[\gamma_1^{X_s}] \times \Delta\mu(c) + \mu(l, s) - E[\gamma_2^{X_c}] \times \Delta\mu(s) \\
&= \mu(l, c) - \gamma_1 \times \Delta\mu(c) + \mu(l, s) - \gamma_2 \times \Delta\mu(s) \\
&= \mu(l, c) - E[\gamma_1^{X_c}] \times \Delta\mu(c) + \mu(l, s) - E[\gamma_2^{X_s}] \times \Delta\mu(s) \\
&= E[\mu(\gamma_1^{X_{a_1(1)}}, c) + \mu(\gamma_2^{X_{a_1(2)}}, s)|a_1(1) = c, a_1(2) = s],
\end{aligned}$$

where the second equality uses $E[\gamma^{X_j}] = \gamma$. Thus, the expected audit quality in period two is independent of assignment in period one.

Part 2. Since we showed in Part 1 that the headquarters' assignment problems over two periods are independent, for notational convenience, we omit the time subscript. Recall the headquarters' payoff from choosing $a(i)$: $\Pi = \sum_{i=1,2} f^{HQ}(i, a(i)) - \big(L(1-p)\mu(\gamma_i, a(i)) + \omega(\gamma_{HQ})\big)$.

There are two assignment options $a(1) = c, a(2) = s$ or $a(1) = s, a(2) = c$. The expected liabilities for both clients under each option are $L(1-p)\mu(\gamma_1, c) + L(1-p)\mu(\gamma_2, s)$ and $L(1-p)\mu(\gamma_1, s) + L(1-p)\mu(\gamma_2, c)$. The difference

$$L(1-p)[\mu(\gamma_1, c) + \mu(\gamma_2, s) - \mu(\gamma_1, s) - \mu(\gamma_2, c)]$$

is less than zero due to supermodularity. That is, for $\gamma_1 > \gamma_2$, $\mu(\gamma_2, s) - \mu(\gamma_1, s) < \mu(\gamma_2, c) - \mu(\gamma_1, c)$. Therefore, liability minimizing assignment is $a(1) = c, a(2) = s$ for $\gamma_1 > \gamma_2$.

□

A.6 Proof of Lemma 3

Let W denote the total wage costs in period two. Without loss of generality let partner i audit the complex client in period one and partner i' audit the simple client. Before period one auditing takes place, the probability that partner i receives an outside offer in period two is denoted as $q_i(u) = (1-p) \times (1-\mu(\gamma_i, c)) \times u$. Observe that the expected period two wage for partner i is then:

$$\begin{aligned} q_i(u)\lambda(\gamma_i^{S_c}) &+ (1-p) \times (1-\mu(\gamma_i, c)) \times (1-u) \times \omega(\gamma_i^{S_c}) \\ &+ (1-p) \times \mu(\gamma_i, c) \times \omega(\gamma_i^{F_c}) + p \times \omega(\gamma_i) \\ &= q_i(u)(\lambda(\gamma_i^{S_c}) - \omega(\gamma_i^{S_c})) + E[\omega(\gamma_i^{X_c})], \end{aligned}$$

where the equality uses $(1-p) \times (1-\mu(\gamma_i, c)) \times (1-u) = (1-p) \times (1-\mu(\gamma_i, c)) - q_i(u)$. Let D and ND respectively denote partner identification disclosure and non-disclosure. We have:

$$\begin{aligned} E[W|D] &= E[q_i(u) \times (\lambda - \omega) \times \gamma_i^{S_c} + \omega(\gamma_i^{X_c}) + \omega(\gamma_{i'}^{X_s})] \\ &> E[\omega(\gamma_i^{X_c}) + \omega(\gamma_{i'}^{X_s})] = E[W|ND]. \end{aligned}$$

With partner identification disclosure, the maximum pay disparity between partners is $\lambda(\gamma_i^{S_c}) - \omega(\gamma_{i'}^{F_s})$, whereas without disclosure, $\omega(\gamma_i^{S_c}) - \omega(\gamma_{i'}^{F_s})$, which is always less than $\lambda(\gamma_i^{S_c}) - \omega(\gamma_{i'}^{F_s})$.

