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Abstract

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This paper develops a basic two period audit pricing model in which clients learn audit quality either through experience or through signalling by auditors. Clients may switch to other auditors in the second period if it is profitable for them to do so, and the auditors' expected costs are a function of the anticipated liability for negligent errors. The probability that such errors will be discovered increases if clients switch auditors. Under such circumstances, we find that the pricing strategy employed depends on the auditor type, the audit client and the nature of the audit market.

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Keywords: audit pricing, low-balling, liability, adverse selection

1 Introduction

This study explores the connection between two contentious issues in the audit services market: lowballing and liability. Lowballing - the practice whereby auditors charge initial engagement fees below cost in order to obtain business - has been criticised on the grounds that it may reduce competition in the audit market and impair audit independence [AICPA, 1978]. Professional liability emerged in the mid-1980s as a serious threat to the continued existence of auditing firms [Gwilliam, 1987, 1992; Narayanan, 1995]. Recent corporate failures such as BCCI, Polly Peck, Mirror Group, Independeent Insurance, and ENRON have been accompanied by allegations of negligence against the failed companies' auditors. Indeed, there have been a number of recent examples of auditing firms incurring significant liability-related payments [see Grout, Jewitt, Pong & Whittington, 1994 and Napier, 1998 for some examples]. Whilst the possibility of lowballing has been explicitly addressed in the accounting literature [DeAngelo, 1981; Simon & Francis, 1988; Ettredge & Greenberg, 1990; Kanodia & Mukherji, 1994; Pong & Whittington, 1994; Calegari et al, 1998], the impact of liability on audit pricing strategy over time has been largely ignored.

Of particular interest is the effect of liability on pricing repeated audit contracts. The nature of professional audit work suggests that audit error is not discovered for some time after the work is performed. An auditor's exposure to the costs of audit error (liability awards and settlements) is a function of the extent of auditor quality and the likelihood of any errors being discovered. In general, detection of audit error takes place in two main ways: 'random' and 'investigative'. Random detection only arises if an event occurs which necessitates external monitoring of the quality of the auditor's work, such as client insolvency, public offering or some form of

corporate restructuring. It is important to realise that, even in these cases, the discovery of auditor error results from the intervention of another audit firm. Investigative detection, on the other hand, arises when the auditor loses the contract and its work is subsequently reviewed by a competitor. An important method of reducing the cost of investigative audit error is to retain the audit contract.

Previous contributions to the theoretical literature on auditor liability have emphasised the 'hidden action' (moral hazard) aspects of the auditor-client relationship. Recent examples of this approach are Narayanan [1994], Simunic & Stein [1996], and Schwartz [1997] in which the auditor's expected litigation costs are inversely related to auditor effort, and this relationship is shown to be weaker under a joint and several liability regime than under a proportionate liability regime. In this paper we are concerned instead with the 'hidden information' (adverse selection) aspects of the relationship, and its implications for audit quality and audit fees. As such our contribution should be distinguished from those hidden information models which stress the *clients'* private knowledge about their financial state and the potential for audits as signals of client quality [Balachandran and Nagarajan, 1987; Nelson, Ronen & White, 1988; Melumad & Thoman, 1990; Dye, 1991; Teoh, 1992; Kanodia & Mukherji, 1994]. We are rather concerned with the *auditors'* private knowledge of their own quality (for example, see Frantz [1999]), and the potential for the audit fee structure to be used as a signal of auditor quality, as well as a device to reduce the likelihood of litigation.

This paper is structured as follows. The following section develops a basic two period audit pricing model under a Wilson-type competitive equilibrium in which clients learn audit quality either through experience or through signalling by auditors. Clients may switch to other auditors in the second

period if it is profitable for them to do so, and the auditors' expected costs are a function of the anticipated liability for discovered errors. Section 3 gives some illustrative fee structures for a simple example, in which both highballing and lowballing strategies are predicted. Section 4 discusses some of the implications of our results for the audit market.

2 Audit Pricing Strategies with Unobservable Auditor Quality

This section explores the combined impact of these factors on the nature of competition between auditors for an audit contract, and on equilibrium audit fees. We assume that auditor quality is unobservable and varies between auditors, but that this quality is predetermined and unalterable (that is, we ignore moral hazard issues arising from the auditor's choice of care).

