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(new) role of an "emphasis of a matter" paragraph**

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# AUDITOR BEHAVIOR AND THE INSTITUTIONAL ENVIRONMENT: THE (NEW) ROLE OF AN "EMPHASIS OF A MATTER" PARAGRAPH

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This paper investigates the existence of unqualified opinions with an emphasis of a matter paragraph disclosing uncertainties. We show that depending on institutional characteristics, auditors may be either conservative or aggressive, but there are economies where auditors become moderate. We define a moderate auditor as one that issues an emphasis of a matter paragraph instead of a qualified opinion when there is inconclusive evidence on the client's condition or even to disguise conclusive evidence about a bad financial condition. We theoretically explain when the type of behavior – conservative, aggressive or moderate – will take place. In addition, we show that greater client pressure on auditors increases audit quality. Finally, the existence of an emphasis of a matter paragraph always induces investment in the economy, despite being suboptimal. This paper contributes to the existing literature by demonstrating the determinants and consequences of this new type of attestation.

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*JEL-Codes: M42; D92; G21.*

## 1. Introduction

The recent changes in capital market regulation in the United States have motivated extensive debate about their implications for auditors. The Sarbanes-Oxley Act (SOX) was an immediate response to the media coverage and public concern about the corporate scandals. It has had a significant impact on auditors' opinions. This is supported by empirical evidence indicating more conservative auditor behavior, as measured by the increased probability of issuing going concern opinions (e.g., Geiger et al., 2005; Cahan and Zhang, 2006; Li, 2009; Feldmman and Read, 2010).

As the pressure on regulators grows to prevent type II errors,<sup>3</sup> the side effect of au-

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<sup>3</sup>A type II error happens when an auditor issues an unqualified opinion immediately before a company goes bankrupt.

ditors' increased conservatism is the potential cost to companies that receive a qualified opinion<sup>4</sup> but later survive (a "type I error situation"). Overall, the results suggest that the dichotomous classification of an auditor report (qualified versus unqualified) leads to a tradeoff between different types of investment inefficiency<sup>5</sup> and this is true even when auditors apply specific rules rather than their own judgment (Carcello et al., 2009).

Acting as economic agents, auditors decide whether or not to issue a qualified opinion by balancing the pros (protection from liability exposure) and cons (loss of audit fees) (Dye, 1993; Schwartz, 1997). This dilemma can also include different types of modified opinions: for example, auditors in the United States can choose between a qualification and a disclaimer of opinion. Although a disclaimer of opinion can be interpreted differently, usually the empirical literature classifies both in the same category because of their signalization of substantial doubt about the firm's continue existence (LaSalle et al., 1996).

In different institutional environments, it can be argued that auditors can also try to use the potential loopholes and choices within auditing standards to take a middle path regarding the disclosure of uncertainties. They can apply different wording to manage their opinion's interpretation by users, aiming to reduce their exposure to legal liabilities while lowering the risk of losing the client. This can be achieved by an emphasis of a matter paragraph without issuance of a qualified opinion. Empirical evidence from countries like the United Kingdom (Lennox, 2000; Citron and Taffler, 2004), China (Chen et al., 2000; Haw et al., 2003, Li et al., 2008, Chen et al., 2010) and Brazil (Santana, 2009) support this argument. We focus on this practice because users can have different interpretations of an unqualified opinion with an emphasis of a matter paragraph disclosing uncertainties compared to a qualified or an unqualified report.

In the United Kingdom, SAS No. 600 introduced the requirement that auditors have to communicate going concern uncertainties even in unqualified reports. As a consequence, different wording can potentially reduce conflicts between auditors and clients, resulting in an increased number of going concern disclosures (Citron and Taffler, 2004). After the new auditing standard, British companies received qualified reports regarding going concern as well as unqualified with an emphasis of a matter paragraph about uncertainties. The empirical literature has classified both types of reports as modified audit opinions (Lennox, 2000).

In recent years, China has been of one of the most interesting countries to study because of its significant differences from benchmark countries like the U.S. and U.K. The changes in the Chinese institutional environment have enhanced auditor independence (DeFond et al., 1999; Gul et al., 2009) and the perceived risk to legal liability has increased among auditors (Chen et al., 2010). However, one specific issue remains: the practice of issuing an unqualified report with an emphasis of a matter paragraph disclosing uncertainties. This situation is brought up in Chinese auditing literature and usually those reports are treated as qualified opinions (e.g., Chen et al., 2000; Haw et al., 2003; Li et al., 2008;

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<sup>4</sup>As in many empirical papers, we apply the term "qualified opinion" to modified audit opinions as well (e.g., Krishnan and Krishnan, 1996).

<sup>5</sup>Lu and Sapra (2009) demonstrate how auditors' aggressive or conservative behavior affects investment efficiency.

Chen et al., 2010).

In South America, the Brazilian Securities Commission issued an official report expressing concern about the potential misuse of an emphasis of a matter paragraph instead of a qualified opinion (Santana, 2009). From 2006 to 2008, only 4 reports were qualified regarding going concern, against 258 unqualified opinions with an emphasis of a matter paragraph disclosing uncertainties.

The overall impression leads to a negative interpretation of such unqualified reports with an emphasis of a matter paragraph. Authors usually classify these attestations within the same category as other qualified opinions. Since the dilemma faced by auditors can lead to a choice between Type I versus Type II errors, we are interested in explaining this phenomenon, its determinants and consequences.

The theoretical auditing literature highlights two incentives that auditors will take into account before issuing a report: legal liability exposure and audit and non-audit fees (Dye, 1993; Swchartz, 1997). When auditors gather inconclusive evidence, they will take into consideration the clients' risk and act more conservatively or aggressively based on that risk (Lu and Sapra, 2009). The intuition is that the new type of attestation (unqualified reports with an emphasis of a matter paragraph disclosing uncertainties) would be issued to reduce liability exposure and at the same time increase the probability retaining the client (e.g., Chen et al., 2000; Citron and Tafler, 2004). We address these new variables by providing an extension of existing models (Dye, 1993; Schwartz, 1997; Lu and Sapra, 2009) to explain under which circumstances this report will be chosen by auditors.

The main result is that this report may be used as a "disguise" for a qualified opinion as well as to communicate auditors' inconclusive evidence about the client's condition, and hence should be interpreted differently from the traditional classification of reports between unqualified and qualified opinions. However, this type of mechanism will be applied only in softer economic-institutional environments. This result sheds some light on the role of the institutional environment on financial reporting, helping to understand its existence in China and Brazil and not in the U.S. The U.K. is a special case, because there are both qualified and unqualified opinions with an emphasis of a matter paragraph. We also find that in this type of institutional environment, great client pressure, through non-audit fees,<sup>6</sup> induces higher audit quality. Finally, investment will always take place in those jurisdictions, despite being suboptimal. This paper contributes to the literature in many ways. First, it promotes a theoretical explanation of the phenomena discussed in empirical papers from different countries. Second, it shows that classification as a qualification can be inadequate, which can lead to new research designs for empirical papers. Third, it demonstrates how the institutional environment leads to a new type of report and how it affects audit quality and investment efficiency.

The remainder of this paper is organized as follows: Section 2 presents the basic model; Section 3 derives the main results of the audit market and characterizes the equilibrium; and Section 4 concludes.

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<sup>6</sup>We consider as non-audit payment the non-audit services and/or repeated audit engagements.

## 2. The Model

In this model we follow the setup suggested by Lu and Saprà (2009). Consider an economy with three different types of agents: firms, auditors and investors. Firms have a production technology that generates a random output  $G$  if their financial condition is good and  $B$  if their financial condition is bad. In the good case an investment of amount  $k$  provides a return of  $2\mu\sqrt{k}$  where  $\mu > 0$ , otherwise, while in the bad scenario an investment  $k$  generates a low return that we normalized to zero.<sup>7</sup> Also, to guarantee investments in a good state of nature the net present value in this state is positive ( $2\mu\sqrt{k} > k$ ). With an exogenous probability  $\lambda$ , the firm's financial condition will be  $G$ , and with probability  $1 - \lambda$  its financial condition will be  $B$ . As in Lu and Saprà (2009), we refer to the parameter  $1 - \lambda$  as the firm's risk.

As a rational agent, the owner of the firm looks to maximize the firm's value. We assume that an endogenously determined market price  $M$  will be paid by prospective new owners. The new owners require audited financial statements in order to invest  $k$  in the firm's technology.

In the sequence of events, first the firm hires the external auditor and chooses the audit fee; second, the financial statements are suggested by the firm to the auditor. The report  $R_G$  suggests that the financial condition is good, and  $R_B$  suggests it is bad. The firm prefers the favorable report  $R_G$  instead of  $R_B$ , since it is a positive signal on its condition. The auditor collects evidence on the firm's financial condition and then issues an opinion about the client's proposed financial statements. Finally, the market receives the information from the auditor about the firm's financial situation. Figure 1 summarizes this time line.

