Scope of Auditors' Liability, Audit Quality, and Capital Investment *

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Abstract

One of the fundamental issues in the discussion of auditors' liability is to whom auditors should be held liable for ordinary negligence under common law. Three judicial viewpoints prevail: the restrictive privity approach, the more liberal Restatement approach, and the most liberal foreseeability approach. To compare these three approaches from an efficiency perspective, this paper develops a model that features an owner-managed firm, an independent auditor, a continuum of unrelated lenders, and an impartial court. Double effort-incentive problems appear for the firm and the auditor. The firm has an additional incentive problem due to the sequential nature of its borrowing. This paper shows that the effort-incentive problem and the sequential borrowing problem of the firm render unambiguous improvements in audit effort/quality, capital investment, and social welfare as the judicial approach governing the scope of auditors' liability becomes more conservative.

Key words: Auditors' liability; Audit quality; Double moral hazard; Sequential borrowing; Underinvestment

JEL classification: D62; D8; K13; L51; M41

1. Introduction

Since *Ultramares Corp.* v. *Touche*,[1] a 1931 New York lawsuit, three different judicial viewpoints have emerged regarding the scope of auditors' liability to third parties for ordinary negligence under common law.[2] The first is the privity approach, which is based on the *Ultramares* precedent, and confines an independent auditor to liability to third parties specifically identified as users of the auditor's work (referred to as primary beneficiary third parties). Secondly, the Restatement approach, which originated from Section 552 of the Restatement (Second) of Torts, expands liability to include third parties whose reliance on the work is specifically foreseen by the auditor (referred to as foreseen third parties).[3] Finally, the foreseeability approach, which is the most liberal among the three, broadens liability to include even third parties whom the auditor could "reasonably foresee" as recipients of the work for routine business purposes (referred to as foreseeable third parties).[4]

While the scope of auditors' liability to third parties has gone through several iterations, recent court cases have indicated a trend toward more restrictive approaches (Siliciano, 1997). In 1997, New Jersey took the rather unusual step of legislatively repealing the foreseeability approach and replacing it with the privity approach.[5] Following the New Jersey legislature's repeal, only Mississipi and Wisconsin remain committed to the foreseeability approach, while fifteen states have endorsed the privity approach and twenty-one states have adopted the Restatement approach (Goldwasser, 1995).[6]

[1] *Ultramares Corp.* v. *Touche*, 225 N.Y. 170, 174 N.E. 441 (1931).

[2] Third parties bringing suits under common law are normally non-shareholders (e.g., creditors, lenders, and other investors). The rights of shareholders are protected under statutory law through the Securities Act of 1933 and the Securities Exchange Act of 1934. Ordinary negligence to third parties arises under Section 11 of the Securities Act of 1933 which states: "In case any part of the registration statement, when such part became effective, contained an untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary to make the statements therein not misleading, any person acquiring such security (unless it is proved that at the time of such acquisition he knew of such untruth or omission) may ... sue ...." Since this provision does not require privity, which is the primary issue addressed in this paper, no third-party suits against auditors under statutory law are considered in this paper.

[3] The leading case is *Rusch Factors, Inc.* v. *Levin*, 284 F. Supp. 85 (D.C.R.I. 1968).

[4] The leading case is *H. Rosenblum, Inc.* v. *Adler*, 461 A. 2d 138 (N.J. 1983).

[5] Ironically, the foreseeability approach is based on the ruling of the New Jersey Supreme Court in *H. Rosenblum, Inc.* v. *Adler* 1983.

[6] The remaining states have not yet received any court cases of auditors' liability to third parties and thus

Notwithstanding that the retraction to more traditional approaches may simply be part of the normal ebb and flow of the tort system, it is evident that courts have not yet reached a single, nationwide liability standard governing the scope of auditors' liability to third parties. The purpose of this paper is thus to contribute to the understanding of the three prevailing judicial approaches, with special emphasis on how audit effort/quality, capital investment, and social welfare may differ. To this end, we develop an equilibrium model that features an owner-managed firm, an independent auditor, a continuum of unrelated lenders, and an impartial court. There is moral hazard on both the firm and the auditor. Specifically, the firm possesses a constant returns to scale project whose probability of success depends on the quality of the project and on some costly actions of the firm. The project quality, as an unknown factor, may be imperfectly verified by the auditor. To motivate the auditor to exert some unobservable audit effort, the court system holds the auditor liable to the relevant parties, depending on the prevailing judicial approach, should the audit report fail to identify a bad type project.

