

**Auditor Independence when Management Attempts to Mislead: A
Rational Economic Analysis**

Paul Barnes*

The ability of the auditor to act independently is tested when a corporation's management and its auditor¹ disagree about the treatment of an item in its financial statements - especially where this has an impact on the perceived value of the corporation. The empirical evidence suggests that the auditor may not always act independently. See for example, Mutchler (1984, 1985), Campisi and Trotman (1985), Krishnan and Krishnan (1996) and Matsumura *et al* (1977). For contrary evidence, see Louvers (1998). The risk of litigation (Farmer *et al.* 1987), the size of the audit fee (Simunic, 1980, Simunic and Stein, 1996) and the risk of losing a client may all influence auditor judgment (Shockley, 1981, Knapp, 1985). This may be made worse if the auditor provides other services (DeAngelo, 1981, Beck *et al.*, 1988, Magee and Tseng, 1990) although there is little empirical support for the decisions in the US to place restrictions on it (Frankel, *et al.*, 2002, DeFond *et al.*, 2002, Ashbaugh *et al.*, 2003, Chung and Kallapur, 2003, Kinney *et al.*, 2004).²

We examine here the economic factors affecting the auditor's independence in a general context when management wishes its financial statements to imply a different (probably higher) overall value to the corporation than that to which the auditor would normally (or should) agree. The paper is arranged as follows. First, we examine the costs and benefits arising to the auditor relating to disagreements with management in the context of a single-person decision theoretic model. We show that, in the absence of transaction costs, the auditor will act independently and, as a result, audited financial statements are unlikely to be biased (in the sense of systematically under- or over-stating the corporation's 'correct' value). However, the

* The author is at the Macquarie University, Sydney, Australia.

¹ Throughout the paper, we refer to an audit firm as 'auditor'. The corresponding pronoun is 'it'.

² See DeFond *et al* (2002) who also cite a large body of research to support the counter-argument

enforcement of the auditor's obligations and duty may not be assured and costless. We, therefore, introduce transaction costs in the form of legal costs arising from a legal action against the auditor for negligence. We show that not only do these create scope, but provide an incentive, for bias although it is unclear whether the size of the bias is large. We then move on to examine by means of a game-theoretic model, the effects of information asymmetry on the strategic interaction between management and auditor. Here, the scope for management to mislead is considerably widened. There are two important instances of information asymmetry which bring this about. One: if the audited financial statements contain misleading or incorrect information, the auditor and management are the only parties likely to know. There is, therefore, a low probability of its detection by others, e.g. shareholders. Two: management has full information about the corporation's financial position and performance but the auditor does not. It is the auditor's task to overcome attempts by management to mislead it and, therefore, investors.³ These instances of information asymmetry provide opportunities for the self-interested auditor to stray into dishonestly. The actions of, and the possible existence of, a 'rogue auditor' ('RA') as opposed to a 'professionally correct auditor' ('PC') in the market for audit services are discussed in the context of a game-theoretic model based on that of Antle and Nalebuff (1991). A feature of their model was the scope for the auditor to conduct further work to resolve differences of opinion. We show here that when management wishes to mislead investors, there is no incentive either for them or the auditor for further audit work – or at least not from a PC. We also show how differences between the auditor and management may be resolved and, if a side payment is involved, how it may be determined. (The term 'side payment' is used here in the technical sense as a means of splitting gains from cooperation in a cooperative game. It does not necessarily suggest the payment of an illegal 'bribe' but, more likely, the payment of additional fees, in some form, to the

that the threat to the auditor's reputation acts is sufficient to protect its independence.

³ The term 'investors' refers to all groups (not just shareholders) who use financial statements to make investment decisions. The corresponding pronoun, 'it' is again used.

auditor). We also show that if the RA agrees to attest to misleading (or ‘rogue’) financial statements, how it may be in its interests to conduct further audit tests. In the final section of the paper we discuss the possible implications of this: notably that, under certain reporting or economic conditions, whether the ‘bad auditors’ will drive out the ‘good auditors’. This is rejected. Instead, the ‘good corporations’ have an incentive to drive out the ‘bad auditors’. In the concluding section of the paper we discuss the main results and briefly examine the policy implications. We review some of the relevant literature in the remainder of this Introduction.

Instead of attempting to resolve these issues empirically or experimentally, our approach is to adopt either a single person or game-theoretic framework with rational players.⁴ As a result, we are able to examine directly the theoretical relationships between the variables under different situations and we are not constrained by what can, and cannot, be observed. Although their interest was not the same as ours, some authors have used a similar approach to study the auditor-client relationship and the game-theoretic model used here is an extension of these. The paper by Antle and Nalebuff (1991) was one of the earliest papers to do this. Boritz and Zhang (1999) used a similar approach but their assumptions, and therefore their conclusions, about the effect of the additional tests were quite different. Unfortunately, Boritz and Zhang (1999) did not examine the possibility that in an attempt to achieve its objectives, management may try to mislead the auditor and/or investors and the effect that this may have. Chaney *et al* (2003) did consider this possibility but in a different and very specific context.⁵ They showed that the auditor would not tell the truth if the costs of doing so were greater than the costs of telling the truth. Unfortunately, they used a single person, decision theory model, as opposed to a game-theoretic model and were, therefore, unable to identify the strategic interaction between the two sides. Other similar studies

⁴ See Fellingham and Newman (1985) who demonstrate the importance of examining the strategic interaction between the auditor and client as opposed to the use of single-person decision theoretic models.

of specific audit decisions include Barnes (2004), Dye (1991), Magee and Tseng (1990) and Kornish and Levine (2004).

The cost variables (notably threat of litigation, audit switch, and loss of reputation) used in most of these studies apply to audit decisions generally and we use them here. Our focus is like Boritz and Zhang (1999) on the corporation's value, as opposed to its reported income. We use value so as to include all audit decisions relating to material changes in the financial statements and not merely to those affecting reported income. Of course, the auditor does not directly attest to a corporation's value but a significant change in the presentation of its financial statements is likely to affect its *perceived* value which, for that reason, would be considered to be material. Reference to the corporation's value as opposed to income is also consistent with the way in which the liability for auditor negligence is estimated. Courts use a 'recissory' measure of damages: the difference between what a shareholder bought at (i.e. the market price) and what the price would have been had the information been correct (Lys and Watts, 1994).⁶

2. A Single Person Decision-Theoretic Model without Transaction Costs

In this section we show how, in the absence of transaction costs, audited financial statements will be unbiased. This is primarily because of the threat of a legal action for negligence against the auditor if the financial statements are materially different from what is deemed to be correct. First, we outline the objectives and assumptions of the model used in the paper. Then, we examine the costs and benefits (in the sense of saved costs) associated with the auditor's decision.

⁵ In a comparison of different client-auditor alignments in banned and allowed markets.

⁶ For a review of the US law affecting class actions in this area see Committee on capital Markets Regulation, Interim Report, December 2006 available at www.capmksreg.org/pdfs/11.30Committee_Interim_Report/REV2.pdf.

< TABLE ONE ABOUT HERE >

We use three concepts relating to the corporation's value implied by its financial statements. See Table 1 which outlines the main algebraic notation used in the paper. Following Antle and Nalebuff (1991), V_T relates to the implied value of the financial statements from the correct and objective application of generally accepted accounting principles as opposed to 'true economic income' and values.⁷ This may be known. For instance, it may be determined for the Court by the evidence of an expert witness. There is also a possibility that financial statements originally prepared by the corporation before it decided to present financial statements to the auditor implying a higher value may even exist.

We assume that the corporation's management and its auditor proceed as follows. First, management presents the corporation's financial statements for audit which imply V_M . These are then audited. If the auditor arrives at a similar valuation, it will give a clean report and $V_M = V_A = V_T$. If the auditor disagrees with management, either the auditor's version of the financial statements that imply V_A will be reported together with a clean audit report, or management's version is reported which, because it is accompanied by a qualified audit report, will also imply V_A rather than V_M . Hence, audited financial statements imply that $V_M = V_T$ whereas unaudited financial statements do not. We also assume that the auditor and management may negotiate freely over how the financial statements reflect the corporation's financial position and performance, albeit that this must be completed within a certain time frame.

Our focus is, where, for whatever reason, $V_M \neq V_T$ and the objective function of management, in line with Antle and Nalebuff (1991), is:

$$U_M = \alpha (V_M - V_T). \tag{1}$$

⁷ V_T may not be a finite point but instead represent a narrow range of values resulting from the

α may take a positive or a negative value depending on whether management wishes to over- or under-state the corporation's implied value, respectively. α takes a value of zero if there is no utility to management in either. It should not be assumed that α will always be positive⁸ and we usually present the analysis for both even though it is usually the same.

Both here and later in the game-theoretic model, we make similar assumptions unless specified. We assume that the auditor will attempt to maximize its own profits without regard to ethical considerations other than their impact on its costs and revenues. We also assume that the auditor is competent and $V_A = V_T$ (although we do vary these later in the game-theoretic model when we discuss the asymmetry of information and audit quality). Therefore, we are also able to assume that another auditor, if required to act for the client, would come to a similar conclusion as the incumbent auditor about what is, and what is not, acceptable in the financial statements. It is not possible in this model for a negative signal to the market to arise from the replacement of the incumbent auditor. Also, as investors have no reason to believe that another auditor would act differently to the incumbent auditor, there is no reason for them to infer that it should. We also assume for simplicity that the costs and benefits arising to the auditor in respect of the audit (particularly those relating to a legal action for negligence) would be the same for the client across other auditors. However, it is possible that neither of these assumptions means that all auditors will behave in the same way. It is conceivable that some auditors may be more amenable to the client's requests than others. We recognize and examine this possibility in the game-theoretic model later in the paper.

application of acceptable but different estimates and GAAP.