Auditor quality is difficult to observe, but can be judged by clients to some extent following experience of the audit [De Angelo, 1981; Grout, Jewitt, Pong & Whittington, 1994]. For this reason, the dynamics of audit pricing may be influenced by the process of learning over time by clients, and by the use of fees by auditors to signal quality. However, the full extent of audit error is something which is normally only verifiable by other auditors, given the complex nature of the audit process. Lys & Watts [1994, p70] posit that "auditor changes are associated with the likelihood of a lawsuit against both the previous auditor (if prior financial statements are found to be misleading) and the new auditor (if he/she acquiesces to management's desire not to correct the mis-statements)". Consequently an additional influence on fees over time is the adoption of defensive strategies by auditors who are reluctant to expose their auditing practice to external scrutiny and potential liability.

A two-period model of the audit market is developed in which auditors achieve a basic Wilson-type competitive equilibrium in the first period, and clients learn about auditor quality. In the second period clients may then choose to switch auditors, and audit fees are set to take account of the possible discovery of auditor error in the first period.

The model suggests that a variety of equilibria. and audit pricing strategies are feasible depending on the complexity of audit process and the range of auditor types.

2.1 One period model

Consider a competitive market for auditors in which auditors vary in quality, but such quality differences are exogenous and are not determined by auditors on a discretionary basis (a one-period model on a similar basis has recently been explored by Frantz [1999]) . Auditor quality is not observable by clients until after they have experienced the auditor's work. High (H) quality auditors make fewer errors than low (L) quality auditors, but have higher audit costs ($c_H > c_L$).

Shareholders buy the services of auditors in order to mitigate the information asymmetry between themselves and managers [Jensen, 1983]. The latter have an incentive to over-report firm earnings/value[1], and thus receive higher financial compensation. The main task of the audit is to detect such over-reporting, and audit error in this context is the failure to detect this behaviour (as was the case, for example, in the well-known UK case of Caparo Industries v. Dickman & others, 1990 - see O'Sullivan, [1993]). Hence

[1] A situation sometimes termed 'inherent risk'. Helliar et al, [1996] find that auditors believe this over-reporting is more likely to occur in companies where management bonus schemes are tied to reported earnings.

if the audited value is v^a and the reported value is v^r then the benefit to the shareholder from this aspect of the audit is $V = \alpha(v^r - v^a)$ - this represents the value shareholders obtain from the verification or monitoring role of the auditor [Antle, 1982]. The constant α represents the proportion of firm value which goes to managers through incentive contracts. If an audit fails to detect the over-reporting we assume that $v^a = v^r$ and thus that the value of the audit is zero.

Let π_i be the probability that the auditor of type i detects the over-reporting behaviour by the company management. Because, by assumption, H auditors make fewer errors than L auditors, we hold that $\pi_H \geq \pi_L$ [2]. Clearly π_i depend on the complexity involved in the audit contract as well as the quality of the auditor, and can be expected to differ in size between one contract and another. Simunic [1980, p172] notes that loss exposure from audit error can be expected to increase the more complex is the auditee's operations. Complex audit contracts are likely to involve clients with a greater degree of decentralisation and diversification, or with assets and/or liabilities which are difficult to value accurately. To explore this concept a little further, let the variable $\gamma \geq 0$ denote the complexity of a given audit contract, where larger values of γ denote more complex contracts. For example, γ could denote the number of different industries in which the company operates or the difficult-to-value assets as a proportion of total assets[3]; since π_i declines with complexity, we require $\partial\pi_i/\partial\gamma = \pi_i' \leq 0$.

In the case of straightforward, non-complex contracts we anticipate that the probability of detecting over-reporting behaviour will be similar for both

[2] Wilson [1983] notes that one key aspect of auditor reputation is the ability to detect over-valuation.

[3] Simunic [1980] proxies complexity by the number of 2-digit industries and the ratio of foreign to total assets

high and low quality auditors (ie $\pi_H = \pi_L$ when $\gamma = 0$). However, as complexity increases low quality auditors will find it increasing difficult to detect over-reporting in relation to their H quality competitors so that $\pi'_L < \pi'_H \leq 0$. Thus in the case of non-complex contracts, we expect π_H and π_L to be near unity and similar in size; however, for more complex contracts π_H and π_L will be lower with a widening gap between them.

We assume that there are barriers to entry into the audit profession which ensure that the market is not flooded with L auditors so that the proportion of H auditors in the market remains a constant p_H. If shareholders know that they cannot distinguish between H and L auditors before agreeing a contract, the maximum they are willing to pay as an initial engagement audit fee is $p_H \pi_H V + (1 - p_H)\pi_L V$. Normalising financial variables such that $V = 1$, we can rewrite this maximum willingness to pay as $p_H \pi_H + (1 - p_H)\pi_L$.