In order to undertake the project, the firm needs to solicit a sequence of loans, one at a time and each from a different lender. To give the firm the right incentives, underinvestment is called for to limit the potential gains from shirking. Sequential borrowing creates an additional perverse effect on investment since attempts by existing lenders to ration credit could be unraveled by supplementary borrowing from new lenders.[7] This perverse effect is more severe when new lenders are more eager to lend.

While the intention of auditors' liability is to motivate the auditor to work, it also obliges the auditor to provide partial insurance to lenders for lending on a bad type project. As such, when the scope of auditors' liability is extended, the firm finds it more tempting to borrow. In equilibrium, this means that greater underinvestment must be used to give the firm the right incentives. The firm thus ends up borrowing less. The effect of this is to

have no legal precedents.

[7] The time-inconsistency problem when a borrower obtains loans from multiple lenders is first identified by Bizer and DeMarzo (1992). See Wong (1993) and Kahn and Mookherjee (1998) for extensions and generalizations.

decrease the auditor's expected litigation costs, thereby worsening the auditor's incentives, as the scope of auditors' liability is extended.

Our analysis demonstrates an important factor missing in the liability debate: the privity approach provides the firm a credible mechanism by which the firm can separate lenders into two groups within its own discretion—lenders who are eligible to recover their losses from the auditor and lenders who are excluded from recovering damages from the auditor. The Restatement approach gives the firm less flexibility in deciding which lenders are eligible to recover their losses, and the foreseeability approach offers the firm no flexibility at all. The contracting limitation due to the firm's dual incentive problems can be made less severe the more the existing lenders can be assured that they would not be exploited. One way in which the existing lenders can receive such an assurance is if new lenders are excluded from recovering damages from the auditor, thereby ultimately making additional borrowing less attractive to the firm. The privity approach allows such exclusivity. In contrast, this exclusivity which is needed by the existing lenders, and enjoyed under the privity approach, is partially destroyed by the Restatement approach and completely eliminated by the foreseeability approach. Since higher capital investment and audit effort/quality improve efficiency and enhance social welfare, it follows that the privity approach dominates the Restatement approach, which in turn dominates the foreseeability approach.

Since any outcomes that can be achieved under the Restatement approach and/or the foreseeability approach can also be achieved under the privity approach, it follows from a simple "degrees of freedom" argument that the privity approach should weakly dominate the other two approaches from an efficiency standpoint. This is along the lines of a widely held notion in the literature of law and economics that, for rational parties who had interactions prior to a dispute, contract law is preferred to tort law because the former can be fine tuned (see Posner, 1992). The contributions of our paper are in demonstrating the strict superiority of the privity approach and in identifying the sources of inefficiency arising from the other two approaches. This is important since the perverse effects on capital

investment and audit effort/quality as a result of movement from privity have not been rigorously demonstrated in the academic literature to date.

Despite being a matter of grave concern to the accounting profession, the liability debate addressed in this paper has received very little formal analysis (Dye, 1995b). Nelson *et al.* (1988) show that slackening the privity requirement induces higher audit effort/quality and raises audit fees. Our model differs from theirs in two important aspects. First, they have not attempted to distinguish among various classes of financial statement users. As a result, the only way to specify an expansion of the scope of auditors' liability is through an exogenous increase in damages awarded to third parties. Second, they have assumed that investment is fixed and is not a choice variable of the client firm. Thus, unlike our model, there is no relationship found between the damage claims against the auditor and the plaintiffs' losses. With the assumed linkage in our paper, we show that the privity approach, which at first blush would seem to involve covering the least number of actual and potential lenders, results in the greatest liability exposure to lenders because it causes the borrower to borrow the most without "reneging" and resorting to the low effort level. This explains why the results of Nelson *et al.* (1988) are at odds with ours.