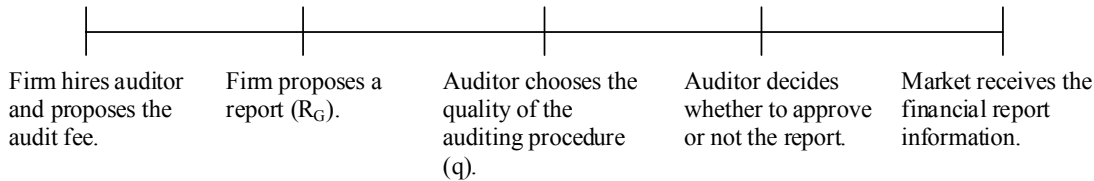


Figure 1: Events time line

When applying auditing procedures, the auditor chooses the level of audit quality  $q$  where  $q \in [0, 1]$ . As a consequence, the higher the effort is to improve audit quality, the higher the cost is. The audit cost  $c(q)$ , is increasing and convex in  $q$  with  $c(0) = 0$ ,  $c'(0) = 0$  and  $c'(1) = \infty$ . As audit quality increases, the evidence about the client's financial condition becomes more accurate. Auditors can obtain a conclusive evidence about the client's condition  $G$  or  $B$  with probability  $q$ . Accordingly, with a probability  $1 - q$  auditors will obtain inconclusive evidence, which we call  $I$ .

The auditor will evaluate the accumulated evidence and then issue an opinion about the client's proposed report  $R_G$ . The auditing literature (Dye, 1993; Schwartz, 1997; Lu

<sup>7</sup>We use this specific return function to make our conclusions mathematically more simpler. However, the results are the same if we use a generic concave function  $R(k)$ , where  $R(0) = 0$ ,  $R'(k) > 0$  and  $R''(k) < 0$ .

and Sapra, 2009) often treats the auditor’s decision as consisting of two possible reports: an unqualified opinion  $R_G$  that agrees with the client or a qualified going concern opinion  $R_B$ . We add an option for auditors to take a middle road by issuing an unqualified opinion with an emphasis of a matter paragraph disclosing uncertainties  $R_{EM}$ . The introduction of this new option leads to three types of auditor behavior when they obtain an inconclusive evidence. Following Lu and Sapra (2009), we define an aggressive auditor as one who issues an unqualified opinion  $R_G$  when in doubt, and a conservative auditor as one who issues a qualified opinion  $R_B$ . We define the third type as a moderate auditor who issues  $R_{EM}$  when in doubt.

To decide on the type of the report ( $R_G$ ,  $R_B$  or  $R_{EM}$ ), the auditor compares the expected benefits from retaining the client against the expected costs from legal liability exposure due to misstatements in the report.<sup>8</sup> The auditor receives an audit fee,  $F$ , independent from the attestation decision. Besides this, retaining the client will lead to additional non-audit fees and audit fees from future work, representing the client’s potential business opportunities, defined as  $\phi$ . This may be the way that clients have to put pressure on auditors’ choices. Thus, auditors lose  $\phi$  if they issue a  $R_B$  report. Based on empirical and anecdotal evidence (e.g., Chen et al., 2000) an auditor that issues a  $R_{EM}$  report will retain the client with probability  $\delta \in [0, 1]$ .<sup>9</sup>

After receiving the audited financial statements, investors will decide whether to make an investment or not. The firm is valued at price  $M$  and if its financial condition is  $G$ , an investment of  $k$  it will generate a return of  $2\mu\sqrt{k}$ . Otherwise, if the bad state of nature ( $B$ ) is realized, the return will be 0. If investors base their decision on a  $R_G$  report and  $B$  is realized, this misstatement will expose the auditor to a legal liability  $L$ . If the report is  $R_{EM}$  instead of  $R_G$ , the liability may be softened because there is a weaker signal of the firm’s bad financial condition. For this case, the legal liability will be  $\eta L$ , where  $\eta \in [0, 1]$ . Therefore, in the unqualified opinion with an emphasis of a matter paragraph, even though the auditor may still be legally liable for overstatement, the punishment is reduced.

Figure 2 illustrates the auditor’s evidence accumulation: nature plays and selects the firm’s financial condition; the auditor is hired at the pair of fees  $F$ ,  $\phi$ ; the client’s proposed report is always  $R_G$ ; auditors defines the level of audit quality  $q$ ; the auditor chooses the attestation  $R_G$ ,  $R_B$  or  $R_{EM}$ , receiving  $\phi$ , 0 and  $\delta\phi$ , respectively. Then, based on all information publicly available as  $\lambda$ ,  $\delta$ ,  $L$ ,  $\phi$ ,  $F$ ,  $\eta$ ,  $\mu$ , the firm is valued at price  $M$  and an investment of  $k$  is made; investors evaluate the return on the investment ( $2\mu\sqrt{k}$  or 0); if the return is 0, the auditor will have a legal liability of  $L$  if the report was  $R_G$  or  $\eta L$  if the report was  $R_{EM}$ .

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<sup>8</sup>Like Dye (1993) and Lu and Sapra (2009) our model does not include a client firm’s legal liability to investors because we focus on the role of auditing.

<sup>9</sup>As Chen et al. (2000, 437) state: “Anecdotal evidence collected through our interviews with regulators and from our reading of Chinese business publications suggests that Chinese auditors often employ unqualified opinions with explanatory notes as a convenient alternative to qualified opinions in order to minimize the probability of losing their clients while avoiding direct violation of auditing standards”.

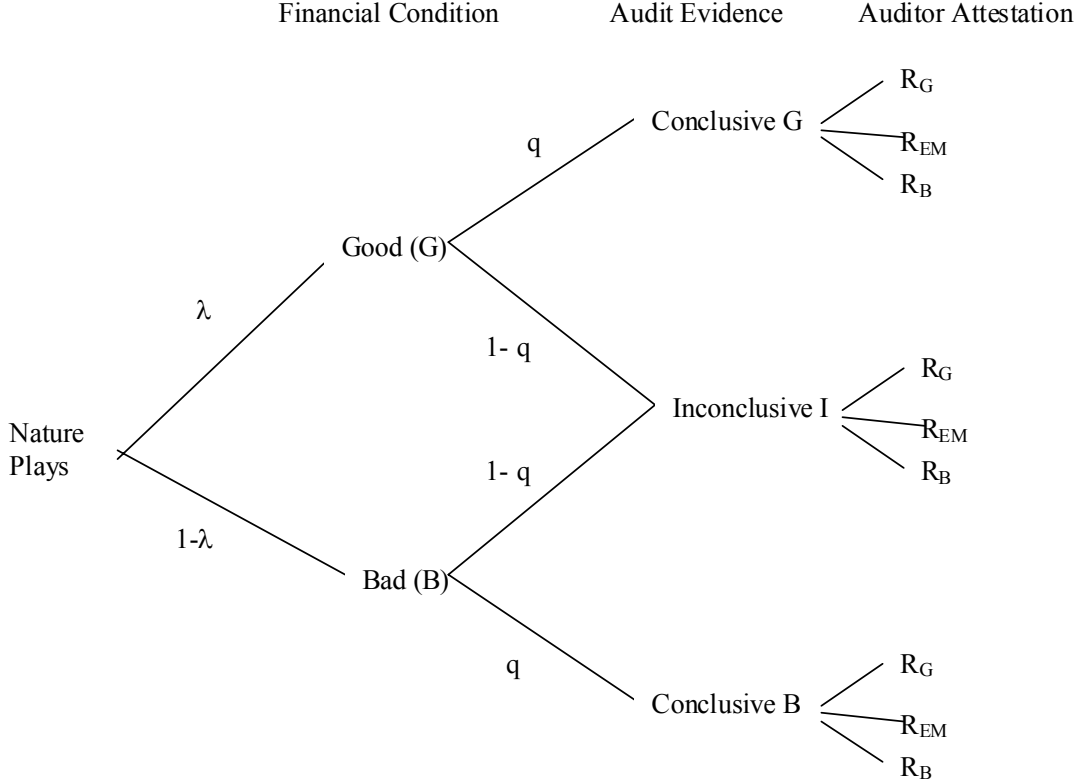


Figure 2: Auditor's evidence accumulation for the attestation

We make the following assumptions: symmetric and imperfect information between the firm and auditor during the auditing process; information asymmetries related to the impossibility for the investor to observe auditing evidence; competitive capital market and audit market. Each agent (firm, auditor and investor) will maximize the respective utility function: the firm will choose auditor fees and non-audit fees ( $F, \phi$ ) in order to maximize their value (expected market price less the expected fees); the auditor will choose audit quality ( $q$ ) and type of attestation ( $R_G, R_B, R_{EM}$ ) that maximizes the gains (auditor fees less legal liability and audit costs); and the investor will choose the investment level ( $k$ ), that maximizes the expected return.