⁸ The practice of writing down the value of assets after a merger (in order that post-merger performance ratios show improved performance) is well-known. There are other situations. For instance, it may be in its interests that the value of a corporation is under-stated at the time of a merger if management believes that their bargaining power is weak relative to that of the other corporation (Barnes *et al*, 1990). In the case of a private corporation, there may be tax reasons why it would be in the interests of shareholders for it to be under-valued.

Finally, we assume that an alternative auditors' cost function is approximately the same as that of the incumbent auditor and that the fee the auditor receives is the same as that which any other auditor would receive for the same audit ('the market price'). There is, therefore, no incentive for management, by way of cost savings, to switch auditors and it would be indifferent to the choice of auditor. This assumption has two implications here. The first is that management is unable to vary the payment to the auditor as an incentive to agree to a value that it would not otherwise accept. The second is that, because the fee cannot be affected, the auditor will, therefore, attempt to minimize its costs in order to maximize its profits. (We relax this assumption later in the game-theoretic model when the making of a side payment to a RA is examined). Underlying these assumptions, of course, is a further assumption: that audit quality is constant across all firms. (We also relax this towards the end of the paper when we discuss the issue of audit quality in the game-theoretic model).

Table 1 shows various costs arising to the auditor if it attests to a value other than V_T (Please see Table 1). These are:

C_A is the necessary measure of damages: the difference between V_M and V_T . If $V_M > V_T$ then $C_A = V_M - V_T$. If $V_M < V_T$ then $C_A = V_T - V_M$, otherwise $C_A = 0$.

C_B is defined as $y_1(V_M - V_T)^2$, where $C_B > 0$ and $y_1 > 0$ and there is an over-statement. If there is an under-statement and $V_M < V_T$, then $C_B = y_2(V_T - V_M)^2$ where $C_B > 0$ and $y_2 > 0$. C_B becomes non-zero at the same point as C_A because we assume that reputational effects occur as a result of the lawsuit. C_B is modelled in line with Boritz and Zhang (1999) and Antle and Nalebuff (1991) to reflect rapidly increasing reputational costs. (As with other costs, the precise relationship between C_B and V is not critical to the arguments made here, merely the point at which it ceases to be zero).

C_C arises if the auditor does not agree to V_T . Here, it is zero for all values of V other than V_T as we assume that no other auditor would arrive at a different value. As a result, there would be no reason for an audit switch and C_C does not appear in Figure 1 (Please see Figure 1).

Figure 1 shows how C_A and C_B vary according to different values of V . They converge on a single point and are zero where $V_M = V_T = V_A$ as $|C_A| = V_M - V_T$ and $|C_B| = y_I(V_M - V_T)^2$. That is: $C_A = C_B = 0$ at V_M as $V_A = V_T$. It is only when $V_M = V_A$ that the auditor would issue a clean report. Hence, in the absence of transaction costs, there is no bias in audited financial statements as the costs to the auditor of doing otherwise provide an incentive for it to agree a value of V_T .

3. A Single Person Decision-Theoretic Model with Transaction Costs

In this section, we show how transaction costs in the form of legal costs (both legal fees and the opportunity costs involved⁹) cause a reluctance by litigants to sue an auditor for negligence. This is because they would not sue if the proceeds are not expected to cover the costs involved. (A rational person would not sue another person if, say, the likely proceeds are \$100 but the legal costs are expected to be \$1,000). This provides an area around V_T within which there is scope for discretion by the auditor because it is not faced with the threat of legal action as it is not in the interests of investors to sue. This compares with the previous situation where, because there were no legal costs, the cost schedules converged on a single point.

In the US, the two parties to a lawsuit have to pay their own legal costs.¹⁰ It is, therefore, necessary to define and distinguish these and restate C_A and C_B with transaction costs. C_C is

⁹ These involve lost opportunities for income and wealth creation because litigants' time and effort are spent on the legal action.

¹⁰ It should be noted that there are differences across countries as to who pays the legal costs. In the UK and most of Europe, for example, the loser is usually required to pay them all. We have prepared this paper according to the system in the US.

unaffected. The new variables are defined in Table 1.

$$C_{AT} = C_A + F_A \tag{2}$$

where $C_{AT} > 0$. As the litigants will not sue unless $(V_M - V_T) > F_L$, the point at which C_{AT} ceases to be zero is V_{CB} which is that value for V where $V_{CB} - V_T = F_L$ in the case of an over-statement. That is: $C_{AT} = F_A + (V_{CB} - V_T)$ where $V_{CB} - V_T = F_L$. See Figure 2 (Please see Figure 2). If there is an under-statement, the point at which C_{AT} ceases to be zero is V_{CA} , which is similarly defined as that value for V where $V_T - V_{CA} = F_L$.¹¹

C_B is similarly affected and becomes non-zero at the same points, V_{CA} and V_{CB} , because reputational effects are assumed to occur only if auditor negligence or dishonesty is discovered.

That is:

$$\begin{aligned} C_B &= y_1(V_M - V_T)^2 \text{ where } V_M = V_{CB} > V_T \text{ and } C_B = 0, \text{ and} \\ C_B &= y_2(V_T - V_M)^2 \text{ where } V_M = V_{CA} < V_T \text{ and } C_B = 0. \end{aligned} \tag{3}$$

Hence, the effect of the introduction of legal costs shifts the origins of C_A and C_B . If $V_M > V_T$, they are shifted to the right: from V_T to V_{CB} ; and if $V_M < V_T$, they are shifted to the left: from V_T to V_{CA} .

These changes affect the possibility of an audit switch and whether C_C is zero. For valuations outside V_{CA} and V_{CB} , all auditors would issue an adverse report so there is no incentive for management to switch auditors and C_C will be zero. However, if V_M falls between V_{CA} and V_T in the case of an under-statement; or between V_T and V_{CB} in the case of an over-statement, and the incumbent auditor does not agree to V_M , there would be other auditors who would be prepared to issue a clean report. That is, if management wishes to under-state and the incumbent auditor is not prepared to agree to a value as low as V_{CA} , another auditor will, and similarly for an over-statement. The incumbent auditor, therefore, faces the risk of a switch if it threatens to issue an

¹¹ We assume that F_L is the same both for an under- and an over-statement.

adverse report where V_M falls between V_{CA} and V_{CB} .¹² $C_C > 0$ in Figure 2 between these points, but not where $V_M = V_{CA}$ or where $V_M = V_{CB}$. $C_C = 0$ at V_{CA} if management wishes to under-state and at V_{CB} if management wishes to over-state. That is:

$$\begin{aligned} \text{If } \alpha < 0 \text{ then } C_A = C_B = C_C = 0, \text{ where } V_M = V_{CA}, \text{ and} \\ \text{if } \alpha > 0 \text{ then } C_A = C_B = C_C = 0, \text{ where } V_M = V_{CB}. \end{aligned} \quad (4)$$

Regarding the auditor's utility function: the utility to the auditor derives from the audit fee and is unaffected by differences between V_M and V_A as long as V_M falls between V_{CA} and V_{CB} . Hence, where there are transaction costs, rather than attesting to V_T , the auditor will attest to V_{CA} or V_{CB} , depending on the objectives of management. If the auditor does not, it may lose the audit. For these reasons financial statements are likely to be biased: an upward bias if α is positive and a downward bias if α is negative. However, because investors do not know whether α is positive or negative, they do not know the direction of the bias.

It is an empirical question, of course, as to the actual size of $(V_T - V_{CA})$ and $(V_{CB} - V_T)$ and, therefore, their likely significance. However, it should be noted that we have assumed that legal fees are principally of a fixed dollar value and unrelated to corporate size.¹³ If this is the case, legal costs are likely to fall as a proportion of a corporation's size as it increases. Therefore, the distance between V_{CB} and V_{CA} will be shorter for a large corporation than a small corporation.¹⁴ As a consequence, the probability of an action against the auditor of a large corporation will be greater than the probability of a similar action against the auditor of a small corporation (Lys and

¹² It does not make sense for $V_T > V_M$ if management wishes to over-state and $V_T < V_M$ if it wishes to under-state.

¹³ Probably, these would be based on the amount of time spent on the case by the lawyers involved and, therefore, would depend on the complexity of the case, the work involved and not merely the value of the claim.

¹⁴ For example, say the corporation is valued at \$1.0bn and the legal costs are \$0.5m., $V_M + F_L$, respectively. In which case V_{CB} and V_{CA} are $\pm 0.05\%$ of V_T , whereas if the corporation were valued

Watts, 1994).¹⁵

4. An Analysis of the Actions of a 'Rogue Auditor' ('RA') using a Game-Theoretic Model.

In this section we extend the earlier models to include information asymmetry and of the presence of one or more RAs in the audit market. First, we will look at the changes to our assumptions which mainly arise from information asymmetry. We will then proceed to the game-theoretic model.

4.1 Assumptions

We showed in Section 3 that in order to avoid an audit switch and because there are no additional costs incurred, the auditor would agree to a value of V_{CA} or V_{CB} (depending on whether management wishes to under- or over-state) rather than V_T . This result is based on one critical assumption: that management is unable to make a side payment as an inducement for the incumbent auditor to agree to another value. In other words, management simply pays the market price that would be paid to any other auditor. If this was possible and the side payment was sufficiently large, it is conceivable that the auditor would agree to a valuation outside V_{CA} or V_{CB} . That assumption will now be relaxed. Acceptance of such a payment effectively involves the auditor making an assessment of whether or not to be honest in line with its profit maximizing objective. Whether (and, if so, to what extent) management would be prepared to compensate the auditor for this may be determined by the benefits arising to it,¹⁶ the maximum being determined

at \$2.0bn, V_{CB} and V_{CA} would be $\pm 0.025\%$. That is $V_T \pm [(V_T + F_L)/V_T]$.