□

A.7 Proof of Proposition 1

Recall that $T(u,i) = q_i(u) \times \left(\lambda(\gamma_i^{S_c}) - \omega(\gamma_i^{S_c})\right) = u(1-p)(1-\mu(\gamma_i,c)) \times (\lambda-\omega) \times \gamma_i^{S_c}$. Then,

$$\begin{aligned} T(u,1) &= u(1-p)(1-\mu(\gamma_1,c)) \times (\lambda-\omega) \times \gamma_1^{S_c} \\ &> u(1-p)(1-\mu(\gamma_2,c)) \times (\lambda-\omega) \times \gamma_2^{S_c} = T(u,2). \end{aligned}$$

The inequality is due to $\mu(\gamma_1,c) < \mu(\gamma_2,c)$ and $\gamma_2^{S_c} < \gamma_1^{S_c}$. Note that $1-\mu(\gamma_i,c) = 1-\mu(l,c)+\gamma_i\Delta\mu(c)$ and that $T(u,i)$ can be simplified as:

$$T(u,i) = u(1-p)(1-\mu(h,c))(\lambda-\omega)\gamma_i.$$

It is straightforward to see that:

$$\begin{aligned} \frac{\partial T(u,i)}{\partial u} &= (1-p)(1-\mu(h,c))(\lambda-\omega)\gamma_i > 0, \\ \frac{\partial T(u,i)}{\partial \lambda} &= u(1-p)(1-\mu(h,c))\gamma_i > 0, \\ \frac{\partial T(u,i)}{\partial \mu(h,c)} &= -u(1-p)(\lambda-\omega)\gamma_i < 0, \\ \frac{\partial T(u,i)}{\partial \gamma_i} &= u(1-p)(1-\mu(h,c))(\lambda-\omega) > 0. \end{aligned}$$

□

A.8 Proof of Proposition 2

The proof consists of three parts. We derive a condition in which 1) the distorted assignment is feasible and 2) it takes place in equilibrium under the partner identification. As specified in our definition of an equilibrium A3., for feasibility, both clients and the partners receive at least their reservation utilities. Provided this feasibility, for the distorted assignment to be an equilibrium, the headquarters' total costs in period one and two must be less under the distorted assignment than the undistorted assignment. We then show 3) how the aggregate audit quality and audit fees change under the distorted assignment.

Feasibility. Since the headquarters breaks even, the equilibrium audit fee is determined by binding inequality (1). Plug the equilibrium audit fee into a client's payoff (2). The complex client's expected payoff in period one under the distorted assignment is given by:

$$pV^{'} + (1-p)(1-\mu(\gamma_2, c))I - \omega(\gamma_{HQ}), \tag{8}$$

The expression (8) must be greater than or equal to the reservation utility, pV'.

$$\begin{aligned}
&pV^{'} + (1-p)(1-\mu(\gamma_2, c))I - \omega(\gamma_{HQ}) \geq pV', \\
&\Leftrightarrow (1-p)(1-\mu(\gamma_2, c))I \geq \omega(\gamma_{HQ}), \\
&\Leftrightarrow I \geq \frac{\omega(\gamma_{HQ})}{(1-p)(1-\mu(\gamma_2, c))} \equiv \overline{I}.
\end{aligned}$$

The reason $\omega(\gamma_{HQ})$ is used even though the complex client conjectures that partner 2 will be assigned is because of the feasibility assumption that the partner's wage payment is at least greater than or equal to his outside option which is based on the market's belief about the partner's ability, γ_{HQ}. Thus, the audit quality is based on the engaged partner's true reputation γ_2 whereas his reservation wage $\omega(\gamma_{HQ})$ is based on the market's belief. Meanwhile, the distorted assignment also needs to be accepted by the simple client. While the simple client conjectures that partner 1 will be assigned, however, by the same logic, partner 1's wage in period one is based on the market's belief about the partner's perceived ability in period one (before disclosure). Thus, the simple client enjoys positive externality from high audit quality at a cheaper price and the condition $I \geq \frac{\omega(\gamma_{HQ})}{(1-p)(1-\mu(\gamma_1, s))}$ is satisfied as long as $I \geq \overline{I}$. Lastly, the headquarters pays the partners their reservation wages to retain them in each period. Therefore, as long as $I \geq \overline{I}$, the distorted assignment is feasible .

Optimality. The headquarters makes its assignment decision by comparing the total expected costs in period one and two conditional on assignment $a_1(1) = c, a_1(2) = s$ to the total costs conditional on assignment $a_1(1) = s, a_1(2) = c$.