### 3. Auditing Market Equilibrium

To derive the equilibrium implications in the audit market we carefully analyze the determinants of supply and demand for audit services. On the supply side, we characterize the space of possible attestations and audit quality as a function of audit fees  $F$  and  $\phi$ , probability of client retention  $\delta$  and exposure to legal liability ( $L$  or  $\eta L$ ).

Then, we analyze how the capital market interprets the audited financial report in order to value the firm. Since the firm can anticipate the capital market's pricing rule, it will influence the demand for audit services. In order to demand audit services that maximize  $M$ , the firm will choose a specific contract that specifies audit fees and non-audit fees ( $F, \phi$ ), and together with the supply of auditing, the equilibrium of the auditing market is

reached.

### 3.1. The supply side of auditing

The supply of auditing is composed of two main factors: the type of attestation ( $R_G, R_B, R_{EM}$ ) and audit quality ( $q$ ). The auditor faces client pressure to approve favorable reports because she may lose future audit and non-audit fees ( $\phi$ ). However, if the auditor accepts this pressure and concedes a report  $R_G$ , she increases her exposure to legal liability ( $L$ ). Also, the auditor may use a middle mechanism and issue a report  $R_{EM}$  reducing the potential liability by  $1 - \eta$  with a probability  $\delta$  of client retention. Ultimately, if the auditor issues a report  $R_B$ , she loses  $\phi$  reducing her liability exposure to 0. Therefore, the supply of auditor attestation and the quality are functions of the fee-liability ratio.

#### 3.1.1. Supply of auditor attestation

After applying auditing procedures, evidence can be either conclusive or inconclusive about the client's financial condition. As a result, the auditor must compare the expected payoff against the potential exposure to legal liability. Table 1 summarizes the auditor's expected payoffs in addition to audit fee  $F$ :

Table 1: Expected Payoff Matrix - Evidence vs. attestation

| <b>Audit Evidence</b>   | <b>Payoff from <math>R_G</math></b> | <b>Payoff from <math>R_{EM}</math></b> | <b>Payoff from <math>R_B</math></b> |
|-------------------------|-------------------------------------|--|-------------------------------------|
| <b>G (conclusive)</b>   | $\phi$                              | $\delta\phi$                           | 0                                   |
| <b>I (inconclusive)</b> | $\phi - (1-\lambda)L$               | $\delta\phi - (1-\lambda)\eta L$       | 0                                   |
| <b>B (conclusive)</b>   | $\phi - L$                          | $\delta\phi - \eta L$                  | 0                                   |

To derive the auditor's attestation rules, we must compare the auditor's expected payoff among the three possible types of report ( $R_G, R_{EM}$  and  $R_B$ ). The auditor will issue:

- an unqualified opinion if the expected payoff is higher than issuing a qualified opinion and an unqualified opinion with an emphasis of a matter paragraph; or
- an unqualified opinion with an emphasis of a matter paragraph if the expected payoff is higher than an unqualified opinion and a qualified opinion; or
- a qualified opinion if the expected payoff is higher than an unqualified opinion and an unqualified opinion with an emphasis of a matter paragraph.

Table 2 presents the auditor's attestation decision rule.



Table 2: Auditor Decision Rule on attestation

| Audit Evidence   | Issue $R_G$ iff   | Issue $R_{EM}$ iff   | Issue $R_B$ iff   |
|------------------|---|--|---|
| G (conclusive)   | $\phi > \delta\phi$ & $\phi > 0$  | $\phi < \delta\phi$ & $\delta\phi > 0$   | $0 > \phi$ & $0 > \delta\phi$                                       |
| I (inconclusive) | $\phi - (1-\lambda)L > \delta\phi - (1-\lambda)\eta L$<br>& $\phi - (1-\lambda)L > 0$ | $\phi - (1-\lambda)L < \delta\phi - (1-\lambda)\eta L$<br>& $\delta\phi - (1-\lambda)\eta L > 0$ | $\phi - (1-\lambda)L < 0$<br>& $\delta\phi - (1-\lambda)\eta L < 0$ |
| B (conclusive)   | $\phi - L > \delta\phi - \eta L$<br>& $\phi - L > 0$                                  | $\phi - L < \delta\phi - \eta L$<br>& $\delta\phi - \eta L > 0$                                  | $\phi - L < 0$<br>& $\delta\phi - \eta L < 0$                       |

By solving these inequalities, we can characterize for which range of parameters each type of attestation exists. First, we can conclude that when the auditor reaches a conclusive evidence that the financial condition of the client is good, she will always approve the accounting report  $R_G$ .

**Proposition 1** *If the audit evidence is good (conclusive), the auditor will always approve the accounting report  $R_G$ .*

**Proof.** The inequality  $\phi > 0$  holds since  $\phi$  is a payment and is always positive. To prove that  $\phi > \delta\phi$ , suppose that  $\phi \leq \delta\phi$ . But this is true only if  $\delta \geq 1$ , which is a contradiction. ■

Second, for inconclusive evidence, the auditor attestation will depend on the liability discount, i.e., the gains provided from the issuance of an unqualified opinion with an emphasis of a matter paragraph instead of an unqualified opinion ( $1 - \eta$ ); the probability of losing the client ( $1 - \delta$ ); and the business risk ( $1 - \lambda$ ). We can divide the possible solutions of the inconclusive evidence into three distinct cases:

1. The auditor will issue  $R_G$  if the liability reduction ( $1 - \eta$ ) due to the use of an emphasis of a matter paragraph is smaller than the losses of audit and non-audit fees ( $1 - \delta$ ); and if the client has low business risk in a way that the fee-liability ratio is bigger than the firm's risk. Thus, when  $\eta > \delta$  and  $\frac{\phi}{L} < (1 - \lambda)$ , the auditor becomes aggressive and issues  $R_G$ .
2. The auditor will issue  $R_{EM}$  if her marginal gains from liability reduction ( $1 - \eta$ ) exceed the expected losses of audit and non-audit fees ( $1 - \delta$ ), irrespective of the firm's risk. Thus, when  $\eta < \delta$ , the auditor becomes moderate and issues  $R_{EM}$ .
3. The auditor will issue  $R_B$  if the liability reduction ( $1 - \eta$ ) due to the use of an emphasis of a matter paragraph is smaller than her losses of audit and non-audit fees ( $1 - \delta$ ); and if the client has high business risk in a way that the fee-liability ratio is smaller than the firm's risk. Thus, when  $\eta > \delta$  and  $\frac{\phi}{L} > (1 - \lambda)$ , the auditor becomes conservative and issues  $R_B$ .

Figure 3 below illustrates the possible areas for each type attestation if the evidence is inconclusive. Consider a medium business risk ( $1 - \lambda = 1/2$ ), and a probability of losing

the client equal to one-half ( $1 - \delta = 1/2$ ). We will vary the level of liability discount (through the parameter  $\eta$ ) to evaluate how it affects the set of possible attestations. The dashed line (decreasing slope) represents the inequality  $\delta\phi - (1 - \lambda)\eta L \leq \phi - (1 - \lambda)L$ , where above the line means that  $R_G$  gives a higher payoff than  $R_{EM}$ , and below it  $R_{EM}$  gives a higher payoff than  $R_G$ . The dotted line (positive slope) represents the inequality  $\delta\phi - (1 - \lambda)\eta \geq 0$ , where above the line means that  $R_{EM}$  is better than  $R_B$ , and below it  $R_B$  is better than  $R_{EM}$ . Finally, the solid line (horizontal) represents the inequality  $\phi - (1 - \lambda)L \leq 0$ , where above it  $R_G$  is better than  $R_B$ , and below it  $R_B$  is better than  $R_G$ . Therefore,  $R_{EM}$  attestation occurs for all parameters in the area area below the blue line and above the red line; the area above both the blue and brown lines is the area of  $R_G$  attestation; and finally the area below both the red and brown lines is the area of  $R_B$  attestation.

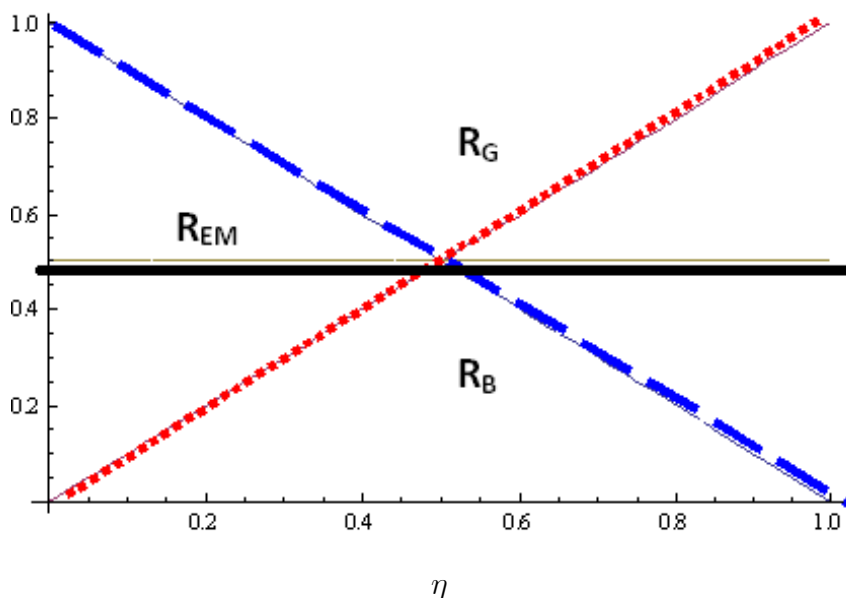


Figure 3: Attestation area.