¹⁵ Lys and Watts (1994) provide empirical evidence for both this and the likelihood of an action against a large audit firm compared with a small audit firm because of the deep pockets phenomenon.

¹⁶ In some cases, α may be high, even unity, where it is vital to achieve V_M for instance, where the continuity of certain loans to the corporation is contingent on it. In other cases, it may not be so important. For instance, the market may be expecting V_M to be reported and not achieving it may not be favorably received and the share price may fall, but the continuation of the corporation is not threatened. In such circumstances, the corporation may decide not to press for

by the expected utility function in Equation (1).

A RA is defined as an auditor that is prepared to take the risk and attest to a value significantly beyond V_{CA} or V_{CB} where $V_A = V_T$ if it considers this to be in its profit-maximizing interests. A ‘professionally correct’ auditor (PC), whilst also profit-maximizing, is defined as not being prepared to take that chance and would not risk being sued for negligence. In other words, a RA is truly profit-maximizing whereas a PC is profit-maximizing but within certain constraints.¹⁷ Because it is not prepared to accept a value outside V_{CA} and V_{CB} , a PC would neither be offered, nor would it accept, a side payment.

We identify two instances where information asymmetry broadens the effective area of discretion available to the auditor, extending this significantly beyond V_{CA} and V_{CB} . These are:

The Probability of Detection

So far, it has been assumed that there would be an action for negligence against the auditor if it agrees to V_M if this is outside the V_{CB} and V_{CA} limits. This is actually a very conservative assumption as it is unlikely that litigants would always know that this has occurred. An important factor affecting the likelihood of an action for negligence is, therefore, whether the litigants know they have been misled. Shareholders and potential investors will only know if the financial statements are later discovered to be wrong. This is only likely to happen on the occurrence of an event involving another party with direct access to the accounting information e.g. on the failure or takeover of the corporation, a management change, or on the appointment of a new auditor (Lys and Watts, 1992).¹⁸ If the incumbent auditor believes that these events are unlikely to occur,

V_M and α will be lower.

¹⁷ These are not necessarily ‘ethical considerations’ but a conservatively determined convention.

¹⁸ In addition to these, the auditor may be inspected or investigated by the Public Company

it could decide to ‘take a risk’ and go beyond V_{CB} if, by doing so, it could increase its profits (Chung and Kallapur, 2003). In order to recognise this, a new variable, $p(D)$, is introduced where the costs to the auditor are:

$$\begin{aligned}x_M &= p(D)[F_L + (V_{CB} - V_T) + y_1(V_{CB} - V_T)^2] = 0 \text{ where } V_T > V_{CB} \text{ or} \\x_M &= p(D)[F_L + (V_T - V_{CA}) + y_2(V_T - V_{CA})^2] = 0 \text{ where } V_T < V_{CA}\end{aligned}\quad (5)$$

for both a RA and PC. For a PC, $p(D)$ will always be unity. For a RA, it may be less. If $p(D) < 1$ and $V_M = V_{CA}$ or $V_M = V_{CB}$, then $x_M > 0$. $p(D)$ is assumed to be a constant and independent of $y_1(V_{CB} - V_T)^2$ or $y_2(V_T - V_{CA})^2$. There is, therefore, a much wider area of discretion extending beyond V_{CA} and V_{CB} depending upon (1) the auditor’s assessment of $p(D)$, (2) the extent to which it would be prepared to take the additional litigation and reputational risks, and (3) the extent to which management would be prepared to compensate it for these.

The Auditor’s Difficulty in Ascertaining the Truth

The second instance of information asymmetry relates to management having full (or nearly full) knowledge and understanding of the corporation’s financial affairs and performance, whereas the auditor does not and has to search for it. If management does not wish to mislead investors, this will not be a problem for the auditor. (In such a situation, there will also be no need for an audit). However, in situations where management does wish to mislead them, it will either have to attempt to mislead the auditor or seek its cooperation in deceiving investors. An important task for the auditor when management wishes to deceive investors is, therefore, discovering the truth in the face of management opposition. Here the concept of audit quality¹⁹ and our earlier assumption that $V_A = V_T$ become considerations. By means of the game-theoretic model, we will

Accounting Oversight Board (‘PCAOB’).

¹⁹ This is usually defined as the ability of the auditor to issue a correct opinion regarding whether the financial statements fairly reflect the financial position and performance of the client (Watkins *et al*, 2004). Therefore, it comprises two elements: competence (the likelihood of finding a violation if one exists) and independence (the likelihood of reporting the breach, if discovered)

examine these.

Of, course, not all RAs will have similar preferences. In the same way that firms' and investors' risk and return trade-offs vary, RA's profit-maximizing y values may vary both across time and across RAs.²⁰ A RA may not always agree to a value outside V_{CA} and V_{CB} . This will depend on x_M . It has also been pointed out in the literature (for example by Reynolds and Francis, 2000) that important auditing decisions of this type may not necessarily be made at the firm level but at the individual or branch level. Hence, profit-maximizing y values may vary both across an individual audit firm and across time by hitherto RA and PCs. In other words, the decision by an auditor to act as a RA may not easily be predicted.

As a consequence of these changes, unlike the single person decision-theoretic models earlier where the information was perfect and certain, here the information is perfect but uncertain in two respects. One: whilst $V_T = V_{A1} \neq V_{A0}$, the auditor does not know V_T until it has performed the additional work. Two: management does not know y and, therefore, it does not know x_M .

The final change to the single person decision-theoretic model relates to the opportunity for the auditor to extend its work, in line with Antle and Nalebuff's (1991) model. We may be more specific about x_M prior to, and following, the extended audit. Prior to the extended audit (represented by the subscript 0) it is:

$$x_{A0} = p(D)_{A0} [F_L + (V_M - V_{A0}) + y_1(V_M - V_{A0})^2] + \Omega \sigma_{A0}^2 \text{ where } V_M > V_{A0}^{21} \quad (6)$$

where the auditor attaches probabilities relating to the likelihood that $V_{A0} = V_T$, represented by σ_{A0}^2 , the variance of the auditor's estimates and their probability, and Ω which places a dollar

(Chaney *et al*, 2003).

²⁰ DeAngello (1981) argued that large audit firms may place a larger value on their reputation than small auditors. However, this does imply that all large audit firms and all small audit firms will have the same values.

value on the negative utility arising to the auditor from this. After the extended audit (represented by the subscript 1) it is:

$$x_{A1} = p(D)_{A1}[F_L + (V_M - V_{A1}) + y_1(V_M - V_{A1})^2] + z \text{ where } V_M > V_{A0}.^{22} \quad (7)$$

Unlike x_{A0} , x_{A1} does not contain a premium for risk as we assume that, because the auditor has discovered the misrepresentations and is certain that $V_{A1} = V_T$, σ_{A1}^2 takes a value of zero.²³

How does the use in this model of V_{CA} and V_{CB} , as values to which the auditor would ordinarily agree, reconcile with the single person decision-theoretic model that assumed certainty? Although it is not certain, V_{A0} is, nevertheless, the auditor's best estimate of V_T and, therefore, V_{CA} and V_{CB} remain the points at which the costs to the auditor are minimized.²⁴ In the single person decision-theoretic model with transaction costs $C_{AT} = 0$; now $C_{AT} = \Omega\sigma_{A0}^2$ and the auditor will accept the financial statements, assuming $\Omega\sigma_{A0}^2 < C_C$. It should also be noted that Equations (6) and (7) recognize that the auditor may revise $p(D)$ as a result of the additional audit.

4.2 The Game-Theoretic Model

In their model of the auditor-client negotiating process, Antle and Nalebuff (1991) identified the raising of audit quality as the principal means by which differences of opinion about the client's income are negotiated and resolved.²⁵ They simplified the process by means of a simple two-step game in which the auditor performed additional work causing its estimates to become more accurate and the differences between the two sides thereby resolved. We will use a similar model

²¹ Or in the case of an under-statement: $x_{A0} = p(D)_{A0}[F_L + (V_{A0} - V_M) + y_2(V_{A0} - V_M)^2] + \Omega\sigma_{A0}^2$.

²² Or in the case of an under-statement: $x_{A1} = p(D)_{A1}[F_L + (V_{A1} - V_M) + y_2(V_{A1} - V_M)^2] + z$.

²³ It should be remembered that when x_M and $p(D)$ were introduced in Equation (5), the model assumed certainty and, as a result, a term representing the dispersion of the auditors probability distribution of V_A was not included.

²⁴ This is a significant departure from the Antle and Nalebuff (1991) model which suggests that the auditor will under-estimate the earnings (and, therefore, value) of the firm.

²⁵ Antle and Nalebuff (1991) focus on reported income but as mentioned in the Introduction,

here to examine the situation where management of the client corporation wishes to misrepresent its financial affairs. However, whilst the main purpose of additional audit work in the Antle and Nalebuff (1991) model was to resolve differences of opinion, here it represents an effort by the auditor to estimate the extent by which management is attempting to mislead it. To simplify matters, we assume here that, if the extended audit is performed, the misrepresentation will be discovered and the correct value ascertained. We also assume that, to simplify the discussion, management wishes to over-state. That is $V_T = V_{AI} < V_{AO} = V_M$. (The results are similar for an under-statement. Where new variables are introduced and it is necessary, these are specified for an under-statement by way of a footnote).