Provided that $\gamma_1 - \gamma_2 \geq M$ (thus, $a_2(1) = c, a_2(2) = s$), the headquarters' expected period two cost when she chooses $a_1(1) = c, a_1(2) = s$ is:

$$E[L(1-p)\Big(\mu(\gamma_1^{X_c}, c) + \mu(\gamma_2^{X_s}, s)\Big) + \Big(\omega(\gamma_1^{X_c}) + \omega(\gamma_2^{X_s})\Big) + T(u,1)].$$

Except $T(u,1)$, the remaining terms are the same as the headquarters' period two costs under the non-disclosure. Let $E[C_2^{ND}]$ denote the headquarters' expected cost in period two without disclosure. Thus, the above can be written as

$$E[C_2^{ND}] + T(u,1).$$

Since we show that $E[\mu(\gamma_1^{X_s}, c) + \mu(\gamma_2^{X_c}, s)] = E[\mu(\gamma_1^{X_c}, c) + \mu(\gamma_2^{X_s}, s)]$ and that $E[\omega(\gamma_i^{X_j})] = \omega(\gamma_i)$ (in Lemma 2), we can write the headquarters' expected period two cost as $E[C_2^{ND}] + T(u,2)$ under the distorted assignment, $a_1(1) = s, a_1(2) = c$.

Now, to determine whether the headquarters is better off by distorting assignment, consider her total costs (over period one and two) under $a_1(1) = c, a_1(2) = s$:

$$L(1-p)\big(\mu(\gamma_1, c) + \mu(\gamma_2, s)\big) + 2\omega(\gamma_{HQ}) + E[C_2^{ND}] + T(u,1). \tag{9}$$

On the other hand, her total costs under the assignment $a_1(1) = s, a_1(2) = c$,

$$L(1-p)\big(\mu(\gamma_1, s) + \mu(\gamma_2, c)\big) + 2\omega(\gamma_{HQ}) + E[C_2^{ND}] + T(u,2). \tag{10}$$

Here, the total wage payments in period one is $2\omega(\gamma_{HQ})$ regardless of period one assignment because the partners' reservation wages in period one are agreed at the beginning of period one (before the disclosure).

The headquarters strictly prefers the distorted assignment if the total costs (10) are less than the total costs (9):

$$T(u,1) - T(u,2) > L(1-p)(\gamma_1 - \gamma_2)(\Delta\mu(c) - \Delta\mu(s)), \tag{11}$$

where $\Delta\mu(j) = \mu(l,j) - \mu(h,j)$. Due to supermodularity, $\Delta\mu(c) - \Delta\mu(s) > 0$. As we showed in Proposition 1, the left hand side of inequality (11) is strictly positive. Then, inequality (11) can be written as:

$$\begin{aligned} L &< \frac{T(u,1) - T(u,2)}{(1-p)(\gamma_1 - \gamma_2)\big(\Delta\mu(c) - \Delta\mu(s)\big)} \\ &= \frac{u(1-p)(1-\mu(h,c))(\lambda - \omega)(\gamma_1 - \gamma_2)}{(1-p)(\gamma_1 - \gamma_2)\big(\Delta\mu(c) - \Delta\mu(s)\big)} \\ &= \frac{u(\lambda - \omega)(1-\mu(h,c))}{\Delta\mu(c) - \Delta\mu(s)} \equiv L^{HQ}. \end{aligned}$$

Thus, when $L < L^{HQ}$, the headquarters strictly prefers the distorted assignment.

Therefore, if $L < L^{HQ}$ and $I \geq \overline{I}$, then the assignment $a_1(1) = s, a_1(2) = c$ is feasible and minimizes the headquarters' total costs over period one and two, thus constitute an equilibrium. If either of conditions is not satisfied, then there is no distortion in equilibrium audit engagement.

Audit quality and fees. First, the audit quality decreases for the complex client by $\mu(\gamma_2, c) - \mu(\gamma_1, c) = (\gamma_1 - \gamma_2)\Delta\mu(c)$, whereas the audit quality increases for the simple client by $\mu(\gamma_2, s) - \mu(\gamma_1, s) = (\gamma_1 - \gamma_2)\Delta\mu(s)$. Since the audit fees are equal to the expected liability plus the reservation wage payments (the headquarters' break-even condition), upon the distortion, the audit fee for the complex client increases by $L(1-p)(\gamma_1 - \gamma_2)\Delta\mu(c)$ whereas, for the simple client, it decreases by $L(1-p)(\gamma_1 - \gamma_2)\Delta\mu(s)$. Since the wage payment for each partner in period one is $\omega(\gamma_{HQ})$ under both assignments, the impact on the audit fees results from the changes in liability. Due to supermodularity, $\Delta\mu(c) > \Delta\mu(s)$, the total effect in period one lowers the audit quality by $(\gamma_1 - \gamma_2)(\Delta\mu(c) - \Delta\mu(s))$ and increases the audit fee by $L(1-p)(\gamma_1 - \gamma_2)(\Delta\mu(c) - \Delta\mu(s))$.