Finally, if the audit evidence is conclusive about a bad financial condition of the client, the auditor's attestation will depend on the fee-liability ratio ( $\frac{\phi}{L}$ ), the liability discount ( $1 - \eta$ ) and the probability of losing the client ( $1 - \delta$ ). The possible solutions are the following:

1. When  $\eta > \delta$  and  $\phi - L > 0$ , the auditor will issue  $R_G$ .
2. When  $\eta < \delta$ ,<sup>10</sup> the auditor will always issue  $R_{EM}$ . This is in line with empirical auditing literature, which raises concerns about the possible "disguise" of qualified opinions through an emphasis of a matter paragraph (e.g., Chen et al., 2000). However, as  $R_{EM}$  may also mean that the evidence is inconclusive (case previously discussed), its meaning can be interpreted differently, partially corroborating the empirical treatment of those reports as qualified opinions.
3. When  $\eta > \delta$  and  $\phi - L < 0$ , the auditor issues  $R_B$ .

<sup>10</sup>We will call economies where  $\delta > \eta$  as "softer economic-institutional environment".

**Proposition 2** *If the audit evidence is not good (conclusive), for an economy where the marginal gains from liability reduction ( $1 - \eta$ ) exceeds the marginal cost of losing the client ( $1 - \delta$ ), the auditor will always issue an unqualified opinion with an emphasis of a matter paragraph.*

**Proof.** Solve both inequalities. ■

Since the fee-liability ratio ( $\frac{\phi}{L}$ ) represents the cost-benefit for the auditor, we present the auditor attestation decision as a function of ( $\frac{\phi}{L}$ ).

**Claim 3** *Auditor attestation is a function of  $\frac{\phi}{L}$ :*

1. In an economy with marginal gains from audit and non-audit fees bigger than marginal losses from liability exposure ( $\delta > \eta$ ):
  - (a) The auditor issue  $R_{EM}$ , unless the auditor evidence  $G$ .
2. In an economy with marginal gains from audit and non-audit fees smaller than marginal losses from liability exposure ( $\delta < \eta$ ):
  - (a) When  $\frac{\phi}{L} \leq 1 - \lambda$ , the auditor issues  $R_B$ , unless the evidence is  $G$ , in which case she issues  $R_G$ ;
  - (b) When  $\frac{\phi}{L} \in [1 - \lambda, 1]$  the auditor issues  $R_G$ , unless the evidence is  $B$ , in which case she issues  $R_B$ ;
  - (c) When  $\frac{\phi}{L} \geq 1$ , the auditor always issues  $R_G$ .

So far, the findings help to better understand how different institutional settings lead to different types of reports. When the institutional environment provides  $\delta > \eta$ , the emphasis of a matter paragraph will be used either to express doubt about inconclusive evidence or as a substitute for a qualified opinion when the evidence is conclusive about the client's bad financial condition. This happens irrespective of client risk, helping to explain empirical evidence from the United Kingdom,<sup>11</sup> China and Brazil. On the other hand, when the institutional environment provides  $\delta < \eta$ , the auditor decision will never be  $R_{EM}$ , the case for the United States, for example.

Notice that changes in the main parameters  $\lambda$ ,  $\delta$  and  $\eta$  lead to significant changes in the area of possible attestations. To analyze the impact of changes in these parameters on the attestation likelihood, we consider the following:

- An increase (decrease) in the liability discount (i.e., decrease (increase) of  $\eta$ ) increases (decreases) the auditor moderate action, resulting in a higher (lower) likelihood of misstatements biased toward  $R_{EM}$ ;
- An increase (decrease) in the probability to retain the client if the auditor issues  $R_{EM}$  (i.e., increase (decrease) of  $\delta$ ) increases (decreases) the auditor moderate action as well, resulting in a higher (lower) likelihood of misstatements biased toward  $R_{EM}$ ;
- An increase (decrease) in the client's risk (i.e., a decrease (increase) of  $\lambda$ ) reduces the likelihood of conservative (aggressive) misstatements by the auditor.

<sup>11</sup>The empirical study by Lennox (2000) provides evidence that there are qualified opinion regarding going concern as well as unqualified reports with an emphasis of a matter paragraph regarding uncertainties.

### 3.1.2. Supply of Audit Quality

The auditor's expected utility is defined by the expected payoff less the cost of effort in performing the audit procedure  $c(q)$ . For a given fee-liability ratio  $\frac{\phi}{L}$ , the choice of audit quality is conditional on the attestation strategy. So, we split our discussion for each type of auditor behavior.

#### Conservative Auditor ( $\delta < \eta$ and $\frac{\phi}{L} \leq 1 - \lambda$ )

A conservative auditor issues  $R_G$  only if she concludes that the firm is  $G$ . This situation happens with probability  $\lambda q$ , and the auditor receives  $\phi$  for issuing a report without reservations. For all other situations (inconclusive evidence and conclusive evidence about a bad financial situation), she issues  $R_B$  and loses the client. However, in this situation, there is no misstatement and therefore no liability. Thus, a conservative auditor's utility ( $U_{CA}$ ) is defined as her certain gains  $F$  for sure plus  $\phi$  with probability  $\lambda q$ , and cost  $c(q)$ , which depends on the choice of audit quality  $q$ . The auditor's expected utility ( $U_{CA}$ ) is:

$$U_{CA} = \lambda q \cdot \phi + F - c(q) \quad (1)$$

Since the auditor behaves rationally, she chooses  $q$  to maximize her expected utility. Solving the optimization problem for the conservative auditor  $U_{CA}$ , we have:

$$q^* = c'^{-1}(\lambda\phi), \quad (2)$$

where  $c'^{-1}(\cdot)$  is an increasing function since  $c(\cdot)$  is a convex function. Therefore, if the fee-liability ratio increases ( $\uparrow \frac{\phi}{L}$ ), the supply of audit quality also increases. As the client's risk decreases ( $\uparrow \lambda$ ) the supply of audit quality increases as well.<sup>12</sup>

#### Aggressive Auditor ( $\delta < \eta$ and $\frac{\phi}{L} \geq 1 - \lambda$ )

An aggressive auditor issues  $R_G$  if she obtains either conclusive evidence  $G$  or inconclusive evidence. The first situation happens with probability  $\lambda q$ , in which she receives  $\phi$  for issuing a report without reservations; the second situation happens with probability  $(1 - q)$  and then she receives  $\phi$  and may be liable for  $L$  with probability  $(1 - \lambda)$ . Therefore, the auditor's expected utility (represented by  $U_{AA}$  for an aggressive type of attestation) is:

$$U_{AA} = \lambda q \cdot \phi + (1 - q) \cdot (\phi - (1 - \lambda)L) + F - c(q) \quad (3)$$

Solving the optimization problem for the aggressive auditor  $U_{AA}$ , we have:

$$q^* = c'^{-1}((1 - \lambda)(L - \phi)) \quad (4)$$

where  $c'^{-1}(\cdot)$  is an increasing function. Therefore, if the fee-liability ratio increases ( $\uparrow \frac{\phi}{L}$ ), the audit quality decreases. Also, as the client's risk decreases ( $\uparrow \lambda$ ), the audit quality decreases as well.<sup>13</sup>

<sup>12</sup>Since  $\frac{dq}{d\phi} = \frac{1}{c'}\lambda > 0$  and  $\frac{dq}{d\lambda} = \frac{1}{c'}\phi > 0$ .

<sup>13</sup>Since  $\frac{dq}{d\phi} = -\frac{1}{c'}(1 - \lambda) < 0$  and  $\frac{dq}{d\lambda} = -\frac{1}{c'}(L - \phi) < 0$ .