The game begins by management preparing the corporation's financial statements and deciding whether to over-state its implied value. The auditor then conducts its audit, arrives at V_{AO} , and decides whether to accept the financial statements or to qualify them. If management decides to tell the truth, the auditor will accept the financial statements. This is Outcome 1 in Figure 3. Here $V_T = V_{AO} = V_M$. If management decides to misrepresent the corporation's affairs (i.e. lie), the auditor will be faced with either accepting the financial statements, knowing them to be wrong (as auditor competence is assumed throughout) which is Outcome 2, or rejecting them and threatening to issue a qualification. Here $V_T = V_{AO} < V_M$. (We assume that, without the additional work, the auditor's level of effort and diligence is sufficient to satisfy its professional and statutory obligations and it could not be found negligent in respect of the quality and/or amount of work performed).²⁶ Management may accept the qualification (Outcome 3) or offer a side

focussing on the firm's implied value amounts to the same thing.

²⁶ Despite efforts in the US post-Enron to ensure certain auditing standards, e.g. PCAOB, there is still a wide area of discretion left to the auditor's professional judgment as to the amount and nature of the checks that need to be performed. Whilst the auditor is required by law to exercise reasonable care (and this remains the legal criterion for negligence) according to Kadous (2000) 'the minimum audit quality level required to avoid legal liability for audit failure is vague, and thus requires interpretation. Jurors in audit negligence cases must determine what that level is -

payment to provide an incentive to the auditor to accept V_M and compensate it, if necessary, for the additional risks involved.

It is possible that management wishes to replace the auditor before offering it a side payment. However, searching for a new RA cannot be justified if the incumbent auditor already is one. This is unnecessarily inconvenient, involves management in additional expense and may be counter-productive as it is likely to provide a negative signal to the market (Fried and Schiff, 1981). This option is, therefore, not included in the model.

If the incumbent auditor does not accept the side payment, management may then replace it by another auditor that is prepared to do so, but management would have to accept the likelihood of a negative signal to the market (Outcome 4). This will, of course, result in a re-running of the game with a new auditor. If the incumbent auditor accepts the side payment, it will have to decide what, additional audit work should be done. The additional costs involved may (but not necessarily) be covered by an additional side payment. (It should be noted that in our discussion of the maximum and minimum side payment required by, or offered to, the auditor, s , refers to the total value of the side payments). If no additional audit work is done and the auditor accepts the side payment and issues an unqualified report, this is Outcome 5. If additional audit work is done (and we assume that $V_T = V_{AI}$) the auditor will then have to decide on the basis of the additional information obtained, whether to accept the financial statements. If it does decide to accept them, this is Outcome 6. If it rejects them, management will seek to replace it, which is Outcome 7. Again, as in Outcome 4, this will result in a re-running of the game with a new auditor.

We examine the current model in terms of three states of nature: easy, moderate and difficult

that is, they must assess standards of care - in order to evaluate whether the audit work performed

reporting/economic conditions. That is, in terms of Equation (1) where, respectively, α is zero, where it is significantly greater than zero and where it is much greater than zero, e.g. where it is unity. These conditions represent: where there are no significant financial reporting fears of, for example, possible bankruptcy or where not meeting analysts' forecasts or other targets would not have major adverse consequences ('easy'); where there are major financial reporting fears; where, for example, bankruptcy is possible or where not meeting analysts' forecasts or other targets would have major adverse consequences for the corporation ('difficult') and 'moderate', a situation between these two extremes where there may be adverse effects but these are not likely to be so great. 'Difficult' and 'moderate' conditions refer principally to the current financial statements but also to subsequent statements where management is anticipating difficult reporting conditions and is considering, for example, smoothing (reducing) current reported income in order to smooth (increase) future reported income. Consider the illustrative dollar values of utility to management (as opposed to the corporation and/or its shareholders) and the incumbent auditor under these conditions that are shown on the right hand side of Figure 3 (Please see Figure 3). The Appendix shows how these data are computed. Here, the benefits to management of misrepresentation change under these states of nature and, in some cases, the benefits arising to the auditor also change.

In easy reporting/economic conditions, the dominant strategy for management and the dominant strategy equilibrium is not to lie, resulting in Outcome 1. Here the net benefits both to management and auditor are zero. Management will tell the truth because misrepresentation involves additional costs for which there are no benefits. Also, there will neither be an incentive for the auditor to be a RA nor for management to appoint one. As a result, the game ends at Outcome 3.

was sufficient to avoid liability.'

In moderate and difficult reporting/economic conditions, Outcome 1 is no longer the dominant strategy. More advantageous outcomes to management are achievable if it is prepared to lie, make a side payment to the auditor if necessary and consider an alternative RA to whom it may switch if the incumbent auditor is not agreeable to its requests. The following limits determine the value of s paid to the incumbent RA. The lower limit is $(x_{A0} - C_C)$ where $x_{A0} > C_C$. In words, the additional costs to the incumbent auditor of agreeing to the rogue audit report less the benefits to it of retaining the audit.²⁷ Outcome 5 would be achieved if $U_M > (x_{A0} - C_C)$ and s is paid. The upper limit for s is determined by the costs and benefits to an alternative RA. This is also $(x_{A0} - C_C)$ assuming that the alternative RA has similar operating costs, also arrived at a value of V_{A0} and assesses the risks of issuing a rogue audit report in a similar way to that of the incumbent RA. Therefore, $s = (x_{A0} - C_C)$ and there is no incentive for management to replace the incumbent auditor with a new RA (Outcome 4). It should be remembered that the incumbent auditor does not know V_{A0} until it has conducted the audit. This will also be the case for the alternative RA. It will simply know that the management of a potential client requires a rogue audit report. It is reasonable, therefore, to assume that an alternative RA would place a much higher value on x_{A0} than the incumbent RA. In which case, the side payment required by the alternative RA would be higher than that required by the incumbent RA and certainly no less.

So far, we have assumed that $x_{A0} > C_C$ then $s = (x_{A0} - C_C)$. If $x_{A0} < C_C$, the RA would be prepared to attest to the rogue audit report without a side payment. In the numerical illustration, $x_{A0} = C_C$. (In which case, a minimal side payment would be necessary). If there is no alternative RA available to management (i.e. it may only replace the RA with a PC)²⁸ there are no benefits from

²⁷ Strictly speaking, the additional costs are $x_M - x_T$ where the subscript T refers to the costs of reporting V_T . These are, of course, zero.

²⁸ This situation is probably similar to that of Arthur Andersen involving, say Enron, where there

Outcome 4. This also affects the determination of s in Outcome 5 which is a sub-game perfect Nash equilibrium. (In the numerical illustration the net benefits arising to management and the auditor prior to the side payment are +2 and -2 respectively under moderate reporting/economic conditions and +4 and -2, respectively under difficult reporting/economic conditions). Whilst the lower limit remains the same, i.e. $(x_{A0} - C_C)$, there is no upper limit to s other than U_M .

Our analysis of the two parties' strategic decision-making has provided an important result. It shows that whether or not there is an alternative RA available to management, the size of the side payment for attesting to values above V_{CB} is not merely determined by the additional auditing costs involved. It may not even cover them. Instead, it is also determined by the net benefits to the two parties: (1) the value placed by the auditor on the loss of the audit, C_C , and (2) the benefits to management from misrepresenting the corporation's correct financial position, U_M .

There is another interesting aspect of the game that relates to the incentive for the additional audit work and the 'attractiveness' of Outcomes 6 and 7. We assume that $V_{CB} < V_{A1} < V_{A0} = V_M$. Whether the additional audit work is performed depends upon the auditor being a RA. (The maximum value that a PC will accept is V_{A0} . If it performed the additional work, it would then insist on reporting V_{A1} , which is lower). A RA would be prepared to attest to V_M without conducting the additional work if $(s + C_C) > x_{A0}$ where $x_{A0} < x_{A1}$ but would prefer to perform the additional work if $x_{A0} > x_{A1}$ and $(s + C_C) > x_{A1}$. (In the numerical illustration, the auditor prefers Outcome 5 to Outcome 6 because, as a result of the additional work, $x_{A1} = 1.5$ whereas $x_{A0} = 1.0$).

So far we have not considered Outcome 7 where the RA agrees to conduct additional work but, as a result of this, it decides not to attest to the financial statements. This would occur if $V_{A0} > V_{A1}$ is

was no alternative RA.

so large that $(s + C_C - x_{AI}) < 0$ and $(s + C_C - x_{A0}) < 0$. This result raises an interesting situation in which a RA will reject the financial statements because they are misleading whereas a PC will accept them because it believes them to be correct. That is: $(s + C_C - x_{AI,RA}) < 0$ but $(C_C - x_{A0,PC}) > 0$. (The subscripts RA or PC are added here in order to be specific to one of the two auditor groups). It is conceivable therefore that, in order to obtain a clean certificate for its rogue financial statements, management could decide to replace the incumbent RA with a PC!

So far, we have assumed that management is able to make a side payment to the RA. What happens if the model does not permit this? See Figure 3. If management decides to lie, either the auditor will accept the rogue financial statements or management will have to choose between (1) accepting the qualification, (2) agreeing to the auditor conducting additional audit work but for no additional fee and (3) replacing the incumbent RA with another RA but not being prepared to offer it a side payment. If $C_C > x_{A0}$ a RA would be prepared to accept the rogue financial statements without conducting the additional work. (In the numerical illustration they are equal). If $x_{AI} < C_C = x_{A0}$, management would agree for the RA to conduct the additional audit work who would then accept the rogue financial statements without an additional payment. If $C_C = x_{A0}$ and $C_C < x_{AI}$, the RA would conduct the additional audit work and then reject the rogue financial statements. (In the numerical illustration $x_{A0} < x_{AI}$). In other words, the auditor may agree to going beyond the limits set by the single person decision-theoretic model depending on the circumstances and if it is a RA.