$\square$

A.9 Proof of Proposition 3

Recall that $\Delta\mu(c) = \mu(l,c) - \mu(h,c)$. It is immediate to see that

$$\frac{\partial L^{HQ}}{\partial u} = \frac{(\lambda-\omega)(1-\mu(h,c))}{\Delta\mu(c)-\Delta\mu(s)} > 0, \qquad \frac{\partial L^{HQ}}{\partial \lambda} = \frac{u(1-\mu(h,c))}{\Delta\mu(c)-\Delta\mu(s)} > 0,$$
$$\frac{\partial L^{HQ}}{\partial \mu(h,c)} = \frac{u(\lambda-\omega)(1-\mu(l,c)+\Delta\mu(s))}{(\Delta\mu(c)-\Delta\mu(s))^2} > 0, \qquad \frac{\partial L^{HQ}}{\partial \gamma_i} = 0.$$

Since $\overline{I} = \frac{\omega(\gamma_{HQ})}{(1-p)(1-\mu(\gamma_2,c))}$, we have $\frac{\partial \overline{I}}{\partial u} = \frac{\partial \overline{I}}{\partial \lambda} = 0$, and $\frac{\partial \overline{I}}{\partial \mu(h,c)} = \frac{\gamma_2\omega(\gamma_{HQ})}{(1-p)(1-\mu(\gamma_2,c))^2} > 0$. Moreover, $\frac{\partial \overline{I}}{\partial \gamma_1} = \frac{\omega}{2(1-p)(1-\mu(\gamma_2,c))} > 0$ and $\frac{\partial \overline{I}}{\partial \gamma_2} = \frac{\omega(1-\mu(l,c)-\gamma_1\Delta\mu(c))}{2(1-p)(1-\mu(\gamma_2,c))^2}$, which is greater than 0 if $\mu(l,c) + \gamma_1\Delta\mu(c) < 1$, or less than 0 if $\mu(l,c) + \gamma_1\Delta\mu(c) > 1$. □

A.10 Proof of Lemma 4

As in the centralized regime, any cost (which depends on assignment) is expected liability. Thus, partners bid for clients to minimize the expected liability they bear. We constructively find a stable equilibrium assignment based on a deferred acceptance algorithm. Then, we show that the expected liability is minimized when partner 1 (partner 2) is assigned to a complex (simple) client compared to the alternative assignment. To find $a_2(1), a_2(2)$ and $f_2(1, a_2(1)), f_2(2, a_2(2))$, observe that when each partner bids, he takes the other partner's bidding price as given and minimizes the expected liability that he bears as in the headquarters' case. Then, the offered audit fee, $f_2(1, a_2(1)), f_2(2, a_2(2))$, will be determined from the zero-profit condition provided that the audit engagement and audit fee guarantee each client's reservation utility.

As mentioned in the main text, the sharing rule in period two may change upon the change in partners' reservation wages. There can be infinitely many feasible sharing rules between partners, however, we will shortly see that the sharing rule does not change the equilibrium audit engagement. Recall that $(\alpha_i, \beta_i)_{i=1,2}$ denote the revenue and liability sharing rule in period two. While there are many unknown variables (including the exogenously given sharing rule), there are only two possible arrangements: $a_2(1) = c, a_2(2) = s$ or $a_2(1) = s, a_2(2) = c$. We will shortly see that this simplifies the analysis.

Let $\gamma_1^{X_j}$ and $\gamma_2^{X_{j'}}$ denote partner 1's and partner 2's updated reputation at the beginning of period two and let $\hat{\gamma}_{HQ} = \frac{\gamma_1^{X_j} + \gamma_2^{X_{j'}}}{2}$. Each partner bids as follows:

$$\begin{aligned}
\alpha_1 f_2(1, a_2(1)) + (1-\alpha_2) f_2(2, a_2(2)) - (1-p)L(\beta_1 \mu(\gamma_1^{X_j}, a_2(1)) + (1-\beta_2)\mu(\gamma_2^{X_{j'}}, a_2(2))) \\
\geq \omega(\hat{\gamma}_{HQ}) \text{ for partner 1,} \\
(1-\alpha_1) f_2(1, a_2(1)) + \alpha_2 f_2(2, a_2(2)) - (1-p)L((1-\beta_1)\mu(\gamma_1^{X_j}, a_2(1)) + \beta_2 \mu(\gamma_2^{X_{j'}}, a_2(2))) \\
\geq \omega(\hat{\gamma}_{HQ}) \text{ for partner 2.}
\end{aligned}$$