### Moderate Auditor ( $\delta > \eta$ )

A moderate auditor issues  $R_G$  only if she obtains a conclusive evidence  $G$ ; otherwise she issues  $R_{EM}$ . Thus, when she issues  $R_G$ , with probability  $\lambda q$ , she receives  $\phi$ . For all other situations she issues  $R_{EM}$  and receives  $\phi$  with probability  $\delta$  and incurs liability  $\eta L$  with probability  $(1 - \lambda)$  if the client's financial situation is  $B$ . Therefore, the auditor's expected utility (represented by  $U_{MA}$ ) for a moderate attestation is:

$$U_{MA} = \lambda q \cdot \phi + (1 - q)(\delta\phi - (1 - \lambda)\eta L) + q(1 - \lambda)(\delta\phi - \eta L) + F - c(q) \quad (5)$$

Solving the optimization problem for the moderate auditor  $U_{MA}$ , we have:

$$q^* = c'^{-1}(\lambda(1 - \delta)\phi) \quad (6)$$

where  $c'^{-1}(\cdot)$  is an increasing function. Therefore, if the fee-liability ratio increases ( $\uparrow \frac{\phi}{L}$ ), the audit quality increases, but at a lower rate compared to the conservative case. As the probability of client retention increases ( $\uparrow \delta$ ), the audit quality decreases. Finally, as the client's risk decreases ( $\uparrow \lambda$ ) the audit quality increases, but at a lower rate than in the conservative case.<sup>14</sup>

### Summary

To study the supply of audit quality, our analysis was divided for each type of auditor behavior. Describing audit quality as a function of the fee-liability ratio we have the following:

1. For a conservative auditor, an increase in the fee-liability ratio increases audit quality, meaning that the pressure of the client on the auditor has a positive effect. The intuition behind this result is that the auditor may make a Type I error (saying that the firm is  $B$  when in fact it is  $G$ ) and lose business opportunities offered by her client of value  $\phi$ . The higher the fee, the larger the expected loss is from making a mistake relative to the client's condition. Therefore, higher fees provide more incentives to the auditor to increase audit quality.
2. For an aggressive auditor, an increase in the fee-liability ratio reduces audit quality. In this case, the auditor may make a Type II error (saying that the firm is  $G$  when in fact it is  $B$ ), incurring a legal liability. However, as the fee increases, the auditor's expected losses from such an error are reduced, leading to a lesser effort in terms of audit quality.
3. For a moderate auditor, an increase in the fee-liability ratio increases audit quality. However, the sensitivity is lower than in the conservative case. The intuition is that if the auditor expects to receive  $\delta\phi$  and to lose business opportunities offered by her client of value  $(1 - \delta)\phi$ . To a lesser extent compared to the conservative auditor, the higher the fee, the higher the expected losses are from losing the client. On the other hand,  $\phi$  provides less incentive for the auditor to increase quality because the expected loss is lower than for the conservative auditor ( $(1 - \delta)\phi < \phi$ ).

<sup>14</sup>Since  $\frac{dq}{d\phi} = \frac{1}{c'}\lambda(1 - \delta) > 0$ ,  $\frac{dq}{d\delta} = \frac{1}{c'}(-\phi\lambda) < 0$  and  $\frac{dq}{d\lambda} = \frac{1}{c'}\phi(1 - \delta) > 0$ .

### 3.2. Investors expectation and price formation

In this section we analyze how audited financial statements are used by investors to value the firm and then decide to invest or not in the firm's production technology. Since the type of auditor behavior and the chosen audit quality affect the information in the firm's financial report, we show that both affect the market price and the investment decision.

Since the firm and the auditor have more information about the firm's real financial situation (i.e., there is an asymmetric information problem), investors, despite not knowing whether the firm's financial condition is  $G$  or  $B$ , may infer it from all publicly available information. We call  $p$  the investors' perceived probability of financial condition  $G$ , i.e.,  $p \equiv P(G \setminus \text{investors' information set})$ . Since we have defined that an investment  $k$  will generate a return of  $2\mu\sqrt{k}$  if the financial condition is  $G$ , and 0 if it is  $B$ , investors will choose the amount of  $k$  that maximizes their net expected value:

$$\text{Max}_k p \cdot 2\mu\sqrt{k} - k \quad (7)$$

Solving the investor problem implies that the firm's optimal investment is an amount of  $k = p^2\mu^2$ .

The investors' belief  $p$  in financial condition  $G$  depends on the the information in the audited report, which in turn depends on the auditor's behavior, attestation and audit quality. Since  $\phi$  and  $L$  are common knowledge in our environment, investors are able to use them to form their expectations. Conditioning the probability of  $G$  or  $B$  on their information set, we apply the Bayes rule to derive investors' beliefs:<sup>15</sup>

- If the auditor is conservative:

$$\begin{aligned} - P(G/R_G, C, q) &= \frac{P(R_G/G)P(G)}{P(R_G)} = \frac{q\lambda}{q\lambda} = 1 \text{ and therefore } P(B/R_G, C, q) = 0 \\ - P(G/R_B, C, q) &= \frac{P(R_G/B)P(B)}{P(R_G)} = \frac{\lambda(1-q)}{1-\lambda q} \text{ and therefore } P(B/R_B, C, q) = \frac{P(R_B/B)P(B)}{P(R_B)} = \frac{1-\lambda}{1-\lambda q} \\ - P(G/R_{EM}, C, q) &\Rightarrow \# \text{ and } P(B/R_{EM}, C, q) \Rightarrow \# \end{aligned}$$

- If the auditor is aggressive:

$$\begin{aligned} - P(G/R_G, A, q) &= \frac{P(R_G/G)P(G)}{P(R_G)} = \frac{\lambda}{1-q(1-\lambda)} \text{ and therefore } P(B/R_G, A, q) = \frac{1-\lambda-q(1-\lambda)}{1-q(1-\lambda)} \\ - P(G/R_B, A, q) &= \frac{P(R_B/G)P(G)}{P(R_B)} = 0 \text{ and therefore } P(B/R_B, A, q) = 1 \\ - P(G/R_{EM}, A, q) &\Rightarrow \# \text{ and } P(B/R_{EM}, A, q) \Rightarrow \# \end{aligned}$$

- If the auditor is moderate:

$$- P(G/R_G, M, q) = \frac{P(R_G/G)P(G)}{P(R_G)} = \frac{q\lambda}{q\lambda} = 1 \text{ and therefore } P(B/R_G, M, q) = 0$$

<sup>15</sup>See figure 2.

$$\begin{aligned}
& - P(G/R_B, M, q) \Rightarrow \# \text{ and } P(B/R_B, M, q) \Rightarrow \# \\
& - P(G/R_{EM}, M, q) = \frac{P(R_G/B)P(B)}{P(R_G)} = \frac{\lambda(1-q)}{1-\lambda q} \text{ and therefore } P(B/R_{EM}, M, q) = \\
& \quad \frac{P(R_B/B)P(B)}{P(R_B)} = \frac{1-\lambda}{1-\lambda q}
\end{aligned}$$

In sum,  $R_G$  perfectly reveals a good financial condition if the auditor is conservative or moderate. In the same way,  $R_B$  perfectly reveals a bad financial condition if the auditor is aggressive. A moderate auditor never issues  $R_B$  and conservative and aggressive auditors never issue  $R_{EM}$ .

Given investors' beliefs  $p$  on firms' financial condition and replacing it in the investors' optimal investment ( $k = p^2\mu^2$ ), we have the optimal amount of investment given the investors' information on the auditor's attestation, profile and the audit quality. The optimal amount of investment is then the following:

1. Optimal investment if the auditor is conservative and the audit quality is  $q$ :

$$\begin{aligned}
& (a) R_G : k(R_G, C, q) = \mu^2 \\
& (b) R_B : k(R_B, C, q) = \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2 \\
& (c) R_{EM} : k(R_{EM}, C, q) \Rightarrow \#
\end{aligned}$$

2. Optimal investment if the auditor is aggressive and the audit quality is  $q$ :

$$\begin{aligned}
& (a) R_G : k(R_G, A, q) = \left[ \frac{\lambda}{1-q(1-\lambda)} \right]^2 \mu^2 \\
& (b) R_B : k(R_B, A, q) = 0 \\
& (c) R_{EM} : k(R_{EM}, A, q) \Rightarrow \#
\end{aligned}$$

3. Optimal investment if the auditor is moderate and the audit quality is  $q$ :

$$\begin{aligned}
& (a) R_G : k(R_G, M, q) = \mu^2 \\
& (b) R_B : k(R_B, M, q) \Rightarrow \# \\
& (c) R_{EM} : k(R_{EM}, M, q) = \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2
\end{aligned}$$

To measure the investment inefficiencies we use as a benchmark the first best results, i.e., there is no asymmetric information between the market and the auditor. The benchmark is as follows:

1. if the evidence is conclusive ( $G$ ), the audit report is  $R_G$  and the investment will be  $k^{FB}(R_G) = \mu^2$ ;
2. if the evidence is inconclusive ( $I$ ), the audit report is  $R_{EM}$  and the investment will be  $k^{FB}(R_{EM}) = \lambda^2(1-q)^2\mu^2$ ;
3. if the evidence is conclusive ( $B$ ), the audit report is  $R_B$  and the investment will be  $k^{FB}(R_B) = 0$ .