Our analysis has so far assumed that the incumbent auditor is a RA. The remaining situations involving a PC as incumbent auditor under moderate or difficult reporting/economic conditions are:

1. Where the incumbent PC can be replaced by a RA. Here the game will end at Outcome 4 which

is the preferred outcome by the management in the numerical illustration and is the sub-game perfect Nash equilibrium. The game will re-run with a new auditor.

2. Where the incumbent PC cannot be replaced by a RA. Again, the first four outcomes are only possible. As a result, the preferred outcome (and, therefore, the dominant strategy) is Outcome 1.

We may summarize the conclusions derived from the game-theoretic model:

1. Under easy economic conditions, there is no incentive for management to mislead (and, for that matter, for the auditor to audit).
2. Under both moderate and difficult reporting/economic conditions, it is in management's interests to mislead but it depends on the benefits to the auditor (i.e. s and C_C) of whether it agrees to the misrepresentation.
3. Under both moderate and difficult reporting/economic conditions, management may decide to make a side payment to the RA. The maximum is determined by Equation (1). The minimum is not determined by the side payment relative to additional costs and risks arising to the auditor. Instead, it is determined by the net benefits arising to the RA from doing this and, in particular, avoiding an audit switch, C_C . As a result, it may even agree to the rogue financial statements without receiving a side payment.
4. Under easy reporting/economic conditions there is no incentive, but under moderate and difficult conditions, the RA may decide to conduct further tests. There is no incentive for it the PC to do them. As a result, a higher quality audit may actually be performed by a RA than a PC although no indication of this or the correct financial statements would be communicated to investors. As a result of performing the additional audit work, a RA may decide not to accept the financial statements. In which case management may prefer a PC to a RA in order to obtain a clean certificate for its rogue financial statements,
5. The analysis does not change whether α is positive or negative.

5. The 'Market for Lemons' and the Problem of Assessing Audit Quality

The confidence that the auditor attaches to the implied value of financial statements is of great importance to the investor. An investor may even be prepared to pay more for greater auditor certainty if this reduces the risk of investing in the corporation. However, whilst there is a preference by investors for the best quality audit, thus providing the corporation with an incentive to provide this, its management may not necessarily share this desire.²⁹

Ideally, management would prefer to have 'the best of both worlds'. That is, report V_M but imply that the financial statements have been audited to the highest standard. This may, conceivably, be achieved if the only indication to investors of audit quality is the auditor's name and reputation. A RA is able to offer this to management if it has a good reputation but is not generally known, especially by the investment community, to be a RA. If a RA can achieve this, it would be able to significantly increase the number of its clients. Not only would it, as the incumbent auditor, be able to provide a 'better' service to management than its competitors, it would also hold a competitive advantage over other auditors (most of whom are presumably PCs) for new clients. For instance, where an incumbent PC is unable to attest to its client's financial statements, management would be able to switch to the RA.³⁰

Does this suggest that the 'good' PCs will be driven out by 'bad' RAs who make money out of

²⁹ The fact that this may reduce the corporation's share price and, therefore, ambivalence on the part of a shareholder is outside the scope of this paper.

³⁰ Evidence from the Chinese audit market suggests that there was a 'flight from quality' in response to the adoption of new more stringent auditing standards. DeFond *et al* (1999) found evidence to support their hypothesis that as larger audit firms had more to lose than smaller firms, they would be more independent. As a result, companies, wishing to reduce their chances of receiving a modified audit report, tended to prefer small rather than large auditors.

their lower standards as Akerlof's market for 'lemons' (1970) suggests?³¹ Klein and Leffler (1981) have shown that, even if quality cannot be enforced, it will not be in the interests of a provider of high quality goods or services to 'cheat' a customer by switching to a lower quality. This is because the future income stream to be derived from providing a high quality service is greater than the one-off wealth increase from switching to a low quality service.³² Lost reputation will affect the ability of an audit firm (large or small) to retain existing clients and attract new ones.³³ Klein and Leffler (1981) also assume the provider has a significant amount of fixed costs (overheads) but not necessarily any sunk costs. If this is so (and it is likely to be so for an audit firm) reducing, or cheating on, audit quality would severely diminish an auditor's profitability.

The critical assumption in Klein and Leffler's (1981) analysis is that in the next period consumers will know that the quality of service provided has changed and they will immediately cease to employ the cheating firm. Whilst in most cases a fall in the quality of a product or service is immediately recognizable (say the cut of a suit or the taste and ambiance of a restaurant meal) this may not be the case with investors and audit services if the only indication of quality is the auditor's name and reputation.³⁴ All the investor can do is to assume that the auditor is acting competently and independently unless, or until, it receives information to the contrary. When this

³¹ In order to examine the problem of linking quality with uncertainty where there is asymmetry of information, Akerlof (1970) used the market for second hand automobiles, a market that contains considerable uncertainty because buyers cannot distinguish between good ones and bad ones (known as 'lemons'). All automobiles will therefore sell at the same price. The consequence is that an owner of a good automobile cannot obtain its true value. The only automobiles that will be traded are therefore 'lemons'. The good ones will not be traded at all because their owners cannot obtain a fair price. The bad automobiles are, therefore, said to drive out the good ones.

³² The provider of a high quality service is able to charge a higher price than those who offer a lower quality service. Although it will have higher unit average and marginal costs, it will earn higher profits representing quasi rents derived from providing a high quality product which would not otherwise be available. Zhang (1999) and Dye (1991) demonstrate this in the case of auditors.

³³ For some evidence concerning loss of market share relative to their competitors by audit firms involved in disciplinary actions by the SEC see Wilson and Grimlund (1990).

³⁴ A change of auditor may, of course, indicate a change of quality, e.g. the appointment of, nowadays, a 'top four' audit firm (DeAngello, 1981).

does occur, the investor is unlikely to know or have any means of knowing the extent of the activity because, as has been shown, the behavior is not easily predictable. The investor is forced, therefore, to again act on name and reputation.

There may, therefore, be a significant time lag before the capital market becomes aware of the existence of a RA. It could even remain unknown indefinitely or until the occurrence of a major scandal. But once the market believes it has sufficient information to alter its assumptions, its actions are likely to be decisive and indiscriminate. Chaney and Philipich's (2002) event study of the impact on the share price of Andersen's clients at the time of the Enron scandal and Barton's (2005) study of how those clients visible in the capital markets quickly replaced it with other auditing firms with an untarnished reputation illustrate this.³⁵ In other words, any suggestion, or perception, in the market that an auditor is prepared to accept lower standards are simply deadly to the reliability of a corporation's earnings. As a result, audit switches on a massive scale are bound to follow as corporations attempt to right the situation.³⁶ Hence, rather than the 'bad' auditors driving out the 'good' ones, the empirical evidence suggests that it is more a case of the 'good' corporations driving out the 'bad' auditors.

There is another reason why the RA's policy is risky. It ties in the auditor. In the first instance, the RA's decision may be quite simple: whether it is in its profit maximizing interests. Initially, this may appear to be so but the RA may be faced with (1) not accepting the financial statements and effectively blowing the whistle bringing about the failure of the client and an action against it for negligence for its earlier actions, or (2) continuing to acquiesce in the hope that the

³⁵ Krishnamurthy *et al* (2006) also show that when firms quickly dismissed Arthur Andersen, the abnormal returns at the time of the announcement were significantly higher when firms switched to a big 4 auditor than when they switched to a non-big 4 auditor or did not announce its identity.

³⁶ It should not be thought that Arthur Andersen is the only instance of the failure of a large and reputable accounting firm. See Barnes (2007) for evidence of cases in the UK during the early

corporation will survive but taking the risk that, if it does not, its further misdeeds are likely to come to light. Of course, this policy may merely 'buy time' and will fail if the client does not recover.³⁷

6. Implications and Conclusions

In this paper we have examined the relationship between the auditor and management when management wishes its corporation's financial statements to imply a different value to that which the auditor thinks they should. We have shown that, in line with Coase (1960), where there are no transaction costs, there will be no scope for discretion by the auditor and, as a consequence, audited financial statements will be unbiased. However, as Coase (1960) went on to say, inefficiencies may arise either through explicit transaction costs or imperfect information. Where information is not perfect and asymmetry of information exists, there is an incentive for participants to provide misleading information. This is the case here.³⁸ We have argued that transaction costs do exist in the form of legal and related costs and lead to bias in financial information to the extent that the auditor would agree to V_{CA} or V_{CB} (depending on whether management wished to under- or over-state) rather than V_T . However, whilst we have been able to specify the bias as $(V_T - V_{CA})$ and $(V_{CB} - V_T)$, we are unable to quantify it or assess its importance in practice. Although some inferential evidence may exist, it would be useful to have some direct

1990s.

³⁷ Management also has the option of providing true financial statements and showing the corrections for previous accounting periods (i.e. confess) or continue to lie. In which case, this is clearly a case analogous to the Prisoners' Dilemma where the dominant strategy equilibrium is to confess.

³⁸ The tightening of GAAP is an example of this. It is sometimes argued that more specific GAAP, or the narrowing of choices, may limit management's ability to influence the auditor's judgement. See Ewert and Wagenhofer (2005) for a recent review of the issues involved. However, whilst it may narrow the area of negotiation, because it contributes to the narrowing of V_T , it may have the effect of 'raising the stakes' and providing an incentive for management to attempt to mislead the auditor.

empirical evidence of their likely size.³⁹ Also, because they do not know whether α is positive or negative, investors do not know its direction and are, therefore, unable to adjust their estimates for this bias.