It is noteworthy that the negative externality imposed by new lenders on existing lenders in our incomplete contract setting can, in principle, be avoided if debt contracts are made exclusive such that the firm is prohibited from dealing with new lenders. To enforce exclusive debt contracts, however, existing lenders need to be able to monitor every transaction entered into by the firm with other lenders, and the court needs to have access to centralized information bases, such as credit bureaus, concerning relationships with all third-party lenders. Even if monitoring costs and enforcement costs are not prohibitively high, Smith and Warner (1979) argue that, if contracts are incomplete, exclusive dealing clauses may be undesirable, as they could create opportunistic hold-up problems when unforeseen profitable investment projects come in the future. Instead of modeling the costs of exclusivity restrictions explicitly, we simply assume that debt contracts are *de facto* non-exclusive.[8]

[8]In an earlier version of this paper, we modeled the costs of exclusivity restrictions explicitly by means

The rest of this paper is organized as follows. The next section provides some legal background (readers who are familiar with the legal development can pass over this section). Section 3 lays out the model. Section 4 describes the auditor's effort decision and characterizes the auditor's reaction function. Section 5 illustrates the dual incentive problems of the firm and their equilibrium consequences. The firm's reaction function is then characterized. Section 6 derives and contrasts the full equilibria under the three different judicial approaches governing the scope of auditors' liability. Section 7 offers some welfare implications. The final section concludes the paper.

2. Legal background

Common-law cases are largely decided by reference to established precedents (i.e., prior legal decisions). *Ultramares Corp.* v. *Touche* is considered as a landmark case for third-party actions against auditors under common law. In this case, the plaintiff-creditor sued the defendant-auditor for negligence and fraud. The *Ultramares* court stated that the auditor could be liable to the plaintiff when the degree of negligence was so grievous that it amounted to constructive fraud. The *Ultramares* court, however, disallowed the charge of ordinary negligence because there was a lack of a contractual relationship (privity) between the auditor and the plaintiff. The primary consequence of the *Ultramares* case was to shield auditors from liability for ordinary negligence to third parties.

CIT Financial Corp. v. *Glover* is cited by many as a prelude to the "erosion" of the precedent set in *Ultramares*.[9] In this case, the plaintiff-creditor charged that loans were made on the basis of materially misleading financial statements. The *CIT* court ruled that the defendant-auditor was not negligent. However, the *CIT* court decided that, if negligent, the auditor would be liable to a third party should the report be prepared for the primary

of a profitable side project arising unpredictably in the future. No additional insights were gained with this complication.

[9] *CIT Financial Corp.* v. *Glover*, 224 F. 2d 44 (2d Cir. 1955).

benefit of the third party. In other words, the *CIT* court extended the definition of auditors' liability to third parties that had primary beneficiary relationships.

For many years the *Ultramares* and *CIT* decisions dominated judicial thinking. Plaintiffs had to have either a contractual or a primary beneficiary relationship to successfully sue auditors for ordinary negligence under common law. This stance was challenged in the late 1960s when the principle of auditors' liability for ordinary negligence to a limited class of foreseen third parties was established, with its legal foundation built on Section 552 of the Restatement (Second) of Torts. In the leading case of *Rusch Factors* v. *Levin*, the defendant-auditor tried to have the case dismissed on the basis of lack of privity of contract. The *Rusch Factors* court ruled in favor of the plaintiff-creditor, stating that the auditor should be liable to a third party whose reliance on the audit report was specifically foreseen by the auditor.

The *Rusch Factors* decision widened the number of third-party groups that could sue auditors for ordinary negligence under common law. It also raised the question of whether auditors should be absolved from liability simply because they had subjective ignorance of the objectively foreseeable harm their negligence might impose on third parties. The answer was negative as was evident in *Rosenblum* v. *Adler*. In this case, the defendant-auditor asked for dismissal of the suit because the plaintiff was neither in privity with the auditor nor a foreseen third party. The *Rosenblum* court denied dismissal and argued that holding auditors liable to foreseeable third parties would both deter negligence and facilitate risk-spreading by stating:

> The imposition of a duty to foreseeable users may cause accounting firms to engage in more thorough reviews. This might entail setting up stricter standards and applying closer supervision, which should tend to reduce the number of instances in which liability would ensue. ... Accountants will also be encouraged to exercise greater care leading to greater diligence in conducting audits. ... Isn't the risk of loss more easily distributed and fairly spread by imposing it on the accounting profession, which can pass the cost of insuring against the risk onto its customers, who can in turn pass the cost onto the entire consuming public (pp. 152–153)?

Armed with the triad of tort law's social policies (compensation, deterrence, and risk-

spreading), the *Rosenblum* court asserted that the adoption of the foreseeability approach was in alignment with the nationwide abrogation of the privity doctrine in product liability. The *Rosenblum* case soon became the heir-apparent to the *Ultramares* case in many jurisdictions for subsequent judicial reassessments of the privity defense.