For an attestation from a conservative auditor, we have no inefficiency if she issues  $R_G$ , since it perfectly reveals the firm's financial condition. On the other hand, there is an overinvestment if she issues  $R_B$ , since  $k(R_B, C, q) = \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2 > 0 = k^{FB}(R_B)$ . The overinvestment occurs because investors recognize that the understatement is possible, and this doubt make them choose an investment level higher than in the case that they know for sure that the firm is in a bad financial situation.

For an attestation from a aggressive auditor, we have no inefficiency if she issues  $R_B$ . However, there is underinvestment if she issues  $R_G$ , since  $k^{FB}(R_G) = \mu^2 > \left[ \frac{\lambda}{1-q(1-\lambda)} \right]^2 \mu^2 = k(R_G, A, q)$ . Investors know that a favorable report may be issued by an aggressive auditor even in the case of a bad financial condition (but inconclusive), so they take this into account and choose a lower investment level than in the first best situation, leading to underinvestment.

Note that the previous cases can be observed in economies where  $\delta < \eta$  and the results show that depending on auditor behavior either overinvestment (conservative) or underinvestment (aggressive) can occur. This is in line with the findings of Lu and Saprà (2009). Instead, in economies where  $\delta > \eta$ , auditors will always be moderate and there can only be overinvestment. For this case, there is no inefficiency (investment of  $\mu^2$ ) if the moderate auditor issues  $R_G$ , since it perfectly reveals the firm's financial condition  $G$ . On the other hand, if she issues  $R_{EM}$ , there is overinvestment because  $k(R_{EM}, M, q) = \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2 > \lambda^2(1-q)^2 \mu^2 = k^{FB}(R_{EM})$ .<sup>16</sup> It is important to highlight that investment always takes place.

**Proposition 4** *For economies where the marginal gains from liability reduction  $(1 - \eta)$  exceed the marginal cost from losing the client  $(1 - \delta)$ , a positive amount of investment always takes place.*

One interesting result is that the magnitude of overinvestment for moderate auditors will be smaller than for conservative auditors. The reason is that investors see there is a possibility that the firm has a good financial situation so, the benchmark investment value will be higher than for the conservative case ( $\lambda^2(1-q)^2 \mu^2 > 0$ ).

For all three cases, there is an improvement in investment efficiency when audit quality increases. However, notice that if  $q \rightarrow 1$ , there is no inconclusive evidence. In this case, the  $R_{EM}$  acts exactly as a  $R_B$  in a weaker institutional environment. This means that the emphasis of a matter paragraph may act as a substitute for qualified opinions in these institutional environments ( $\delta > \eta$ ). We have  $k^{FB}(R_{EM}) \rightarrow k^{FB}(R_B) = 0$  if  $q \rightarrow 1$ . Therefore, as  $q \rightarrow 1$ :

$$\begin{aligned} k(R_B, C, q) &= \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2 \rightarrow 0 \Rightarrow k(R_B, C, q) \rightarrow k^{FB}(R_B) \\ k(R_G, A, q) &= \left[ \frac{\lambda}{1-q(1-\lambda)} \right]^2 \mu^2 \rightarrow \mu^2 \Rightarrow k(R_G, A, q) \rightarrow k^{FB}(R_G) \\ k(R_{EM}, M, q) &= \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2 \rightarrow 0, \text{ and } k^{FB}(R_{EM}) \rightarrow 0 \Rightarrow k(R_{EM}, M, q) \rightarrow k^{FB}(R_{EM}). \end{aligned}$$

<sup>16</sup>This inequality holds since  $\lambda q \in (0, 1)$ .



The price formation under competitive capital market is usually given by investors' expected return on investment. However, here we have an additional cost due to the misstatement in the audited accounting report. In this case, the firm's market price is equal to the investors' expected return plus their expected damage award for the misstatement in order to balance the costs of potential liability.

Since we have derived the investors' beliefs and their optimal amount of investment, we are able to price the firm:

$$M = p \cdot 2\mu\sqrt{k} - k + E(L)$$

1. For a conservative auditor and audit quality  $q$ , and:

(a) for a given  $R_G$ , the firm's price is:  $M(R_G, C, q) = 1 \cdot 2\mu\sqrt{\mu^2} - \mu^2 + 0 = \mu^2$

(b) for a given  $R_B$ , the firm's price is:  $M(R_B, C, q) = \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2$

(c) for a given  $R_{EM}$ : this situation does not exist.

2. For an aggressive auditor and audit quality  $q$ , and:

(a) for a given  $R_G$ , the firm's price is:  $M(R_G, A, q) = \left[ \frac{\lambda}{1-q(1-\lambda)} \right]^2 \mu^2 + \frac{1-\lambda-q(1-\lambda)}{1-q(1-\lambda)} L$

(b) for a given  $R_B$ , the firm's price is:  $M(R_B, A, q) = 0$

(c) for a given  $R_{EM}$ : this situation does not exist.

3. For a moderate auditor and audit quality  $q$ , and:

(a) for a given  $R_G$ , the firm's price is:  $M(R_G, M, q) = \mu^2$

(b) for a given  $R_B$ : this situation does not exist

(c) for a given  $R_{EM}$ , the firm's price is:  $M(R_{EM}, M, q) = \left[ \frac{\lambda(1-q)}{1-\lambda q} \right]^2 \mu^2 + \frac{1-\lambda}{1-\lambda q} \eta L$ .

Thus, price formation in the capital market depends on the report, auditor behavior and audit quality. Notice that it does not only depend on the accounting report, it also depends of the interpretation of investors of the auditor's profile and the institutional environment that they are subjected.

### 3.3. The demand side of auditing

Firms always look to maximize their market value. Given that market prices vary a lot with auditor behavior and audit quality, firms aim to induce auditor behavior in order to fulfill their objectives.

To derive firms' demand for auditing, first we have to see how auditor behavior and audit quality affect the expected payoff. Once again, we divide our analysis for each type of auditor profile: conservative, aggressive and moderate.

**The case of a conservative auditor** ( $\delta < \eta$  and  $\frac{\phi}{L} < 1 - \lambda$ )

The function  $V_C$  represents the firm's expected value given a conservative auditor and audit quality:

$$V_C \equiv \lambda q \cdot \mu^2 + (1 - \lambda q) \cdot \left[ \frac{\lambda(1 - q)}{1 - \lambda q} \right]^2 \mu^2 - \lambda q \cdot \phi - F \quad (8)$$

where the first two terms represent the firm's price if the report is unqualified ( $R_G$ ) and if its qualified ( $R_B$ ). The last two are the contingent payment of non-audit fee and the audit fee, respectively. Maximizing the firm's objective function with respect to quality  $q$ , the firm finds the optimal level of audit quality.

**The case of an aggressive auditor** ( $\delta < \eta$  and  $\frac{\phi}{L} > 1 - \lambda$ )

The function  $V_A$  represents the firm's expected value given an aggressive auditor and audit quality:

$$V_A \equiv [1 - (1 - \lambda)q] \cdot \left[ \left[ \frac{\lambda}{1 - q(1 - \lambda)} \right]^2 \mu^2 + \frac{1 - \lambda - q(1 - \lambda)}{1 - q(1 - \lambda)} L \right] + (1 - \lambda)q \cdot 0 - [1 - (1 - \lambda)q] \cdot \phi - F \quad (9)$$

where the first two terms represent the firm's price if the report is  $R_G$  and if the report is  $R_B$ . In this case, the payoff when  $R_B$  is issued is equal to zero, and the last two terms are the contingent payment of non-audit fees and the audit fees respectively. Maximizing the firm's objective function with respect to quality  $q$ , the firm finds the optimal level of audit quality.

**The case of a moderate auditor** ( $\delta > \eta$ )

The function  $V_M$  represents the firm's expected value given a moderate auditor and audit quality:

$$V_M \equiv \lambda q \cdot \mu^2 + (1 - \lambda q) \cdot \left[ \left[ \frac{\lambda(1 - q)}{1 - \lambda q} \right]^2 \mu^2 + \frac{1 - \lambda}{1 - \lambda q} \eta L \right] - \lambda q \cdot \phi - (1 - \lambda q) \cdot \delta \phi - F \quad (10)$$

where the first two terms represent the firm's price if the report is  $R_G$  and if the auditor issues  $R_{EM}$ , and the last three are the payment terms. The first term is the contingent payment of non-audit fees in case of  $R_G$ ; the second term refers to the contingent payment in case of  $R_{EM}$  and the last term refers to the audit fees. Maximizing the firm's objective function with respect to quality  $q$ , the firm finds the optimal level of audit quality.