The situation is made worse when transaction costs arising from asymmetry of information (that is: the inability of investors to know if misleading financial statements have been prepared and the difficulties for the auditor in discovering the truth if management wishes to mislead) and the possibility of a side payment are considered. Whilst an area of discretion, determined by transaction costs in the form of legal and related costs, may be identified (between V_{CA} and V_{CB}), the pressures on management may be so great that a RA may decide to take advantage of information asymmetry, risk legal action and its reputation and agree to a value outside these limits if it believes this and the receipt of a side payment are in its profit - maximizing interests.

By means of a simple game-theoretic model, we showed that a side payment may be accepted by a RA even though it may not cover the additional costs involved. The model also showed that whilst investors would prefer the highest quality audit (especially under moderate and difficult reporting/economic conditions when management is most likely to attempt to mislead them), there is no such incentive to management or a PC of an extended audit. It is only when the RA wishes to remove the uncertainties about the size of a possible misrepresentation that there is an incentive for an extended audit.⁴⁰ As a result, whilst misrepresentation may go undetected by a PC (because it will not conduct the extended audit) it would be detected by the RA if it did the

³⁹ For example, Patterson and Smith (2003) although they only use a game-theoretic model and provide no empirical evidence.

⁴⁰ It is tempting to speculate about what is an empirical question, but the decision of the auditor to go beyond V_{CB} would explain why cases of negligence are so much more common following a stock market crisis because at that time management's needs for satisfactory financial results are greater. Lennox (1999) provides some inferential evidence of this from the recession in the UK that followed the world stock market crash of 1987.

additional work. But, of course, this would not be reported to investors. We also showed that it is possible in certain circumstances for management to decide to replace the RA with a PC in order to obtain a clean audit report.

At first glance, the RA strategy may appear very attractive to the profit-maximizing auditor. It is, nevertheless, doomed. Whilst in a particular instance, $p(D)$ may be minimal, it is, of course, additive (if not addictive!) so as to become a significant threat to the auditor's reputation. There is no better illustration of this than the fall of Arthur Andersen. Whether this was additive across clients and/or across a client (or small group of these) is an interesting empirical question requiring research. Nevertheless, the effect is clear: rather than the 'bad auditors' driving out the 'good auditors', the 'good clients' will drive out the 'bad auditors' because they threaten the value of a 'good audit'. Unfortunately, because investors have no information of changes in audit quality and because a RA may not always act in this way, there may be a significant time lag before these are detected and because the investment community is unable to assess the extent of the activity, it is likely to act indiscriminately. Again, this raises interesting new research questions.

Although this analysis is simply based on the behaviour of rational economic agents and the splitting of the gains from cooperation by making a side payment, it does contain some clear regulatory implications: First, it illustrates the ineffectiveness of limiting the amount paid to audit firms by preventing non-audit fees. Not only would they still be able to negotiate fees but a RA may still decide that it is in its interests to attest to rogue financial statements even without a side payment. Second, the model illustrates the benefits arising from auditor rotation. A RA would risk going beyond V_{CA} or V_{CB} because the likelihood of detection is low. Auditor rotation, if it involves the change of audit firm, would significantly raise the likelihood of detection,

significantly raising x_M in our analysis, and effectively eliminating this option for the auditor. Auditor rotation would also reduce C_C (as it is a present value) and help to eliminate the scenario that if the loss to the incumbent auditor was so great, it would agree to a rogue audit report without even a side payment.

The game-theoretic model also highlights audit quality as an important aspect of auditor independence. Both management and auditor are able to exercise their discretion in the level of audit quality over and above the legally acceptable minimum. Only they know what scope is available to them and the extent to which they may take advantage of it. Until investors also have an indication of the level and changes in audit quality, auditing scandals and the possibility of the indiscriminate penalization by the market of an offending audit firm are likely to persist.

To what extent does the 2007-9 financial crisis confirm the prediction of this model? It was, of course, a time when economic conditions were particularly difficult and the occurrence of accounting fraud was expected to increase and earlier frauds discovered (Kindleberger and Aliber, 2005, Barnes, 2007). However, until the investigations have been completed and the outcomes of the cases that come to court are decided, it is not possible for these to be quantified and the effects and existence of rogue auditors understood. Nevertheless, it is significant that the auditors implicated in the collapse of the two large Ponzi schemes (Madoff and Stanford Financial) were both remarkably small (Fuerman, 2009) and in the wake of most of the large corporate collapses accounting scandals are already emerging.

There is other less dramatic evidence. For example, it is interesting that a negative relationship between audit tenure and earnings management risk has been established in a number of recent post-SOX studies (e.g. Mitra *et al*, 2009). It is also possible to infer behavior consistent with the

model from the empirical evidence relating to auditor going concern decisions and the frequency of Type II errors (corporate failure preceded by a clean audit report). According to Venuti (2004) twelve of the 20 largest bankruptcy filings in US history occurred during 2001 and 2002. All twelve received an unqualified opinion on their most recent financial statements prior to the bankruptcy filing. Also, out of a sample of 202 of the 257 publicly traded bankrupt corporations that filed for bankruptcy in 2001, only 96 (48%) indicated doubts by their auditors as to their ability to continue as going concerns. More recently, Geiger and Rama (2006) found that Big Four audit firms made fewer Type II errors than other firms suggesting a problem of independence for smaller audit firms. As yet, there are no comparable data for 2007-9, but it may be a little unfair to criticize auditors in the same way given the suddenness of the crisis.

On the other hand, the empirical evidence from academic studies into audit opinion shopping in the US does not support the hypotheses. Krishnan (1994) suggested that opinion shopping was futile because incoming audit firms more often issue unfavorable audit opinions than outgoing audit firms. More recent evidence from a variety of perspectives by Lu (2006) concurred, that opinion shopping enhanced audit quality, and there was no evidence of it enabling management to mislead.⁴¹ We will have to wait, therefore, for the full story to emerge and for history to judge.

⁴¹ Also see Vinten, (2003) and DaDalt *et al* (2006). The only exception is Lennox (2003) in a Scottish publication but using US data argued that audit firm changes and retentions suggested that opinion shopping was a powerful predictor of audit firm changes and estimated that opinion

Table 1

Principal Algebraic Notation in Order of Appearance in the Paper.

V_M = the corporation's value as presented by management for audit

V_T = the corporation's 'true' or 'correct' value

V_A = the corporation's value in the opinion of the auditor

U_M = the dollar value of the utility to management of reporting V_M rather than V_T

C_A = the cost of a lawsuit to the auditor arising from a shareholder or third party (subsequently referred to as 'the litigants') acting on the belief that the corporation was worth V_M when it was really worth V_T excluding legal and other costs

C_B = the cost to the auditor of its lost reputation arising from the outside world knowing that it had acted negligently

C_C = the cost to the auditor in terms of lost profits arising from an audit switch

y_1, y_2 = represent the capitalization of lost profits to the auditor arising from the lost reputation in the case of, respectively, an over- and an under-statement.

C_{AT} = the cost to the auditor of a lawsuit including legal and other costs

F_A = the legal and other costs incurred by the auditor

F_L = the legal and other costs incurred by the litigants

V_{CA} = the corporation's value below which C_A and C_B become non-zero for an under-statement

V_{CB} = the corporation's value above which C_A and C_B become non-zero for an over-statement

$p(D)$ = the probability of detection by third parties that $V_M \neq V_T$

V_{A0} = the corporation's value in the opinion of the auditor after its audit but before any additional audit work

$\Omega\sigma_{A0}^2$ = the dollar value of the negative utility to the auditor arising from its uncertainty that $V_{A0} \neq$

V_T

shopping motivated many audit firm dismissals.

V_{AI} = the corporation's value in the opinion of the auditor after its additional audit work

s = the total value of the side payment to RA

x_M = the total costs to the auditor of attesting to V_M

x_{A0} = the total costs to the auditor of attesting to V_{A0}

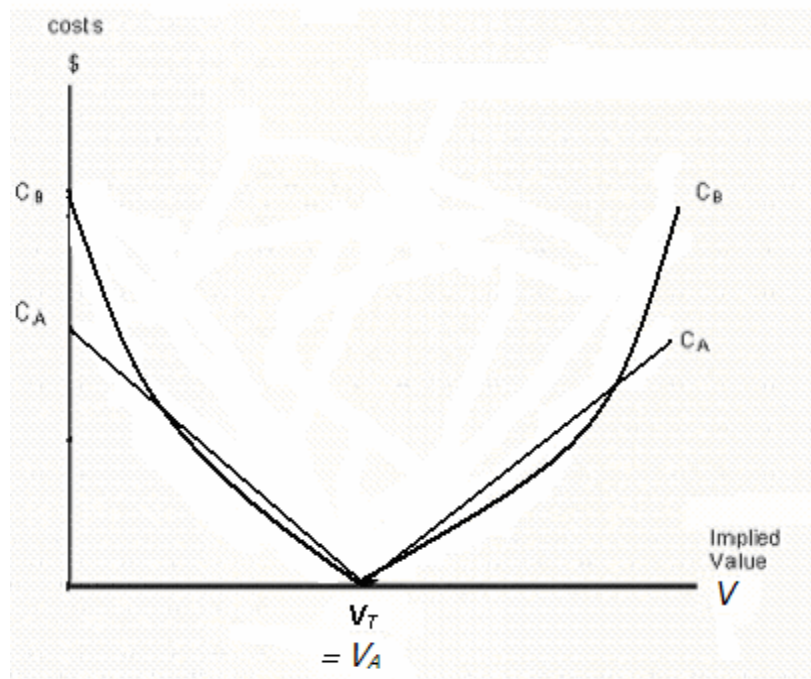
x_{AI} = the total costs to the auditor of attesting to V_{AI}

z = the direct costs to the auditor of the additional audit work

Because these variables are used in an *ex ante* decision making context, they relate to expected values.