How far the boundaries of auditors' liability for ordinary negligence under common law will be extended is still an open question as conflicting decisions continue to emerge from the courts. For example, in *Credit Alliance* v. *Arthur Andersen*, the court ruled in favor of the defendant-auditor and reaffirmed the precedent set in *Ultramares*, notwithstanding its earlier decision in *White* v. *Guarente* in which it embraced a limited foreseeability concept.[10] In *Bily* v. *Arthur Young*, the court reasonably argued that there were notable differences between product liability and auditors' liability: the nature of the injury (bodily versus economic); the class of plaintiffs (ordinary consumers versus sophisticated users of financial statements); the ability to order risks through contracts (generally unavailable for product liability versus available to users of financial statements who can contract directly with auditors); and efficient loss spreading (available through product liability versus unavailable to auditors).[11] The *Bily* decision clearly points out that the extension of the nonprivity doctrine of product liability to auditors' liability is unsuitable, as the relationships among buyers, manufacturers, and victims are quite distinct from those among clients, auditors, and users of financial statements.[12]

While it is generally agreed that the factors supporting the nonprivity doctrine in product liability are less persuasive in the auditor/third party context, Schy (1988) argues that the nonprivity rule dominates the privity rule in auditors' liability.[13] He points out that the privity approach creates two inefficiencies. First, an auditor will intend to underaudit in case, by some chance, a transaction between the auditor's client and a known third party

[10] *White* v. *Guarente*, 43 N.Y. 2d 356 (1977). *Credit Alliance* v. *Arthur Andersen*, 493 N.Y. Supp. 2d 435 (1985).

[11] *Bily* v. *Arthur Young*, 834 P. 2d 745 (1992).

[12] See Feuer (1992) for a detailed discussion about the *Bily* case and its implications.

[13] See Dye (1995b), Goldberg (1988), Goldwasser (1988), Schy (1988), and Siliciano (1988) for insightful arguments against the application of the principles of product liability to the law of auditors' liability.

will fall through. Second, even if the auditor can reasonably foresee that the client would use the financial statements in a variety of ways, the auditor will discount his/her level of care in all those uses. The Restatement approach avoids the first but not the second inefficiency of the privity approach, while the foreseeability approach eliminates both of them. In spite of this, Schy does recognize that the foreseeability approach is far from perfect:

> Holding a negligent defendant liable for all reasonably foreseeable harm is the optimal rule only if that defendant is always the lowest cost avoider. ... In the auditing context, however, the client, not the auditor, is almost always the lowest-cost loss avoider. The client ... can much more easily discover errors in financial statements. ... The client also has control over the uses of financial statements. The client affords creditors, equity holders, customers, and guarantors the opportunity to rely on the audited financial statements. Thus, it is inefficient for auditors to have to conform their level of care to the possibility of management fraud and the uncertainty of all reasonably foreseeable users of the financial statements when the client knows all of the facts and controls the actual uses (p. 54).

Notwithstanding Schy's argument, we create a bias in favor of the privity approach by assuming that all agents have rational expectations so that no desirable transactions will fall through. Since a client has full control over the use of the audited financial statements, the client is always free to specifically identify in advance as many creditors as possible to the auditor, making the privity approach indistinguishable from the Restatement approach or even from the foreseeability approach. This flexibility, in conjunction with the credibility endowed by law, makes the privity approach *de facto* a mechanism, albeit imperfect, that the client can use to make a commitment not to exploit existing creditors by means of additional borrowing. As the client's incentive to borrow from additional creditors is alleviated, investment is encouraged and welfare is enhanced. The model presented in the next section formalizes this idea.

3. The model

Consider a universally risk-neutral economy with four types of agents: an owner-managed firm, an independent auditor, a continuum of unrelated lenders, and an impartial court. The

lenders are uniformly distributed over support $[0,\ N]$, where N is a large, possibly infinite, number.[14] The firm has no initial wealth while the lenders have one unit of capital each. The riskless rate of interest is, without loss of generality, set equal to zero. Figure 1 below depicts the sequence of events in the model, followed by detailed descriptions of the model structure.