### 3.3.1. Demand for attestation

In this section we analyze the demand for attestation and how it is related to economic-institutional parameters. First, given the assumption of a competitive audit market, the auditor's expected payoff is equal to her outside option, which we assume, for simplicity, to be zero. Therefore, for a conservative auditor, using the expected utility represented by equation (1) and equating it to her outside option, we have:

$$\lambda q \cdot \phi + F - c(q) = 0.$$

Attaching it to the firm's value, for the conservative case (8) we have:

$$V_C = \frac{\lambda(\lambda + q - 2q\lambda)}{1 - \lambda q} \mu^2 - c(q). \quad (11)$$

Repeating the same procedure for the aggressive and moderate auditor's behavior, we have:

$$V_A = \frac{\lambda^2}{1 - (1 - \lambda)q} \mu^2 - c(q). \quad (12)$$

and

$$V_M = \frac{\lambda(\lambda + q - 2q\lambda)}{1 - \lambda q} \mu^2 - c(q). \quad (13)$$

If we have  $\delta < \eta$ , two types of behavior are possible: conservative and aggressive. To find the region of optimal attestation, let us consider the difference between the firm's worth for each case as the metric to be studied. We would like to know the value of  $\lambda$  that makes this metric equal to zero. More precisely, we want to find a threshold point  $\lambda^*$  that makes  $\left| \frac{V_C - V_A}{\frac{\lambda(\lambda + q - 2q\lambda)}{1 - \lambda q} \mu^2 - \frac{\lambda^2}{1 - (1 - \lambda)q} \mu^2} \right| = 0$ .

We find that when  $\lambda^* = 0.5$ , the marginal benefits of demanding a conservative auditor are equal to the marginal benefits of demanding an aggressive auditor. For all  $\lambda > \lambda^*$  (except for  $\lambda = 1$ ), the marginal gains from an aggressive auditor are larger than those from a conservative auditor. Conversely, if  $\lambda < \lambda^*$ , the marginal gains will be larger for the conservative auditor (except for  $\lambda = 0$ ).<sup>17</sup>

In economies where  $\delta > \eta$ , auditors will always behave moderately (see Proposition 2). This happens because the marginal gains from issuing an unqualified opinion with an emphasis of a matter paragraph (represented by a reduction in the liability) exceeds the marginal costs (reduction in the expected gains from non-audit fee). Thus, and unlike the other type of economy ( $\delta < \eta$ ), it is not possible for a firm to induce a specific type of behavior through  $\phi$ . Additionally, the type of attestation will also be independent of the business risk.

**Remark 5** *For an economic-institutional environment where  $\delta > \eta$ , no attestation management is possible since the only behavior available is the moderate one.*

<sup>17</sup>See Lu and Sapra (2009) for the economic intuition.

### 3.3.2. Audit quality demand

Firms will demand a level of audit quality in order to maximize their value. In other words, we need to compare the marginal gains from audit quality versus the marginal losses to infer the firm's demand for audit quality.

Consider equations (8), (9) and (10). Rewriting these equations with respect to the quality variable,  $q$ , we have the following results:

1. For a conservative auditor:

$$\left( \frac{\lambda^2(q + \lambda - 2q\lambda)}{(1 - q\lambda)^2} + \frac{(1 - 2\lambda)\lambda}{(1 - q\lambda)} \right) \mu^2 - \lambda\phi \geq 0$$

where the term multiplied by  $\mu^2$  is the marginal benefit and  $\phi$  is the marginal loss. We cannot assure a positive monotonic relation between quality and firm value for all levels of risk, although this is true for the majority of the parameters. For low levels of risk (high  $\lambda$ ), it is possible to observe a non-monotonic U-shaped relationship. However, the conservative case happens only if  $\lambda < 1/2$ , where the relationship is monotonic.

2. For an aggressive auditor:

$$\left( \frac{(1 - \lambda)\lambda^2}{(1 - q(1 - \lambda))^2} \right) \mu^2 - (1 - \lambda)\phi \geq 0$$

the idea is similar to the conservative case, but the difference is that the non-monotonicity emerges when the risk level is high. However, the aggressive case happens only if  $\lambda > 1/2$ , where the relationship is monotonic.

3. For a moderate auditor:

$$\left( \frac{\lambda^2(q + \lambda - 2q\lambda)}{(1 - q\lambda)^2} + \frac{(1 - 2\lambda)\lambda}{(1 - q\lambda)} \right) \mu^2 - \lambda(1 + \delta)\phi \geq 0.$$

For the moderate case, the relationship between firm value and audit quality is almost always monotonic. However, for extremely low-risk firms (high  $\lambda$ ), there is a non-monotonic U-shaped form. For example, suppose the parameters  $\lambda = 0.9$ ,  $\phi = 5$ ,  $\mu = 10$ , and additionally  $\delta = 0.5$  (and  $\eta < \delta$ ). This happens because the benefit of audit quality is a convex function and the cost of audit quality is a linear function. Therefore, a marginal increase in quality reduces the firm's value. However, since the audit quality benefit is convex, from the level  $q^*$  onward, an increase in the audit quality raises the firm's value.

The intuition behind this non-monotonicity is that for extremely low risk firms, it would not be worthwhile to invest in audit quality because the marginal benefits of reducing misstatements would not always exceed the marginal costs, since the firm's financial condition is almost surely good. It happens only for low values of  $q$  and is represented by Figure 5.

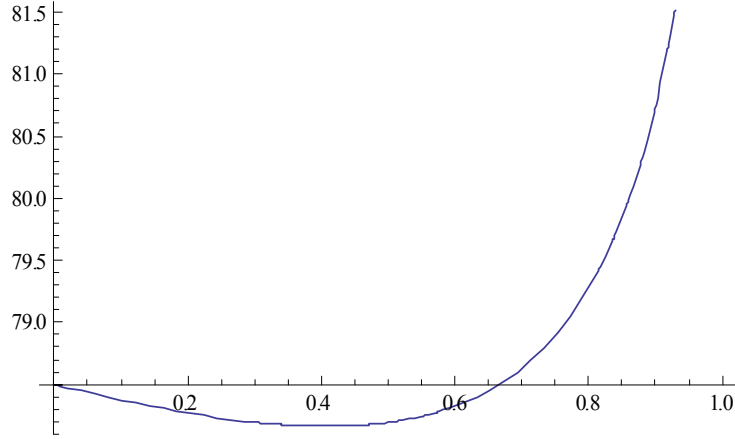


Figure 5: Firm value and the demand for quality from moderate auditors

In sum, for both aggressive and conservative auditors, an increase in audit quality raises the firm's value, and this is also valid for moderate auditors in most situations. The only exception is for an extremely low-risk business, in which case we observe a non-monotonic relationship.

### 3.4. Optimal contracts and audit market equilibrium

After understanding the dynamics of supply and demand for auditing, it is possible to characterize the audit market equilibrium. Firms use  $\phi$  to influence auditor behavior and audit quality. Basically, firms will offer to auditors the contract  $\{\phi, F\}$  in order to maximize their value and to satisfy the auditor's participation constraint. Firms' optimal decision on fees determines the auditor attestation equilibrium and audit quality equilibrium simultaneously.

The following proposition establishes the existence and uniqueness of equilibrium.

**Proposition 6** *Consider the economy described so far with firm risk  $\lambda$ , probability of client retention  $\delta$ , liability  $L$ , liability discount  $\eta$ , return  $\mu$  and a competitive audit market. For any firm, there is a unique contract  $\{\phi^*, F^*\}$  that leads to a specific auditor behavior  $B^*$  and to a unique level of audit quality  $q^*$  that maximizes its market value.*

**Proof.** See Appendix A. ■

**Corollary 7** *For an economy where the marginal gains from liability reduction are higher than the expected losses from audit fees ( $\delta > \eta$ ), there is a unique contract  $\{\phi_m, F_m\}$  that satisfies:*

$$\begin{aligned}\phi_m &= \frac{(1-\lambda)^2}{(1-\delta)(1-\lambda q_m)^2} \mu^2 \\ F_m &= c(q_m) - \lambda q \phi_m - (1-\lambda q_m) \delta \phi_m + (1-\eta)L \\ \frac{dF_m}{d\phi_m} &< 0\end{aligned}$$

such that in equilibrium the auditor adopts moderate behavior and the unique audit quality is given by

$$\frac{\lambda(1-\lambda)^2}{(1-\lambda q_m)} \mu^2 = c'(q_m).$$

**Proof.** See Appendix A. ■

**Corollary 8** *For an economy where the marginal gains from liability reduction are lower than the expected losses from audit fees ( $\delta < \eta$ ) and for a firm with high business risk ( $\lambda < 1/2$ ), there is a unique contract  $\{\phi_c, F_c\}$  that satisfies:*

$$\begin{aligned}\phi_c &= \left( \frac{(1-\lambda)}{(1-\lambda q_c)} \right)^2 \mu^2 \text{ s.t. } \frac{\phi_c}{L} \leq 1 - \lambda \\ F_c &= c(q_c) - \lambda q_c \phi_c \\ \frac{dF_c}{d\phi_c} &< 0\end{aligned}$$