If $p_H \pi_H + (1-p_H)\pi_L \geq c_H$ then all auditors will bid for the audit contract (as profits are feasible) and competition will force the initial engagement fee down. The impact of competition on the audit market under asymmetric information depends on the behaviour of the L auditors. We assume that L auditors cannot offer profitable contracts if they enter into unrestricted competition only with each other; in other words L unit costs are sufficiently high, due perhaps to the need the comply with minimum audit standards, that $c_L > \pi_L$[4]. The one-period equilibrium is thus a Wilson type whereby L auditors will not offer contracts that become unprofitable if H auditors are unable to bid [Wilson, 1980]. In the resulting one-period pooling equilibrium, neither L nor H auditors bid the initial engagement fee down below c_H (so

[4]If π_L is sufficiently large that $c_L < \pi_L$ (which might be the case if the audit is straightforward, and both π_i are near unity) then the contract will always be won by the auditors with the lower costs (ie the L auditors) ie a separating equilibrium in which L auditors alone supply the contract

long as $c_L > \pi_L$) but L auditors obtain rent from their private information whereas H auditors do not. If $p_H\pi_H + (1-p_H)\pi_L < c_H$ then no auditors will bid for the contract (the classic "lemons" problem)[5].

Of course, it is likely that some of the audit errors made will be detected as a result of random factors such as insolvency or takeover [for example, see St. Pierre & Anderson, 1984; Stice, 1991; Lys & Thomas, 1994]. We term this the 'random' detection of audit error. Consequently, all auditors must assume that some proportion of shareholder value appropriated by managers but not detected, $1 - \pi_i$, will be returned to the shareholders through court-determined expectation damages[6]. If the probability of an error being detected and recovered in this way is q, then the expected damages under a strict liability rule are $q(1 - \pi_i)$. Thus under strict liability shareholder value from an audit of quality i is given by $\pi_i + (1 - \pi_i)q$. It follows that the one-period equilibrium fee in this market (if auditors are risk neutral and not judgement proof[7]) is $c_H + (1 - \pi_H)q$, so long as $p_H(\pi_H + (1 - \pi_H)q) + (1 - p_H)(\pi_L + (1 - \pi_L)q) \geq c_H + (1 - \pi_H)q$.

With a negligence rule, damages are only awarded if the auditor is found not to have delivered a standard of care which would reasonably be expected from a professional auditor [Balachandran & Nagarajan, 1987; Simunic &

[5] Note that solving the lemons problem by means of screening with price-quantity competition is not feasible here, given the indivisible nature of the audit contract

[6] We ignore the possibility that managers would also be held liable in the event that errors made by a previous auditor were revealed. The effect of managerial liability on the audit fee structure will depend on the way in which liability is shared between managers and auditors [Nelson, Ronen & White, 1988; Dopuch, King & Schatzberg, 1994; Narayanan, 1994, Schwartz, 1997, Napier, 1998]

[7] A risk neutral client will value the auditor's purchase of professional indemnity insurance (at actuarially fair rates) to the extent that it prevents the auditor from being judgement proof [Faure & Van den Bergh, 1989; Skogh, 1991]

Stein, 1996]. For convenience we assume that the H auditor represents this standard of care, whereas the L auditor falls short of it. We rule out the possibility that H quality auditors may still be sued - nothwithstanding the demonstration that they conducted the audit in accordance with accepted standards [for a discussion of this problem see Dye, 1995; Willekens, Steele & Miltz, 1996; Frantz, 1999][8]. Consequently, under a negligence rule the L auditor faces an expected cost of $(1-\pi_L)q$ while the H auditor expects no liability. Shareholder value for an H audit is π_H, and for an L audit is $\pi_L + (1-\pi_L)q$ where the second term represents the expected value that shareholders obtain from the risk-sharing or so-called 'insurance' role of the auditor [Beattie & Fearnley, 1995; Schwartz, 1997][9]. We also rule out the possibility raised by Grout et al [1994] and Schwartz [1997] that potential auditor liability incentivises clients to enter into risky transactions. The equilibrium fee will therefore be c_H so long as this is less than the shareholders' *ex ante* value of audit quality, which is given by $p_H\pi_H + (1-p_H)(\pi_L + (1-\pi_L)q)$[10].

The existence of an audit contract in a one period model with unobservable auditor quality for an audit of complexity (π_L,π_H), and the nature of the resulting audit fee, are summarised in Proposition 1:

[8] The assumption that H auditors cannot be sued successfully for negligence is in direct contradiction to the, rather perverse, assumption made by several authors (such as Firth & Liau-Tan, 1998) that high quality and large (Big 6) auditors are synonymous. Indeed Palmrose [1988] finds evidence for differences in litigation rates among the Big 6 firms

[9] If q were large then the ability of shareholders to recover damages from negligent L auditors dominates the superior verification or monitoring role of the H auditor - a situation which must be regarded as extremely unlikely. Shareholder value for an H quality audit will exceed that for an L audit if q is sufficiently small so that $[\pi_H - (\pi_L + (1-\pi_L)q)] > 0$.