Figure 1

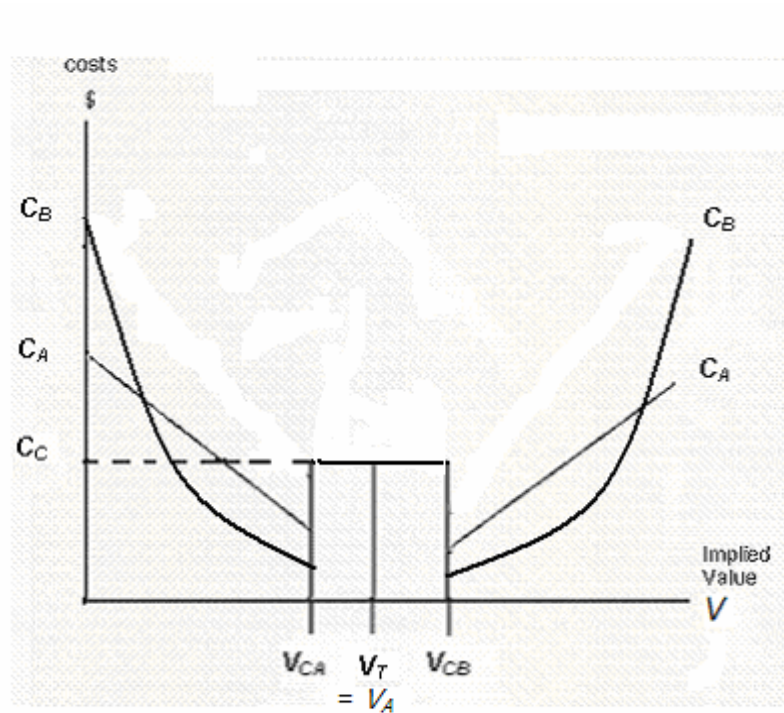
The auditor's costs of agreeing to financial statements implying V where there are no legal costs. (For definitions of V_T , V_A , C_A and C_B see Table 1).



On the left hand side of V_M lines C_A and C_B relate to an under-valuation and on the right hand side they relate to an over-valuation. As there are costs for all other values, the auditor would agree to V_T where they are zero.

Figure 2

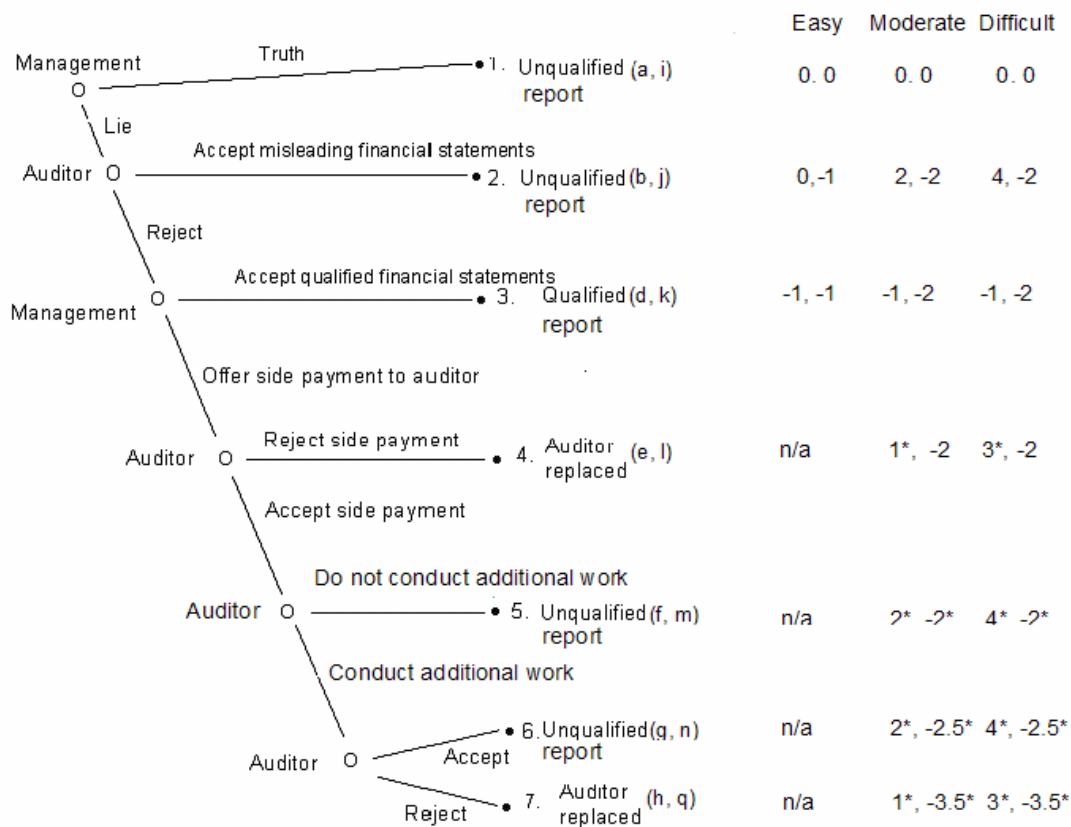
The auditor's costs of agreeing to financial statements implying V where there are legal costs. (For definitions of V_T , V_A , C_A , C_B and C_C see Table 1).



As there are costs for all other values, the auditor would agree to V_{CA} or V_{CB} (depending whether the client's management wishes to under- or over-state its value) where they are zero. Points V_{CA} and V_{CB} represent the points at which C_A and C_B become non-zero for an under-statement and over-statement of value, respectively. C_C is non-zero at or below V_{CA} and at or below V_{CB} .

Figure 3

The Auditor/Management Negotiation Process in Extensive Form together with a Quantification of the Payoffs to Management and Auditor, respectively. (These are defined and computed in the Appendix by reference to the algebraic notation in brackets following the Outcomes).



Appendix

Definitions and Calculation of Illustrative Net Benefit Values for Variables in Figure 3 for Easy, Moderate and Difficult Reporting/Economic Conditions where the Auditor is asked to Attest to V_M rather than V_T . (Variables a to h – client; variables i to q – auditor. ‘*’ indicates before side payment, i.e. excluding s).

Variable	Representation	Definition of Variable if not in Table 1	Illustrative values under the following Reporting/Economic Conditions		
			Easy	Moderate	Difficult
a	a	Starting point	0	0	0
b	$b = U_M$		0 $U_M = 0$	2 $U_M = 2$	4 $U_M = 4$
d^\dagger	$d = a - r$	r = negative signal to market from a qualified audit report	-1 = 0 - 1 $r = 1$	-1 = 0 - 1 $r = 1$	-1 = 0 - 1 $r = 1$
e	$e = a + U_M - t - s$	t = negative signal to the market from a change of auditor	n/a	1* = 0 + 2 - 1 $t = 1$	3* = 0 + 4 - 1 $t = 1$
f	$f = a + U_M - s$		n/a	2* = 0 + 2	4* = 0 + 4
g	$g = a + U_M - s$		n/a	2* = 0 + 2	4* = 0 + 4
h	$h = a + U_M - t - s$		n/a	1* = 0 + 2 - 1	3* = 0 + 4 - 1
i	$i = \Omega\sigma_{A0}^2$	Starting point	0 $\Omega\sigma_{A0}^2 = 0$	-1 $\Omega\sigma_{A0}^2 = 1$	-1 $\Omega\sigma_{A0}^2 = 1$
j	$j = i - x_{A0}$		-1 = 0 - 1 $x_{A0} = 1$	-2 = -1 - 1 $x_{A0} = 1$	-2 = -1 - 1 $x_{A0} = 1$
k	$k = i - v$	v = goodwill caused by auditor ^{††}	-1 = 0 - 1 $v = 1$	-2 = -1 - 1 $V = 1$	-2 = -1 - 1 $v = 1$

l	$l = i - C_c$		n/a	-2 = -1 - 1 $C_c = 1$	-2 = -1 - 1 $C_c = 1$
m	$m = i + s - x_{A0}$		n/a	-2* = -1 - 1	-2* = -1 - 1
n	$n = i + s - x_{AI}$		n/a	-2.5* = -1 - 1.5 $x_{AI} = 1.5$	-2.5* = -1 - 1.5 $x_{AI} = 1.5$
q	$q = i + s - x_{AI} -C_c$		n/a	-3.5* = - 1 - 1.5 - 1	-3.5* = -1 - 1.5 - 1

[†] We assume that the effect of the auditor's qualification is to imply V_T rather than V_M .

^{††} This may adversely affect its future contracting terms, the likelihood of being replaced etc. (Antle and Nalebuff, 1991; Boritz and Zhang, 1999). On the other hand, the qualification may enhance the auditor's reputation but for present purposes, the latter possibility is ignored.