*such that in equilibrium the auditor adopts conservative behavior and the unique audit quality is given by*

$$\frac{\lambda(1-\lambda)^2}{(1-\lambda q_c)} \mu^2 = c'(q_c).$$

**Proof.** Similar to Corollary 5. ■

**Corollary 9** *For an economy where the marginal gains from liability reduction are lower than the expected losses from audit fees ( $\delta < \eta$ ) and for a firm with low business risk ( $\lambda > 1/2$ ), there is a unique contract  $\{\phi_a, F_a\}$  that satisfies:*

$$\begin{aligned}\phi_a &= L - \left( \frac{\lambda}{(1-(1-\lambda)q_a)} \right)^2 \mu^2 \text{ s.t. } \frac{\phi_a}{L} \geq 1 - \lambda \\ F_a &= c(q_a) - \lambda q_a \phi_a - (1 - q_a)[\phi_a - (1 - \lambda)L] \\ \frac{dF_a}{d\phi_a} &< 0\end{aligned}$$

*such that in equilibrium the auditor adopts aggressive behavior and the unique audit quality is given by*

$$\frac{\lambda^2(1-\lambda)}{(1-(1-\lambda)q_a)^2} \mu^2 = c'(q_a).$$

**Proof.** Similar to Corollary 5. ■

To understand how equilibrium is achieved, consider a firm in a softer institutional environment, i.e.,  $\delta > \eta$ . In this economy, it is not possible to induce moderate behavior, since this is not related to fees, but rather only to institutional-economic parameters. Thus, to maximize its expected payoff, the firm should only set auditor fees ( $\phi$ ) to induce the audit quality  $q_m$ . In turn, to choose the optimal level of audit quality, the firm faces a tradeoff, since higher audit quality reduces the possibility of misstatements, enhancing investment efficiency and market price (it is the marginal benefit of quality), but it also increases audit costs (the marginal cost of quality). This tradeoff between investment efficiency and audit costs generates the equilibrium.

The same idea applies to an environment where  $\eta > \delta$ , except that it also depends on business risk. The firm will choose  $\phi$  that will lead to specific auditor behavior since both

conservative and aggressive are possible. If the business risk is lower (higher) than half, to induce conservative (aggressive) behavior the firm sets  $\phi$  below (above) the expected liability cost  $(1 - \lambda)L$ . Given this participation constraint, the firm should choose the level of  $\phi$  in order to achieve the optimal level of audit quality.

Overall, the audit market equilibrium depends on the economic-institutional parameters. For economies with a softer institutional environment, only the moderate behavior will be observed.

#### 4. Conclusion

This paper investigates the determinants and consequences on the existence of unqualified opinions with an emphasis of a matter paragraph disclosing uncertainties. Our main conclusion is that this type of report is in fact used by auditors in some economies to communicate their inconclusive evidence or as a disguise for a qualified opinion. This result brings new evidence on the role of the institutional environment on financial reporting, helping shed light on its existence in the United Kingdom, China and Brazil but not in the US. We show that economies with softer institutional environments, represented by a discount in the liability due to misstatements, induce the use of this type of report, and this is not dependent on the business risk.

Also, in economies where this mechanism is used, greater client pressure - via non-audit services and repeated future engagements - always leads to an increase in audit quality because the higher the fees, the higher the expected losses from losing the client. Finally, we show that apart from harder institutional environments, where no investment in the firm is possible, for economies with softer institutional environments investment always takes place, despite being suboptimal.

Therefore, our paper contributes to the theoretical explanation of the phenomena discussed in empirical papers from different countries. It shows that the classification as a modified opinion as other qualifications can be inadequate, and this can be important for the design of new approaches for empirical research. Finally, it demonstrates how the institutional environment will lead to a new type of report and how it affects both audit quality and investment efficiency.

#### REFERENCES

1. Cahan, S. F., and Zhang, W. 2006. After Enron: Auditor Conservatism and Ex-Andersen Clients. *The Accounting Review* 81 (1): 49–82.
2. Chen, C. J. P., Su, S. and Zhao, R. 2000. An emerging market's reaction to initial modified audit opinions: Evidence from the Shanghai Stock Exchange. *Contemporary Accounting Research* 17 (3): 429–455.
3. Chen, C. J. P., Chen, S. and Su, X. 2001. Profitability regulation, earnings management, and modified audit opinions: Evidence from China. *Auditing: A Journal of Practice and Theory* 20 (2): 9–30.
4. Chen, C. J. P., Sun, S. Y. J., and Wu, D. 2010. Client importance, institutional improvements, and audit quality in China: An Office and Individual Auditor Level Analysis. *The Accounting Review* 85 (1): 127–158.
5. Chung, J., Farrar, J., Puri, P., and Thorne, L. 2010. Auditor liability to third parties

- after Sarbanes-Oxley: An international comparison of regulatory and legal reforms. *Journal of International Accounting, Auditing and Taxation* 19: 66–78.
6. DeFond, M. L., Wong, T. J. 1999. The effects of qualified audit opinions on earnings response coefficients. *Journal of Accounting and Economics* 15: 229–248.
  7. Dye, R. A. 1993. Auditing standards, legal liability, and auditor wealth. *Journal of Political Economy* 101: 887–914.
  8. Fargher, N. L., and Jiang, L. Changes in the audit environment and auditors' propensity to issue going-concern opinions. *Auditing: A Journal of Practice and Theory* 27 (2): 55–77.
  9. Feldmann, D. A., and Read, W. J. 2010. Auditor Conservatism after Enron. *Auditing: A Journal of Practice and Theory* 29 (1): 267–278.
  10. Gul, F. A., Sami, H., and Zhou, H. Auditor disaffiliation program in China and auditor independence. 2009. *Auditing: A Journal of Practice and Theory* 28 (1): 29–51.
  11. Haw, I. G., Park, K., Qi, D., and Wu, W. 2003. Audit qualification and timing of earnings announcements: Evidence from China. *Auditing: A Journal of Practice and Theory* 22 (2): 29–51.
  12. Laux, V., and Newman, D. P. 2010. Auditor Liability and Client Acceptance Decisions. *The Accounting Review* 85 (1): 261–285.
  13. Li, C., Song, F. M., and Wong, S. M. L. 2008. A continuous relation between audit firm size and audit opinions: Evidence from China. *International Journal of Auditing* 12: 111–127.
  14. Melumad, N. D., and Ziv, A. 1997. A Theoretical Examination of the Market Reaction to Auditors' Qualifications. *Journal of Accounting Research* 35 (2): 239–256.
  15. Schwartz, R. 1997. Legal Regimes, Audit Quality and Investment. *The Accounting Review*, 72 (3): 385–406.

## A. Appendix

**Proof of Proposition 4.** First, maximizing the firm's expected payoff (equations (11), (12) or (13)) with respect to quality,  $q$ , we can characterize the marginal gains and costs as a function of  $q$ . Since both elements are convex functions of  $q$  and the marginal cost is zero and marginal benefit is positive when  $q = 0$ , and the marginal cost goes to infinity and marginal benefit is limited to  $\mu^2$  when  $q = 1$ , both sides intersect only once and therefore the optimal level of quality exists and is unique. Given the risk level  $\lambda$ , probability of keeping the client  $\delta$  and liability discount  $\eta$ , we saw that for economies where the marginal gains from liability reduction are higher than the expected losses from non-audit liability ( $1 - \eta > 1 - \delta$ ) the attestation will be moderate and therefore unique. Otherwise ( $\delta < \eta$ ), it will depend on the business risk. For a high (low) business risk ( $\lambda < (>)1/2$ ), it is optimal for the client to have a conservative (aggressive) auditor, and since the audit market is competitive, the marginal gains of the auditor equal its marginal costs, which are the same as the firm's marginal costs, giving the optimal non-audit fees  $\phi^*$ . Finally, to satisfy the auditor participation constraint, we have  $F^*$ . ■

**Proof of Corollary 5.** Taking the derivative of the firm's expected payoff given the auditor opportunism (equation (13)) with respect to  $q$ , we have



$$\frac{\lambda(1-\lambda)^2}{(1-\lambda q_o)} \mu^2 = c'(q_o).$$

which defines the optimal  $q_o$ . Since both elements are convex functions of  $q$  and the marginal cost is zero and marginal benefit is positive when  $q = 0$ , and the marginal cost goes to infinity and marginal benefit is limited to  $\mu^2$  when  $q = 1$ , both sides intersect only once and therefore the optimal level of  $q_o$  exists and is unique. Equating the above equation with (6), we can have the optimal non-audit fees

$$\phi_m = \frac{(1-\lambda)^2}{(1-\delta)(1-\lambda q_m)^2} \mu^2.$$

Using the auditor participation constraint (5) equal to zero (outside option equal to zero), we have

$$F_m = c(q_m) - \lambda q_m \phi_m - (1 - \lambda q_m) \delta \phi_m + (1 - \eta)L.$$

By the envelope theorem we have

$$\frac{dF_m}{d\phi_m} = -\lambda q_m - (1 - \lambda q_m) \delta < 0$$

■