[10] The criteria for a one-period Wilson equilibria then becomes $\pi_L + (1-\pi_L)q < c_L + (1-\pi_L)q$ ie $\pi_L < c_L$ as before

Proposition 1 *Given that the audit market is characterised by a Wilson-type equilibrium where new clients are uninformed of auditor quality, auditors cannot profitably signal their quality, and damages are determined by the negligence rule, there are three possible alternatives for the initial engagement fee on a given audit contract characterised by* (π_L,π_H)*:*

(1) a separating equilibrium where the audit costs of low-quality auditors are sufficiently small ($c_L \leq \pi_L$) *that high quality auditors do not bid for the audit contract, and the audit fee is set at the level of the low-quality audit costs ie* $c_L + (1 - \pi_L)q$*, or*

(2) a non-existent equilibrium, since although the costs of low quality auditors are higher (ie $c_L > \pi_L$*), no auditor is able to bid for the contract because average auditor quality is too low (ie* $c_H > p_H\pi_H + (1-p_H)(\pi_L + (1-\pi_L)q)$*), or*

(3) a pooling equilibrium where both low and high-quality auditors bid for the contract (ie we have $c_L > \pi_L$ *and* $c_H \leq p_H\pi_H + (1-p_H)(\pi_L + (1-\pi_L)q)$*), and all auditors charge the same initial engagement fee determined by the high-quality audit costs* c_H*.*

2.2 Two period model with learning

Consider now a two period model in which shareholders are able to learn the auditor's quality during period 1, for example, by observation of the detail and quantity of audit evidence gathered by the audit team [Wilson,1983; Elitzur & Falk, 1996]. However, at the beginning of period 1 shareholders are uninformed, and in the absence of signalling possibilities, the equilibrium remains as in the one period model discussed above. Assume a negligence liability rule and that $\pi_L < c_L$ so that the equilibrium first period fee is c_H - all auditors will therefore bid for the contract.

At the end of period 1, shareholders become aware of the quality of their current auditor (but not whether or not an audit error has been made), and the auditor must then make a decision about the period 2 fee. Clients of H auditors will be willing to pay up to π_H for a second period audit, whereas if they moved to another auditor their maximum expected value would be $p_H\pi_H + (1-p_H)(\pi_L + (1-\pi_L)q)$. Consequently they will stay with their current auditor provided that

$$\pi_H - f_H \geq \{p_H\pi_H + (1-p_H)(\pi_L + (1-\pi_L)q)\} - c_H \tag{1}$$

where f_H is the auditor's second period fee[11]. It follows that a profit-maximising auditor which is constrained by competition from other auditors (of unknown quality) will charge a fee of

$$f_H = c_H + (1-p_H)[\pi_H - (\pi_L + (1-\pi_L)q)] \tag{2}$$

That is, the second period fee will be uplifted relative to the first period fee by an amount reflecting the informational rent which has now been acquired (i.e. a "lowballing" strategy). However, because under a negligence rule L auditors provide 'insurance' benefits arising out of the recovery of undetected errors, it is possible that the second term on the right hand side of (2) is negative[12]. For this reason we should also consider a participation constraint for H auditors. The H auditor will only provide a service in the second period if

$$f_H \geq c_H \tag{3}$$

Consequently (2) and (3) together define the maximum equilibrium second period fee that can be charged by an H auditor. It follows that the

[11] We ignore the possibility here that company management will be less inclined to over-report value once the auditor is known to be H quality

[12] Although, as noted above, it is unlikely that $[\pi_H - (\pi_L + (1-\pi_L)q)] \leq 0$

H auditor will either pursue a lowballing strategy and retain the audit contract[13], or will provide audit services only in period 1. However, because the H auditor is not negligent by assumption, the possibility of a client transferring to another auditor in period two raises no liability fears. The nature of the second period fee for high-quality auditors is then summarised in Proposition 2:

Proposition 2 *Given that the audit market is characterised by a Wilson-type equilibrium where new clients are uninformed of auditor quality, auditors cannot profitably signal their quality, and damages are determined by the negligence rule, high-quality auditors will retain the audit contract - characterised by (π_L,π_H) - in the second period if and only if* $\pi_H - (\pi_L + (1 - \pi_L)q) \geq 0$

Proof. From Equation (3) the H auditor will only retain the contract if and only if $f_H \geq c_H$. This will be the cases iff $\pi_H - (\pi_L + (1 - \pi_L)q) \geq 0$ (from Equation (2)). ■

If follows from Proposition 2 that the H auditors will undertake a lowballing pricing strategy (so that their second period fee will equal or exceed unit costs c_H) if the probability of random detection of audit error and/or the probability that the L auditor will detect any over-reporting are sufficiently small.