(Insert Figure 1 here)

3.1. Investment opportunities

To begin, the firm has access to a non-transferable project with variable size, I. The project has stochastic constant returns to scale and a minimum capital requirement, $\underline{I} > 0$.[15] Specifically, an investment, $I \geq \underline{I}$, generates a positive cash flow, RI, if the project succeeds and 0 if it fails, where $R > 1$ is the gross return upon success.

The project's success probability depends on its quality, Q, which is perfectly correlated with the type of the owner-manager. It is common knowledge that Q is either good (G), with probability ϕ, or bad (B), with probability $1-\phi$, where $0 < \phi < 1$, but the true quality is not known *ex ante* to any agents, including the firm.[16] If $Q = G$, the project succeeds with a positive probability, p_0, which can be further enhanced to p_1 should the firm exert an effort that is unobservable to others, where $1/2 \leq p_0 < p_1 \leq 1$.[17] Shirking, however,

[14] Working with a discrete set of unrelated lenders yields no additional insights and is mathematically more involved in that the incentive constraints become piece-wise continuous, thereby not differentiable everywhere.

[15] The assumption of constant returns to scale production technology simplifies our analysis in that the dual incentive problems arising from the firm's unobservable effort choice and from sequential borrowing discussed in the next few paragraphs must be resolved by underinvestment. For details, please refer to the discussion following Proposition 1. In the first version of the paper, which is available upon request, we have considered decreasing returns to scale production technology. All the qualitative results remain intact should appropriate restrictions on parameter values be imposed.

[16] This assumption is common in the literature of auditors' liability. Examples include Dye (1993, 1995a), Schwartz (1997), and Chan and Pae (1998).

[17] The lower bound on p_0 is imposed to simplify the proof of Proposition 1 (see Appendix B). Other than this, it plays no role in our analysis.

provides the firm a private benefit, $\beta(I - \underline{I})$, where $\beta > 0$ and $I \geq \underline{I}$.[18] If $Q = B$, the project certainly fails and the private benefit from shirking is much smaller. To simplify the analysis, we normalize the private benefit in this case to zero.

The idea that shirking creates a private benefit is based on the following argument. One can view "working" as firm-specific human capital activities and "shirking" as marketable human capital activities by the owner-manager. While the former is pertinent only to the firm and valueless to other firms, the latter is of value to other firms only. Both of these values increase with the firm's investment, I. However, whether or not the "shirking" owner-manager can capitalize on the marketable human capital activities depends on his/her type, which is perfectly correlated with the quality of the project. If the project is good, the "shirking" owner-manager, being revealed as a good type, is able to capitalize on the marketable human capital activities and receives the private benefit, $\beta(I - \underline{I})$. In contrast, if the project is bad, the "shirking" owner-manager is inferred as a bad type and thus the marketable human capital activities offer him/her a much lower private benefit, which is normalized to zero.

A few more simplifying assumptions are in order. First, we assume that the project has positive expected net present value under the prior on Q if the firm exerts the effort (i.e., $\phi p_1 R > 1$). Should the firm choose to shirk, the project has negative expected net present value even when $Q = G$ (i.e., $p_0 R < 1$). In other words, the firm's payoff in this case is mainly derived from the non-transferable private benefit associated with the investment. An immediate consequence of these assumptions is that external financing is viable only if the firm can devise a mechanism by which commitment to working is credibly assured. Finally, to have non-trivial, yet solvable, incentive problems, we restrict the private benefit

[18] This set-up of the moral hazard is adapted from Holmström and Tirole (1997, 1998). All the qualitative results are unaffected if we model the moral hazard by means of an effort cost entailed on the firm (see Wong, 1993). The existence of a private benefit, however, allows us to make an assumption that the project yields negative expected net present value when the firm shirks. This assumption greatly simplifies our analysis in that, with external financing, only equilibria wherein the firm works need to be considered.

under $Q = G$ to be moderate:

$$(p_1 - p_0)R < \beta < \frac{p_1}{p_0}(1 - p_0 R). \tag{1}$$

Note that the feasible set of β would be non-empty as long as $R < p_1/p_0(2p_1 - p_0)$.[19]

Being cash-constrained, the firm has to borrow funds from the continuum of unrelated lenders in a sequential manner, according to the ascending order in $[0,\ N]$. Lenders are atomistic and thus are perfectly competitive.[20] A loan contract specifies an interest factor (i.e., one plus the rate of interest), r, for one unit of capital. To eliminate dilution of earlier debt by new debt, loan contracts are fully prioritized.[21] Succinctly, if the firm borrows I from lenders in $[0,\ I]$, it must completely satisfy the debt obligations to lenders in $[0,\ L]$ before paying anything to lenders in $(L,\ I]$, where $0 < L < I$. All lenders observe the loan portfolio of the firm and are willing to lend as long as they expect to break even at least. The firm chooses to exert the effort or to shirk after it satisfies itself about the terms of the loan portfolio and invests all the proceeds in the project.