Rearrange the liability term,

$$\begin{aligned}
&\alpha_1 f_2(1, a_2(1)) + (1-\alpha_2) f_2(2, a_2(2)) \\
&\qquad \geq (1-p)L(\beta_1 \mu(\gamma_1^{X_j}, a_2(1)) + (1-\beta_2)\mu(\gamma_2^{X_{j'}}, a_2(2))) + \omega(\hat{\gamma}_{HQ}), \\
&(1-\alpha_1) f_2(1, a_2(1)) + \alpha_2 f_2(2, a_2(2)) \\
&\qquad \geq (1-p)L((1-\beta_1)\mu(\gamma_1^{X_j}, a_2(1)) + \beta_2 \mu(\gamma_2^{X_{j'}}, a_2(2))) + \omega(\hat{\gamma}_{HQ}).
\end{aligned}$$

Add these two inequalities and use the fact that in equilibrium, the inequalities are satisfied with equality, we have

$$\begin{aligned}
&f_2(1, a_2(1)) + f_2(2, a_2(2)) \\
&\qquad = (1-p)L(\mu(\gamma_1^{X_j}, a_2(1)) + \mu(\gamma_2^{X_{j'}}, a_2(2))) + 2\omega(\hat{\gamma}_{HQ}).
\end{aligned} \tag{12}$$

Due to supermodularity of $\mu(\gamma_i, j)$, it is immediate to see that:

$$f_2(1, c) + f_2(2, s) < f_2(1, s) + f_2(2, c).$$

Therefore, the liability minimizing assignment, $a_2(1) = c, a_2(2) = s$, also minimizes audit fees. For this to be an equilibrium assignment, the corresponding audit fee must guarantee at least the clients' reservation utilities as specified in (6).

$$pV^{'} + (1-p)(I - \mu(\gamma_1^{X_j}, c)(I-L)) - f_2(1,c) \geq pV^{'} \text{ for client } c,$$
$$pV^{'} + (1-p)(I - \mu(\gamma_2^{X_{j'}}, s)(I-L)) - f_2(2,s) \geq pV^{'} \text{ for client } s.$$

Since there are two audit fee variables in one equation (12), there are infinitely many potential audit fees. However, there always exist $f_2(1,c)$ and $f_2(2,s)$ that satisfy (12) and guarantee the reservation utility for clients. To see this, add the above two inequalities and use (12) to replace the audit fees:

$$\begin{aligned}
&(1-p)I(2 - \mu(\gamma_1^{X_j}, c) - \mu(\gamma_2^{X_{j'}}, s)) > 2\omega(\hat{\gamma}_{HQ}),\\
&\qquad \Leftrightarrow \underbrace{(1-p)I(1 - \mu(\gamma_1^{X_j}, c)) - \omega(\hat{\gamma}_{HQ})}_{>0} + \underbrace{(1-p)I(1 - \mu(\gamma_2^{X_{j'}}, s)) - \omega(\hat{\gamma}_{HQ})}_{>0} > 0,
\end{aligned}$$

where the last step uses our assumption on the value of an audit, A1.

Notice that, without partner identification, due to the liability sharing, as long as $\beta_i \in (0,1)$, both partners 1 and 2 prefer the audit engagement in which partner 1 audits the complex client and partner 2 audits the simple client. Based on this observation, now we describe the partner-proposing deferred acceptance algorithm, which is based on Gale and Shapely's deferred acceptance algorithm (Roth and Sotomayor 1990, Theorem 2.8). First, each partner proposes to its highest preferred client: partner 1 makes an offer to the complex client and partner 2 makes an offer to the simple client. Then, each client makes a tentative match based on their preferred offer, and reject the other offer. Since it is better to receive audit service than none, there is no such offer that is unacceptable: the complex client accepts partner 1 and the simple client accepts partner 2. Since there is no more rejection or offer, this tentative match is stable, thus an equilibrium.