Clients of L auditors will be willing to pay up to $\pi_L + (1 - \pi_L)q$ for a second period audit. Given the possibility that it may lose the contract, the L auditor will need to take into account the likelihood that a new auditor will detect any errors that L has made in the first period [Lys & Watts, 1994]

[13] Arruñada & Paz-Ares [1997] cite empirical evidence which indicates that audit error declines with audit tenure (pp 46-7): this behaviour may arise because high-quality auditors are more likely to be retained

- this is termed the 'investigative' detection of audit error. For example, in the process of examining the firm's financial accounts, the new auditor may need to check the previous year-end estimates of assets and liabilities, and may even have access to the working papers of the prior auditor. By assumption, these are negligent errors for which the prior auditor will be held liable (and which were not previously subject to 'random' detection)[14]. Let the probability of an error being detected in this way be q'. As these errors will only be detected if the new auditor is of type H, clients of L auditors will remain with that auditor only if

$$\pi_L+(1-\pi_L)q-f_L \geq \{p_H(\pi_H+(1-\pi_L)(1-q)q')+(1-p_H)(\pi_L+(1-\pi_L)q)\}-c_H \tag{4}$$

The profit maximising L auditor will therefore charge a second period fee of

$$f_L = c_H - p_H[\pi_H - (\pi_L + (1-\pi_L)q] - p_H(1-\pi_L)(1-q)q' \tag{5}$$

That is, for an L auditor, the second period fee may possibly be reduced relative to the first period fee by an amount reflecting the client's perceived chance of obtaining improved value elsewhere (a "highballing strategy"). This strategy is reinforced by the fear of the investigative detection of first-period audit error[15]. Moreover, the participation constraint for the L auditor requires that any second period loss from retaining the client must be no greater than the expected damages resulting from a change in auditor. That

[14] Barnes [1989] cites the case of Bambers Stores plc where the overvaluation of assets was only uncovered when a report was commissioned from a firm of investigating accountants. Following liquidation of Bamber Stores a writ for negligence was issued against its directors and auditors.

[15] In their survey of UK listed companies, Beattie &Fearnley [1995] noted that a negotiated reduction in the audit fee was the major reason explaining why companies did *not* change auditors

is,

$$c_L + (1 - \pi_L)q - f_L \leq (1 - \pi_L)(1 - q)q' \tag{6}$$

Rearranging this, we require that

$$f_L \geq c_L + (1 - \pi_L)(q - q'(1 - q)) \tag{7}$$

The implications for the second-period audit fee charged by low-quality auditors are given in Proposition 3:

Proposition 3 *Let the audit market be characterised by a Wilson-type equilibrium where new clients are uninformed of auditor quality, auditors cannot profitably signal their quality, damages are determined by the negligence rule, and low-quality auditors can win an initial engagement. The L auditors will be able to retain an audit contract characterised by the pairing (π_L,π_H) if and only if* $\pi_H \leq \pi_L + \frac{c_H - c_L}{p_H} - p_H(1 - p_H)(1 - \pi_L)\{q - (1 - q)q'\}$

Proof. This follows from the requirement that the second period fee in Equation (5) should exceed the participation constraint in Equation (7) ■

Corollary

A sufficient condition that L auditors fail to retain their audit contracts in the second period is:

(1) the proportion of high-quality auditors (p_H), and the probability of random detection of audit error (q) are sufficiently large, and/or

(2) the probability of detecting over-reporting by L auditors (π_L) and the probability of investigative detection of audit error (q') are sufficiently small

Proof. The low-quality auditors will fail to retain the audit contract if the second-period fee established in Equation (5) is less than the participation constraint (7) when parameters are set at feasible levels. This condition can

be rewritten as $c_H - p_H\pi_H + p_H(\pi_L + (1-\pi_L)q) < c_L + (1-\pi_L)q - (1-p_H)(1-\pi_L)(1-q)q'$.

However Proposition 1 (3) requires $\pi_L + (1-\pi_L)q \geq c_H - p_H\pi_H + p_H(\pi_L + (1-\pi_L)q)$ and $c_L \geq \pi_L$ so the condition will certainly hold if $\pi_L + (1-\pi_L)q < c_L + (1-\pi_L)q - (1-p_H)(1-\pi_L)(1-q)q'$.