REFERENCES

- Antle, R. and B. Nalebuff, 1991. Conservatism and auditor-client negotiations. *Journal of Accounting Research*, 29 (Supplement): 31-54.
- Akerlof, G.A. 1970. The market for 'lemons': quality uncertainty and the market mechanism. *Quarterly Journal of Economics*, 84(3): 488-500.
- Ashbaugh, H., R. Lafond and B. Mayhew, 2003, Do non-audit services compromise auditor independence? Further evidence. *The Accounting Review*, 78(3): 611-39.
- Barnes, P., 2004. The auditor's going concern decision and types I and II errors: the Coase theorem, transaction costs, bargaining power and attempts to mislead, *Journal of Accounting and Public Policy*, 23(6): 415-440.
- Barnes, P., 2007. Minsky's financial instability hypothesis: Information asymmetry and accounting information: events surrounding the UK financial crises of 1866 and 1987, *Accounting History*, 12(1): 7-27.
- Barnes P., S. Chakravarty and J. Haslam. 1990. Bargaining power, dissimulation, and takeovers in a rational market with asymmetric information, *Journal of Business Finance and Accounting*, 17(4): 529-539.
- Barton, J. 2005. Who cares about auditor reputation? *Contemporary Accounting Research*, 22(3):549-86
- Beattie, V., S. Fearnley, and R. Brandt. 2001. *Behind Closed Doors: What Company Audit is Really About*, Basingstoke, Palgrave.
- Beck, P.J., T.J. Frecka and I. Solomon, 1988. An empirical analysis of the relationship between MAS involvement and auditor tenure: Implications for auditor independence, *Journal of Accounting Literature*, 7: 65-84.
- Boritz, J.E. and P. Zhang. 1999. The auditor's objectivity under a negligence liability system. *Auditing: A Journal of Practice and Theory*, 18(Supplement), 147-164.

- Campisi, S. and K.T. Trotman. 1985. Auditor consensus in going concern judgements, *Accounting and Business Research*, 15(Autumn): 303-10.
- Chaney, P.K. and K.L. Philipich 2002. Shredded Reputation: The Cost of Audit Failure, *Journal of Accounting Research*, 40: 1221-1246.
- Chaney, P.K., DC. Jeter and P.E. Shaw, 2003 The impact on the market for audit services of aggressive competition by auditors, *Journal of Accounting and Public Policy*, 22: 487-516.
- Chung, H. and S. Kallapur, 2003. Client importance, non-audit services, and abnormal accruals, *The Accounting Review*, 78(4): 931-955.
- Coase, R.H., 1960. The Problem of Social Cost, *Journal of Law and Economics*, 3: 1-44.
- Committee on Capital Markets Regulation, Interim Report, December 2006 available at www.capmksreg.org/pdfs/11.30Committee_Interim_Report/REV2.pdf.
- DeAngelo, L. 1981. Auditor independence, "Low balling", and disclosure regulation, *Journal of Accounting and Economics*, 3: 113-127.
- DaDalt, P. J., W. Davidson, and P. Jiraporn, P., 2006. Causes and consequences of auditor shopping: An analysis of auditor opinions, earnings management, and auditor changes. *Quarterly Journal of Business and Economics*, 45(1-2): 69-87.
- DeFond, M. L., K. Raghunandan and K.R. Subramanyam 2002. Do Non-Audit Service Fees Impair Auditor Independence? Evidence from Going Concern Audit Opinions, *Journal of Accounting Research*, 40(4): 1247-1274.
- DeFond, M. L., T. J. Wong and S. Li 1999. The impact of improved auditor independence on audit market concentration in China, *Journal of Accounting and Economics*, 28(3): 269-305.
- Dye, R.A. 1991. Informationally motivated auditor replacement. *Journal of Accounting and Economics*, 14: 347-74.

- Ewert, R and A. Wagenhofer 2005, Economic effects of tightening accounting standards to restrict earnings management, *The Accounting Review*, 80(4):1101-1124.
- Farmer, T., L. Rittenberg and G. Trompeter. 1987. An investigation of the impact of economic and organizational factors on auditor independence. *Auditing: A Journal of Practice & Theory*, 6(Fall): 1-14.
- Fellingham, J.C. and D.P. Newman. 1985. Strategic considerations in auditing *The Accounting Review*, 60(October): 634-650.
- Frankel, R., M. Johnson and K. Nelson, 2002. The relation between auditors' fees for non-audit services and earnings management *The Accounting Review*, 77(Supplement): 71-105.
- Fried, D. and A. Schiff, 1981. CPA switches and associated market reactions. *The Accounting Review*, 56(2): 326-341.
- Fuerman, R.D., 2009. Bernard Madoff and the solo auditor red-flag. *Journal of Forensic & Investigative Accounting* 1(1): 1-38.
- Geiger, M.A., and D.V. Rama, 2006. Audit firm size and going-concern reporting accuracy. *Accounting Horizons* 20(1), 1-17.
- Goldman, A and B. Barlev. 1974. The auditor-firm conflict of interest: Its implications for independence. *The Accounting Review*, 49(October): 707-718.
- Kadous, K. The Effects of Audit Quality and Consequence Severity on Juror Evaluations of Auditor Responsibility for Plaintiff Losses, *The Accounting Review* 75, 3 (2000): 327-341.
- Kadous, K., J. Kennedy and M.E. Peecher 2003. The effect of quality assessment and directional goal commitment on auditors' assessment of client-preferred accounting methods, *The Accounting Review*, 78(3): 759-778.
- Kindleberger, C.P. and R.Z. Aliber 2005. *Manias, Panics, and Crashes: A History of Financial Crises*, 5th edit., Basingstoke, John Wiley & Sons.

- Kinney, W.R., Z. Palmrose and S. Scholz 2004. Auditor independence, non-audit services and restatements: was the U.S. government right? *Journal of Accounting Research*, 42(3): 561-588.
- Klein, B. and K.B. Leffler, 1981. The role of market forces in assuring contractual performance, *Journal of Political Economy*, 89(4) 615-641.
- Knapp, M.C. 1985. Audit conflict: An empirical study of the perceived ability of auditors to resist management pressure, *The Accounting Review*, 60(1): 202-211.
- Kornish, L.J. and C.B. Levine 2004. Discipline with common agency: The case of audit and non-audit services, *The Accounting Review*, 79(1): 173-200.
- Krishnamurthy, S., J. Zhou and N. Zhou 2006. Auditor Reputation, Auditor Independence, and the Stock Market Impact of Andersen's Indictment on Its Client Firms, *Contemporary Accounting Research* 23(2):465-490.
- Krishnan, J. 1994. Auditor switching and conservatism. *The Accounting Review*, 69 (1): 200-215.
- Krishnan, J. and J. Krishnan. 1996. The role of economic trade-offs in the audit opinion decision: An empirical analysis, *Journal of Accounting, Auditing and Finance* 11(4), 565-586.
- Lennox, C.S. 1999. The accuracy and incremental information content of audit reports in predicting bankruptcy, *Journal of Business Finance and Accounting*, 26(7-8): 779-803.
- Lennox, C. 2003. Opinion shopping and the role of audit committees when audit firms are dismissed: The US experience. Edinburgh, The Institute of Chartered Accountants of Scotland.
- Louwers, T.J. 1998. The relation between going-concern opinions and the auditor's loss function, *Journal of Accounting Research* 36(1): 143-153.
- Lu, T., 2006. Does opinion shopping impair auditor independence and audit quality? *Journal of Accounting Research*, 44(3): 561-583.

- Lys, T. and R.L. Watts 1994. Lawsuits against auditors, *Journal of Accounting Research*, 32(Supplement): 65-93.
- Magee, R.P., and M. Tseng, 1990. Audit pricing and independence. *The Accounting Review*, 65(2): 315-336.
- Matsumura, E.M., K.R. Subramanyam and R.R. Tucker. 1997. Strategic Auditor Behaviour and Going Concern Decisions, *Journal of Business Finance and Accounting*, 24(6): 728-751.
- Mitra, S., D.R. Deis and M. Hossain 2009. Pre and Post-SOX Association between Audit Firm Tenure and Earnings Management Risk, *Journal of Forensic & Investigative Accounting* 1(1).
- Mutchler, J.F. 1984. Auditors perceptions of the going concern decision, *Auditing: A Journal of Practice and Theory*, 3(Spring): 17-30.
- Mutchler, J.F. 1985. A multivariate analysis of the auditor's going concern opinion decision, *Journal of Accounting Research*, 23(2): 668-82.
- Nash, J. 1950. The Bargaining Problem, *Econometrica*, 18, 155-162.
- Patterson E.R. and R. Smith, 2003. Materiality uncertainty and earnings misstatement, *The Accounting Review*, 78(3): 819-846.
- Reynolds, J.K. and J.R. Francis, 2000. Does size matter? The influence of large clients on office-level auditor reporting decisions, *Journal of Accounting and Economics*, 30, 375-400.
- Simunic, D. 1980. The pricing of audit services: Theory and evidence, *Journal of Accounting Research*, 18(1): 161-190
- Simunic, D. and M. Stein, 1996. The impact of litigation risk on audit pricing: a review of the economics and the evidence, *Auditing: A Journal of Practice & Theory*, 15(Supplement): 128-142.
- Smith, T. 1992 *Accounting for Growth: Stripping the Camouflage from Company Accounts*, London, Century Business.

- Venuti, E.K., 2004. The going concern assumption revisited: Assessing a company's future viability, *The CPA Journal* 74(5):40-43.
- Vinten, G, 2003. Opinion shopping and the role of audit committees when audit firms are dismissed: the US experience, *Managerial Auditing Journal*, Vol. 18(6-7): 618 – 618.
- Watkins, A.L., W. Hillison, and S.E. Morecroft, 2004. Audit quality: a synthesis of theory and empirical evidence, *Journal of Accounting Literature*, 23.
- Wilson, T.E. Jr., and R.A. Grimlund 1990. An examination of the importance of an auditor's reputation. *Auditing: A Journal of Practice & Theory* 9(2):43-59.
- Zhang, P. 1999 A bargaining model of auditor reporting. *Contemporary Accounting Research*. 16(1), 167-184.