□

A.11 Proof of Proposition 4

The proof proceeds as follows. We derive a condition in which underbidding is feasible and takes place in equilibrium. i.e., underbidding must provide at least reservation utilities for both clients and partners (feasibility) and such underbidding is stable in the sense that there is no more profitable deviation. We find a stable assignment equilibrium constructively using a partner-proposing deferred acceptance algorithm. We will show that our result remains qualitatively the same even if the clients care about period two consequences upon period one audit engagement. Lastly, we will discuss the impact of partner identification disclosure on the total audit fees in period one and two.

Feasibility. For underbidding to be feasible, receiving audit from partner 2 must generate a greater expected payoff (than partner 1 without underbidding) to the complex client. As mentioned in Proposition 2, since the complex client can infer the identity of each partner based on their bidding and the audit fee must be based on the partner's reservation wage (which is determined at the beginning of period one), the only relevant component is the liability. That is, the discount that partner 2 can offer by reducing the audit fee must compensate the lost benefit incurred to the complex client. Let $f_1^{ND}(i,j)$ denote partner i's break-even price that he would bid if he worked for client j without partner identification (which is also the same as the headquarters' break-even price). Let d_2 denote partner 2's maximum discount he is willing to offer (we will derive this shortly). The complex client would accept the offer from partner 2 if the presence of d_2 generates a greater payoff when receiving audit from partner 2 than the payoff from partner 1 as follows:

$$
\begin{aligned}
& pV' + (1-p)(1-\mu(\gamma_2,c))I + (1-p)\mu(\gamma_2,c)L - (f_1^{ND}(2,c) - d_2) \\
& > pV' + (1-p)(1-\mu(\gamma_1,c))I + (1-p)\mu(\gamma_1,c)L - f_1^{ND}(1,c) \\
& \Leftrightarrow d_2 > (1-p)(\gamma_1-\gamma_2)\Delta\mu(c)(I-L) + (f_1^{ND}(2,c) - f_1^{ND}(1,c)), \qquad (13)
\end{aligned}
$$

where $f_1^{ND}(i,c)$ is determined by (from expression (12)):

$$f_1^{ND}(1,c)+f_1^{ND}(2,s)=(1-p)L(\mu(\gamma_1,c)+\mu(\gamma_2,s))+2\omega(\gamma_{HQ}) \text{ for } f_1^{ND}(1,c),$$
$$f_1^{ND}(1,s)+f_1^{ND}(2,c)=(1-p)L(\mu(\gamma_1,s)+\mu(\gamma_2,c))+2\omega(\gamma_{HQ}) \text{ for } f_1^{ND}(2,c).$$

For each $f_1^{ND}(i,c)$, we have two audit fee variables for one equation, thus, there are infinitely many possible audit fee combinations. Without loss of generality, we assume that audit fee is split fairly so that it is the expected liability plus the partner's reservation wage pertaining to that client. Thus,

$$f_1^{ND}(1,c)=(1-p)L\mu(\gamma_1,c)+\omega(\gamma_{HQ}),$$
$$f_1^{ND}(2,c)=(1-p)L\mu(\gamma_2,c)+\omega(\gamma_{HQ}).$$

Then, $(f_1^{ND}(2,c)-f_1^{ND}(1,c))=(1-p)L(\gamma_1-\gamma_2)\Delta\mu(c)$ and the condition (13) can be written as:

$$d_2>(1-p)(\gamma_1-\gamma_2)\Delta\mu(c)I. \tag{14}$$

The right hand side captures the lost benefit from audit service for the complex client upon accepting the distorted offer from partner 2. That is, the offered discount from partner 2 must be greater than the lost benefit from audit service for the complex client.

We now derive the threshold L^P below which partner 2 is willing to underbid. Partner 2's willingness to underbid is important because without partner 2's underbidding, partner 1 does not have to worry about matching with the complex client. Recall that the sharing rule in period one is 1/2. For partner 2 (who wants to minimize period one liability but at the same time maximize the chance of career advancement) to have incentive to underbid, it must be the case that the increased outside option in period two is greater than the incremental expected liability in period one due to distortion. Formally,

$$\begin{aligned}&-\frac{1}{2}(1-p)L(\mu(\gamma_1,s)+\mu(\gamma_2,c))+T(u,2)\\&\qquad\qquad>-\frac{1}{2}(1-p)L(\mu(\gamma_1,c)+\mu(\gamma_2,s)),\end{aligned}$$

here, as in the headquarters' case, when partner 2 compares two assignment rules, the equilibrium audit fees do not appear because they are determined by the partners' break-even conditions and partners bid in order to minimize the liability they bear. Rearrange this and use that $\mu(\gamma_2, j) - \mu(\gamma_1, j) = (\gamma_1 - \gamma_2)\Delta\mu(j)$, we have

$$T(u,2) > \frac{L(1-p)}{2}(\gamma_1 - \gamma_2)(\Delta\mu(c) - \Delta\mu(s)).$$

Thus, partner 2's maximum discount, d_2, is:

$$d_2 = T(u,2) - \frac{L(1-p)}{2}(\gamma_1 - \gamma_2)(\Delta\mu(c) - \Delta\mu(s)).$$