Thus L auditors will fail to renew their contracts if $(1-p_H)(1-q)q' < \frac{c_L - \pi_L}{1-\pi_L}$. ■

Proposition 3 and its corollary raise the possibility that the client of an L auditor may refuse the offer of a second period contract and instead choose to re-enter the pool. Indeed a survey of 210 listed UK companies, Beattie & Fearnley [1995] confirmed that dissatisfaction with auditor quality - which was defined in terms of the auditor's inability to detect problems - was the second most cited reason for considering a change of auditor (the first was the level of the audit fee).

Taken together Propositions 2 and 3 raise interesting possibilities about the ability of H and L auditors to renew their contracts in period two, and these are explored in the following corollary:

Corollary

Both H and L auditors may be able to renew their audit contracts if π_L lies within the following range

$$\frac{\pi_H - q}{1-q} \geq \pi_L > \frac{c_L - (1-p_H)(1-q)q'}{1-(1-p_H)(1-q)q'} \qquad (**)$$

If the contracts are renewed H auditors will undertake a lowballing strategy; L auditors on the other hand will operate a highballing strategy whereby their second period fee in Equation (5) is set below the first period fee of c_H

Proof. The range follows from Propositions 2 and 3. The condition

for highballing in the L auditor's fee is satisfied under the conditions of Proposition 2. ■

The impact of possible investigative discovery therefore has an interesting impact on the L auditors. In cases where the probability of investigative discovery q' is sufficiently large, the feasible range for L auditors to retain the contract is widened.

2.3 Two period model with signalling

Thus far we have assumed that the H auditors are not capable of signalling their quality prior to period 1. However, the literature on repeat purchasing has emphasised the potential for "introductory offers" as a possible signal of quality [Milgrom & Roberts, 1986][16]. In this context, the auditor may be able to signal its quality to potential clients by deliberately making a loss on period 1 contracts, secure in the knowledge that an informational rent will be earned in period 2 (that is, the H auditor may be able to win custom from L auditors by deliberately exaggerating the lowballing strategy described above).[17] However, for this to be feasible, it should not be possible for L auditors to profitably copy this strategy. That is, the fee charged by H auditors in period 1 must be less than $c_L + (1 - \pi_L)q$, because L auditors, unable to make profits once their quality has been revealed in period 2, will not supply an audit if they cannot make profits in period 1.

Consequently, providing that H auditors can make profits taking the two periods together when charging a fee of $c_L + (1 - \pi_L)q$ in the first period, this

[16] Bagwell [1987] shows how introductory offers can also be used to signal private information about producer cost, and hence second period price

[17] Tirole [1988] demonstrates that this is formally equivalent to using "wasteful expenditure" as a signal of quality

represents a revealing equilibrium in which only H auditors provide audits. This condition therefore requires that

$$c_L + (1-\pi_L)q - c_H + \delta\{c_H + (1-p_H)[\pi_H - (\pi_L + (1-\pi_L)q)]\} - \delta c_H \geq 0 \quad (8)$$

where $\delta \in [0,1]$ is the discount factor, and the term in $\{\}$ represents the maximum period two fee (Equation (2)). Clearly, a signalling equilibrium of this kind is generally characterised by an extreme form of lowballing strategy, with a loss-making fee in the first period. Moreover since L auditors cannot bid for the contract, clients are always retained in period two; therefore the possibility of investigative detection of audit error as a result of a review by new auditors plays no role in determining the fee structure.

The existence of a signalling equilibrium is summarised in Proposition 4:

Proposition 4 *H auditors will signal their quality in period one, and therefore make it impossible for L auditors to secure the contract, if and only if* $c_L + (1-\pi_L)q - c_H + \delta(1-p_H)[\pi_H - (\pi_L + (1-\pi_L)q)] \geq 0$

Proof. Follows from Equation (8) ■

2.4 A summary of audit pricing strategies

The previous sections have discussed the existence of audit contracts with unobservable auditor quality for an audit of complexity (π_L,π_H), and the nature of the resulting audit fee. Propositions 1 to 4 identify six alternative scenarios depending on the nature and complexity of the audit contract, the costs and quality of auditors, and the composition of the audit market as follows:

1. Clients will not choose to use any auditor voluntarily. This is the classical lemons problem whereby clients cannot tell the difference between low and high quality auditors, and the average audit quality is too low to make selection of an auditor 'at random' worthwhile. In these circumstances (ie those set out in Proposition 1 (2)), audits will only be undertaken if they are made compulsory.