3.2. Audit services

Since information is symmetric among agents and a bad project always yields zero returns, there is no reason for the firm to report in its financial statements that $Q = B$. Without attestation by the independent auditor, the favorable financial statements provided by the firm are not credible.

The auditor renders the following services: performing an audit of the firm's financial statements; expressing an opinion on the fairness of the financial statements in conformity

[19] For example, if $p_1 = 0.75$, $p_0 = 0.5$, and $R = 1.4$, then the feasible set of β would be (0.35, 0.45).

[20] Indeed, our qualitative results hold as long as there are at least two lenders who act in a non-cooperative manner.

[21] Note that seniority clauses would not help to resolve the time consistency problem due to sequential borrowing in our model. This is because the crux of the time consistency problem is not the dilution of prior debt *per se*. Rather, the problem stems from the public good nature of the moral hazard under which additional debt imposes a negative externality on prior debt. Increased indebtedness, with moral hazard, reduces the probability of repayment of prior debt, which cannot be resolved by the seniority clauses.

with GAAP; and supplying an audit report to the firm. As a compensation for these services, the auditor charges the firm an audit fee, f, which is independent of the audit report, consistent with the requirement of the Code of Ethics' ban on contingent fees (rule 302). The audit fee, however, hinges on the prevailing liability regime governing the scope of auditors' liability to third parties. The structure of auditors' liability will be discussed in the next subsection.

Prior to the audit, the firm informs the auditor of the intended use of the audit report. Specifically, we assume the auditor knows that lenders in $[0,\ M]$, where M is a fixed finite number much smaller than N, are intended users of the audit report. The firm also specifically identifies to the auditor by name that lenders in $[0,\ K]$ will be the primary users of the audit report, where K is within the firm's own discretion.[22] We refer to $[0,\ K]$ as the set of primary beneficiary third parties. If $K < M$, $(K,\ M]$ is referred to as the set of foreseen third parties and $(M,\ N]$ is referred to as the set of foreseeable third parties.[23] If $M \leq K < N$, the set of foreseen third paries is empty and $(K,\ N]$ becomes the set of foreseeable third parties. Finally, if $K = N$, the sets of foreseen and foreseeable third parties are empty. All lenders know which third-party class they belong to when making their lending decisions.

In executing his/her attestation duties, the auditor exerts a personal effort, a, to acquire additional information about Q. This audit effort, unobservable to others, affects the probability that the auditor can successfully detect any discrepancies between the firm's favorable report and the true quality of the project. The auditor either agrees with the firm's original favorable report and issues an unmodified opinion (indicated by $\mathcal{A}$), or disagrees with the

[22] For instance, the firm may inform its auditor that it needs to submit its audited financial statements with its loan applications to banks in order to obtain funds for its investment project. Hence, all banks in the market are the intended users of the audit report. The firm may tell the auditor that it will go to some particular banks for loans. Hence, only those banks are the primary users of the audit report. The auditor, however, cannot prevent the firm from using the audit report to obtain loans from other banks, or even obtain trade credits from its material suppliers. In the latter case, even if the auditor knows that material suppliers in the industry are selling on credit, the firm does not have to mention that the audit report would be used to obtain trade credits.

[23] Of course, in real legal terms, foreseeable third parties include foreseen third parties which in turn include primary beneficiary third parties. Without creating too much confusion, we take these three classes of third parties as if they were mutually exclusive.

firm's report and issues a modified opinion (indicated by $\mathcal{D}$). Following Dye (1993, 1995a), we focus on the auditor's effort choice and not on his/her reporting choice. As such, we assume that the audit report is posited to be in accordance with the information gathered by the auditor.[24]

The auditor possesses a noisy audit technology that can be summarized by the following conditional probabilities:

$$\Pr(\mathcal{D}|B,a) = q(a), \quad \text{and} \quad \Pr(\mathcal{A}|G,a) = 1. \tag{2}$$

In words, if the auditor exerts an audit effort, a, the probability of correctly issuing a modified opinion given that $Q = B$ is $q(a)$, and the auditor always correctly issues an unmodified opinion given that $Q = G$.[25] Without loss of generality, we normalize the audit effort so that $q(a) = a$, where $0 \leq a \leq 1$. The audit effort entails a cost of $C(a)$ on the auditor, where $C(a)$ is strictly increasing and convex with $C(0) = 0$, $C'(0) = 0$, and $C'(1) = \infty$.