That is, partner 2 is willing to bid by $f_1(2,c) = f_1^{ND}(2,c) - d_2$. Rearrange inequality (14) to derive a condition for L,

$$\begin{aligned} & d_2 > (1-p)(\gamma_1 - \gamma_2)\Delta\mu(c)I \\ & \Leftrightarrow L < \frac{2}{\Delta\mu(c) - \Delta\mu(s)}\Big(\frac{u(\lambda - \omega)(1 - \mu(h,c))\gamma_2}{\gamma_1 - \gamma_2} - \Delta\mu(c)I\Big) \equiv L^P. \end{aligned} \tag{15}$$

Thus, if $L < L^P$, partner 2 is willing to underbid up to d_2 and the complex client would be willing to accept if partner 1 had not offered any discount.

Recall that $T(u,1) > T(u,2)$. Thus, partner 1 is willing to offer a greater discount. Given that partner 2 is willing to discount audit fee, say by d_2 for the complex client, partner 1 must offer the discount d_1 such that the complex client is indifferent between the two offers:

$$\begin{aligned} & pV' + (1-p)(1 - \mu(\gamma_2, c))I + \mu(\gamma_2, c)L - (f_1^{ND}(2,c) - d_2) \\ & = pV' + (1-p)(1 - \mu(\gamma_1, c))I + \mu(\gamma_1, c)L - (f_1^{ND}(1,c) - d_1) \\ & \Leftrightarrow d_1 \equiv d_2 - (1-p)(\gamma_1 - \gamma_2)\Delta\mu(c)I. \end{aligned}$$

Since $L < L^P$, we have $d_1 \geq 0$. In principle, partner 1 may offer the discount greater than d_1, however, given that the partners want to maximize their payoffs, there is no incentive for partner 1 to bid further below $f_1^{ND}(1,c) - d_1$. Since $T(u,1) > T(u,2)$ and $T(u,2) > d_1$, partner 1 enjoys a strictly positive benefit from the expected career advancement (even though the discounted offered price is less than his break-even price without career advancement). For given offered prices by both partners, the complex client prefers partner 1 to partner 2 for discount $d_1 + \epsilon$ for any $\epsilon \geq 0$ made by partner 1. Since $f_1(1, c) = f_1^{ND}(1, c) - d_1$, where $f_1^{ND}(1, c)$ is the headquarters' break-even price, the equilibrium audit fee for the complex client is less than the headquarters' break-even price. Lastly, auditing for the simple client does not generate any benefit. Thus, the audit fee for the simple client is the same as that under non-disclosure regime, which guarantees the reservation utility for the simple client, thus accepted.

Stability. We now show that, with the audit fees found above and for $L < L^P$, the assignment in which partner 1 audits the complex client and partner 2 audits the simple client is stable. First, notice that both partners prefer the complex client most: partner 1 prefers the complex client because it minimizes the total expected liabilities and expands career advancement; partner 2 prefers the complex client although it increases the expected liabilities he bears, the expected benefit of career advancement exceeds such liabilities (Inequality (15)). Thus, initially, both partner 1 and partner 2 make an offer to the complex client. Then, the complex client tentatively accepts partner 1 due to the underbid price and rejects partner 2. Then, partner 2 makes an offer to the simple client, in which case the simple client accepts. Since there is no more rejection or offer, this tentative assignment is stable, thus an equilibrium.