2. Low quality auditors always gain, and retain, the initial contract. This arises in cases where the audit contract is fairly straightforward (and so can be completed to a satisfactory level even by low quality auditors) and the contract is won by the auditors with the lowest costs. Proposition 1 (1) explains that this will occur if the audit costs of the low-quality auditors are sufficiently small.

3. High quality auditors always gain, and retain, the initial contract. In our model, high quality auditors can only be sure of gaining the initial engagement if they can signal their quality via deep price discounts below cost. The conditions under which this can occur are outlined in Proposition 4.

4. A high quality auditor which secures the initial engagement then retains the contract or renewal. Proposition 2 demonstrates that a client will be reluctant to change auditors once it has learned that the auditor is high quality. The initial engagement fee is then set at cost but the second period fee is higher as the auditor takes advantage of informational rent.

5. A low quality auditor which secures the initial engagement manages to retain the contract on renewal by virtue of substantial fee-cutting in the second period (ie highballing). The incentive to do this arises

principally from the auditor's desire to avoid the risk of discovery of (previous) audit error if it loses the contract. The conditions under which such behaviour is possible are set out in Proposition 3.

6. The last possibility arises when auditors which secure an initial engagement fail to retain the contract. The corollaries arising from Proposition 3 indicates that this is a distinct possibility for low quality auditors. However this possibility is regarded as extremely unlikely for high quality auditors so long as the probability of the random discovery of audit error is sufficiently small[18].

As far as the dynamics of audit prices are concerned, the model explains why some (but not all) audit contracts can involve long-term stable relationships between clients and their auditors: for example, Grout et al [1994] report a survey of 577 UK listed companies over an eight year period which revealed that only 2% of clients switched auditors. This behaviour can arise in those circumstances listed above where high and low quality auditors win and retain the contract (ie in scenarios 2-5). In fact, unless there is a change in those factors which are exogenous in the model (such as audit costs, the audit market, or the value shareholders place on an audit), the model suggests that a change in auditors will only occur when a low quality auditor wins an initial engagement and chooses not to opt for a highballing strategy on renewal.

The following section provides an illustration of the various audit pricing strategies, and the resulting audit fees for different types of audit contract and different levels of auditor quality.

[18] See Proposition 2 and Footnote 9

3 An illustration of audit pricing strategies

To illustrate the possible fee structures that can arise from differing informational assumptions, we can identify a specific audit market in which there are many auditors, with 68% being of type H ($p_H = 0.68$). H auditors have costs per audit of $c_H = 0.7$, whereas L auditors have audit costs of $c_L = 0.45$. The probability that an audit error will be randomly detected is $q = 0.2$, and the probability of the audit error being detected following a change in auditors is $q' = 0.7$. The discount factor is $\delta = 0.95$.

Figure 1 shows the existence of the various audit pricing strategies for audit contracts of varying complexities as specified by the pairing (π_L, π_H) - where $\pi_L \leq \pi_H$ - representing the probabilities that auditors of low and high quality will detect over-reporting behaviour by company management [19]. The probability space is divided into five main regions (labelled (i) - (v)), showing the different feasible pricing strategies generated by Propositions 1-4. Figure 2 illustrates audit pricing behaviour in these five regions by plotting the audit fees against π_L on the assumption that the high quality auditor can detect over-reporting behaviour with probability $\pi_H = 0.85$; the horizontal line at $c_H = 0.7$ shows the costs of the H quality auditors.

The five feasible audit pricing strategies are as follows:

(i) The area to the right of the vertical line $\pi_L = c_L$ represents combinations of π_L and π_H where auditors of low quality and low cost always gain and retain the contract (Proposition 1 (1)). The audit fee in each period is given by f_{Low} so that neither lowballing nor highballing pricing strategies are adopted.

[19] Alternatively for an audit of given complexity, the pairing represents alternative levels of auditor quality available in the audit market

(ii) The situation where no audit contract will be chosen voluntarily is illustrated in Figure 1 by the shaded region under the bold downward diagonal line labelled $\Pi_{H1}(\Pi_L)$ - which is the line $c_H = p_H\pi_H + (1-p_H)(\pi_L + (1-\pi_L)q)$ in Proposition 1 (2) - and to the left of $\pi_L = c_L$. In Figure 2, there is no viable audit fee for either type of auditor below $\pi_L = 0.225$.