3.3. Structure of auditors' liability

Due to the Code of Ethics' ban on contingent fees (rule 302), the auditor is motivated to work not by his/her compensation but by the legal system exogenously chosen by the courts or legislature before the game begins. In this paper, we assume that the legal environment faced by the auditor is governed by the strict liability rule under each of the three different judicial approaches regarding the scope of auditors' liability to third parties.[26] An "audit

[24]This assumption is not as unrealistic as it appears. In practice, auditors may be sued by their clients who believe that a modified opinion is falsely issued. The resulting threat of litigation would alleviate the opportunistic reporting behavior of auditors (Nelson *et al.*, 1988). A further justification for this assumption is that auditors are likely to lose the consulting business from disgruntled clients.

[25]The given audit technology implies that the auditor makes only type II errors but not type I errors. This assumption simplifies the analysis. In practice, type I errors would normally be corrected before the auditor issues the audit report. That is, if the auditor falsely accuses the firm of a material error, the resulting denial would trigger additional audit work to rectify the accusation. See, e.g., the discussion in Arens and Loebbecke (1981, p. 136).

[26]It can be easily shown that none of the qualitative results of this paper would be affected had the strict

failure" is defined by a situation in which the firm is granted an unmodified opinion by the auditor and the quality of the project is publicly revealed to be bad following the firm's bankruptcy. It is a *sine qua non* for the third-party lenders to bring suits against the auditor so as to recoup their losses. Court-awarded damages are assumed to be on an "out-of-pocket" basis.[27] Under the strict liability rule to third parties, an audit failure is both necessary and sufficient to hold the defendant-auditor liable to the plaintiff-lenders.

The three judicial approaches, which determine the classes of third parties to whom the auditor is held liable in an audit failure, are the privity approach, the Restatement approach, and the foreseeability approach. To illustrate these three approaches, suppose that the firm borrows I from lenders in $[0,\ I]$ and specifically identifies lenders in $[0,\ K]$ by name to the auditor prior to the audit, where $K < M < I < N$. Under the privity approach, the auditor is held liable only to primary beneficiary third parties. Thus, lenders in $[0,\ K]$ are entitled to recoup their out-of-pocket losses from the auditor in an audit failure, while lenders in $(K,\ I]$ are not. The Restatement approach is more liberal in that auditors' liability is expanded to include both primary beneficiary and foreseen third parties. Thus, in our example, the auditor is held liable to lenders in $[0,\ M]$, but not to lenders in $(M,\ I]$, in an audit failure. Finally, the foreseeability approach, which is the most liberal among the three, extends auditors' liability to include additional foreseeable third parties. Lenders in $[0,\ I]$ as such are able to recover their out-of-pocket losses from the auditor if the audit fails.

liability rule been replaced by the vague negligence liability rule as formalized by Schwartz (1998). Under the vague negligence liability rule, the auditor is held liable to third parties only if he/she fails to exercise due care and there is uncertainty in determining whether the due care standard has been met. We adopt the strict liability rule solely for the sake of legibility.

[27] Out-of-pocket damages are referred to as "reliance damages" in the literature on law and economics. None of the qualitative results would change if we modeled the damage awards as an increasing function of the plaintiff's out-of-pocket losses.

3.4. Equilibrium concept

The equilibrium concept employed is the Bayesian Nash equilibrium. To characterize an equilibrium under each of the three judicial approaches, we need to go through three steps. First, we derive a solution to the auditor's effort choice problem. It is noteworthy that the auditor does not know his/her potential legal liability costs when making the audit effort decision, as the court-awarded damages depend on how much and from whom the firm borrows, which have not yet been determined prior to the audit. The optimal audit effort choice is therefore contingent upon some conjecture that the auditor forms about how much and from whom the firm will borrow. Second, we derive a solution to the firm's decision problem that includes the optimal choice of the set of identified lenders as well as the optimal effort and investment choices. Since the firm does not observe the audit effort, the solution is contingent upon some conjecture that the firm forms about the auditor's effort choice. Third, given that all agents have rational expectations, their conjectures must be correct in equilibrium. That is, a full equilibrium is characterized by the intersection of the auditor's and the firm's reaction functions.