Higher discount to price-protect. We show that this proof remains the same even if the complex client price-protects himself by asking a greater discount from partner 1 due to period two consequence. The maximum discount partner 1 can offer is $T(u, 1)$. Partner 1 has to offer the discount that covers increased cost for the complex client in period two due to partner 1's career advancement minus any cost borne by the client due to the cost from low audit quality (from partner 2):

$$d_1' = T(u, 1) - (1 - p)(\gamma_1 - \gamma_2)\Delta\mu(c)I.$$

Since two partners strictly prefer the complex client, it is sufficient to show that both partner

1 and the complex client do not have any incentive to deviate. First, given the discount offer d_1', the complex client is indifferent, thus taking partner 1's offer. Second, by offering d_1', partner 1 enjoys strictly positive benefit (by $T(u, 1) - d_1'$) from auditing the complex client. Offering discount is the same as transferring increased outside option in period two to period one. However, due to superior audit quality of partner 1, he does not need to fully compensate the complex client who cares about period two.

Total audit fees. Let $AF = \sum_{t=1,2} \sum_{i=1,2} f_t(i, a_t(i))$ denote the total audit fees over two periods. We compare $E[AF|D]$ (under the disclosure regime) to $E[AF|ND]$ (under the non-disclosure regime). The total audit fees consist of 1) expected liability, 2) partners' reservation wages, and 3) fee discounts, if any. Since in both periods, the assignment is $a_t(1) = c, a_t(2) = s$ for $t = 1, 2$, the total expected liability is the same in both disclosure and non-disclosure regimes. We showed that the partners' reservation wages (in period one and two) are greater under the disclosure than non-disclosure (Lemma 3). As for an audit fee discount d_1 (or d_1') in period one under the disclosure regime, partner 1 offers the discount which is strictly less than the expected benefit of his career advancement. The total audit fees under the non-disclosure regime contains neither the benefit of career advancement nor the audit fee discount. Thus,

$$E[AF|D] - E[AF|ND] = T(u, 1) - d_1 > 0.$$

Here, the inequality is always satisfied (even if d_1 is replaced by d_1'). To understand the intuition, first note that partner 1's discount is always less than partner 2's, because the former can deliver higher audit quality to the complex client than the latter. Second, partner 2 bears incremental liability when he bids for the complex client. This suggests that partner 2 cannot lower the audit fee up to $T(u, 2)$, that is, $d_2 < T(u, 2)$. Lastly, recall from Proposition 1 that the expected talent retention cost is always greater for partner 1 than for partner 2: $T(u, 2) < T(u, 1)$. Taken together, we have:

$$d_1 < d_2 < T(u, 2) < T(u, 1).$$

Therefore, the total audit fees over two periods is higher with the partner identification disclosure than without disclosure.

Next, we illustrate the mechanisms in more detail. If partner 1 audits the complex client, he can better detect bad projects than the partner 2. Hence, the client can enjoy a benefit resulting from a higher likelihood of avoiding investing in a bad project if hiring partner 1. Now suppose partner 2 offers a discount that can be greater than the expected benefit difference from avoiding investing in a bad project. Then partner 1 only needs to offer a discount to be the difference between partner 2's discount and the reduction of expected benefits so that the client is indifferent. This is because partner 1 can provide such a benefit difference due to higher ability.

□

A.12 Proof of Proposition 5

It is immediate to see that

$$\begin{aligned}
\frac{\partial L^P}{\partial u} &= \frac{2}{\Delta\mu(c)-\Delta\mu(s)}\frac{(\lambda-\omega)(1-\mu(h,c))\gamma_2}{\gamma_1-\gamma_2} > 0,\\
\frac{\partial L^P}{\partial \lambda} &= \frac{2}{\Delta\mu(c)-\Delta\mu(s)}\frac{u(1-\mu(h,c))\gamma_2}{\gamma_1-\gamma_2} > 0,\\
\frac{\partial L^P}{\partial \mu(h,c)} &= \frac{2}{(\Delta\mu(c)-\Delta\mu(s))^2}\Big(\frac{u(\lambda-\omega)(1-\mu(l,c)+\Delta\mu(s))\gamma_2}{\gamma_1-\gamma_2} - \Delta\mu(s)I\Big),\\
\frac{\partial L^P}{\partial \gamma_2} &= \frac{2u(\lambda-\omega)(1-\mu(h,c))\gamma_1}{(\gamma_1-\gamma_2)^2(\Delta\mu(c)-\Delta\mu(s))} > 0.
\end{aligned}$$

Here, $\frac{\partial L^P}{\partial \mu(h,c)} > 0$ if $I < \frac{u(\lambda-\omega)(1-\mu(l,c)+\Delta\mu(s))\gamma_2}{\Delta\mu(s)(\gamma_1-\gamma_2)}$, otherwise, $\frac{\partial L^P}{\partial \mu(h,c)} \leq 0$.

□

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