(iii) Those combinations of π_L and π_H where high quality auditors can always gain and retain the contract by virtue of their ability to signal quality are shown in Figure 1 by the area above the upward diagonal line $\Pi_{H4}(\Pi_L)$ - which is the signalling condition of Proposition 4 - and also above $\Pi_{H1}(\Pi_L)$. In Figure 2, the first-period signalling fee is shown by $f_{Hsignal}$ and the second-period fee by the higher f_H: however this pronounced lowballing strategy is only viable in the range $0.225 \leq \pi_L \leq 0.335$.

(iv) The circumstances where a low quality auditor can manage to retain the contract on renewal by cutting the second period fee are represented in Figure 1 by area below the line $\Pi_{H3}(\Pi_L)$[20], above $\Pi_{H1}(\Pi_L)$ and to the left of $\pi_L = c_L$. In Figure 2, the first-period fee is given by $c_H = 0.7$ and the second denoted by f_L (which is substantially lower indicating a highballing strategy); however this is only viable for $0.375 \leq \pi_L \leq 0.45$. In this range, high quality auditors which secure the initial engagement (again at the fee $c_H = 0.7$) will retain the contract and charge an increased second-period fee of f_H.

(v) Finally the remaining circumstance is where high quality auditors retain their contracts but low quality ones do not. This is between regions (iii) and (iv) and to the left of $\pi_L = c_L$ in Figure 1[21]. In Figure 2, the

[20] Which is the constraint of Proposition 3 which allows low quality auditors to retain their contracts

[21] This area is completely above the line labelled $\Pi_{H2}(\Pi_L)$ - which shows the minimum combination of π_L and π_H where H auditors always retain their contracts

behaviour only occurs in the range $0.225 \leq \pi_L \leq 0.375$.

4 Conclusion

This paper develops a model of asymmetric information in order to investigate the impact of auditor professional negligence on audit pricing strategies. The majority of literature on audit pricing concentrates, quite properly, on the severe problems that can arise for auditors if they are ill-informed about their client's financial state and/or the readiness of client managers to misrepresent financial information. Thus the existing 'hidden information' models of audit pricing tend to focus on the auditor's lack of information about client inherent risk: in these circumstances, clients have information about their financial state which is hidden from their auditors. Lowballing behaviour is then attributed to the 'purchase' by auditors (in the initial audit engagement) of information on the client's true financial state: clients which are then discovered to be low risk are willing to pay an increased renewal fee, while high risk clients switch auditors. These models are most usefully applied in circumstances where client companies are large and complex, and where auditor technology is inadequate.

However the rapid increase in litigation against auditors in recent years, combined with the sizeable liability awards that have been paid by audit firms adjudged to be negligent, has focused attention on the need to differentiate between auditors in quality terms. This paper therefore concentrates on the case where clients (that is, the owner/shareholders of the audited company) cannot distinguish between auditors of different quality, so that auditors have information about their own quality which is hidden (initially) from their clients.

We assume that there are two types of risk neutral auditor operating in the market - high (H) and low (L) quality: in comparison with L auditors, the monitoring role of H quality auditors provides greater value to their clients in terms of the ability to detect over-reporting of financial performance in the shareholder accounts. On the other hand, under a negligence system, H auditors are rarely found to be in error (never in our model), while L auditors may sometimes act in a negligent manner - and be required to pay compensation based on their failure to detect the over-reporting of true company value. Thus paradoxically, low quality auditors can provide their clients with a risk-sharing or 'insurance' role (via the court award of professional negligence damages) which is denied to H auditors. The predictions of the model therefore depend on the comparative cost (and client valuation) of the two main audit functions: monitoring and risk-sharing.

The model demonstrates that, for a particular audit contract, a wide variety of existence and pricing strategies are possible depending on the nature of the audit contract and the characteristics of the audit market, and suggests an explanation why the majority of audit contracts seem to involve long-term stable relationships between clients and their auditors that does not rest on the usual switching costs arguments.

Under certain conditions, H auditors may be driven out of the market because of clients' inability to recognise quality. On the other hand, if H auditors survive the first period (which will arise as long as the L audit costs are sufficiently high), the model predicts subsequent lowballing behaviour as high quality auditors may be able to charge an increased renewal fee because of the additional value that clients obtain from their high-quality services. In some cases, H auditors may be able to use pronounced lowballing pricing strategies (with initial fees substantially below costs) to signal their quality

and guarantee winning the initial engagement contract.

The model also predicts that hidden information on auditor quality could also produce highballing pricing strategies, as low quality auditors reduce renewal fees to try to prevent their clients from switching audit firms once their L status is revealed. The possibility of auditor professional negligence may exacerbate highballing as L auditors may try to retain clients in order to avoid having their work scrutinised by competitors (since the possibility of an award for damages provides clients with an additional incentive to switch).

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