4. Audit effort decisions

For a given effort choice of the auditor, a, it follows from the audit technology, (2), that the probability of an audit failure is

$$\Pr(B, \mathcal{A}|a) = \Pr(\mathcal{A}|B, a)\Pr(B) = (1-a)(1-\phi).$$

For any given liability regime, let D be the auditor's conjecture about the court-awarded damages in an audit failure. Since the audit fee has already been determined, the auditor's decision problem is to choose an audit effort, a, so as to minimize the sum of the audit

effort cost, $C(a)$, and the expected legal liability costs, $(1-a)(1-\phi)D$:

$$\min_{1\geq a\geq 0} \; C(a) + (1-a)(1-\phi)D.$$

Solving the first-order condition of this minimization problem yields

$$C'[a(D)] = (1-\phi)D, \tag{3}$$

which implicitly defines the auditor's reaction function, $a(D)$.

To specify, equation (3) states that, for any conjecture about the court-awarded damages in an audit failure, the auditor chooses his/her optimal audit effort so as to equate the marginal audit effort cost with the expected marginal benefit from avoiding legal liability. It is evident from equation (3) that the auditor exerts no effort when facing no legal liability, $a(0) = 0$, and exerts the highest effort when facing infinite legal liability, $a(\infty) = 1$. Furthermore, $a'(D) > 0$ as the expected marginal benefit from avoiding legal liability increases with D, thereby inducing the auditor to work harder.

5. Financing and investment decisions

The audit technology, (2), implies that the quality of the project must certainly be bad should the audit report be a modified one. In this case, no lenders are willing to lend and the game ends. Thus, it remains for us to consider the case in which the auditor issues an unmodified opinion about the firm.

Given that the firm and the continuum of lenders conjecture the auditor's effort choice to be a, by Bayes' rule, the probability that the quality of the project is good given that the auditor issued an unmodified opinion is

$$\Pr(G|\mathcal{A},a) = \frac{\Pr(\mathcal{A}|G,a)\Pr(G)}{\Pr(\mathcal{A}|G,a)\Pr(G) + \Pr(\mathcal{A}|B,a)\Pr(B)} = \frac{\phi}{\phi + (1-a)(1-\phi)}, \tag{4}$$

where the second equality follows from the audit technology, (2). We let $\pi(a) = \Pr(G|\mathcal{A}, a)$. It follows from equation (4) that $\pi(0) = \phi$, $\pi(1) = 1$, and $\pi'(a) > 0$. This means, the audit report is informative and the informativeness increases with the audit effort.

To characterize the optimal financing and investment decisions of the firm with a conjectured audit effort choice, a, it is noteworthy that the project yields negative expected net present value if the firm shirks and that the private benefit is non-transferable to others. Thus, irrespective of which judicial approach governing the scope of auditors' liability prevails, the firm must devise loan contracts by which it can credibly commit itself to working in equilibrium, otherwise there will be no break-even loan contracts that would require an interest factor exceeding R given that $p_0 R < 1$.

Let us first solve for the firm's optimal investment decision under the privity approach. Suppose that the firm invests I in the project by borrowing from lenders in $[0,\ I]$. Since the firm is expected to exert the effort in equilibrium, if $K \geq I$, the break-even interest factor for lenders in $[0,\ I]$ is $1/p_1$. This is independent of the conjectured audit effort choice, a, due to the partial insurance provided by the auditor's liability to them against an audit failure. If $K < I$, lenders in $(K,\ I]$ are not primary beneficiary third parties and, thus, under the privity approach, are not entitled to recoup their out-of-pocket losses from the auditor in an audit failure. The break-even interest factor for lenders in $(K,\ I]$ becomes $1/\pi(a)p_1$, which is higher than the one for primary beneficiary third parties. To reduce the total interest payments, the working firm must choose $K \geq I$ and, as a residual claimant, receives $\pi(a)p_1(R - 1/p_1)I$ at the optimum. Thus, for a given conjectured audit effort choice, a, the firm chooses an investment level, I, and a set of primary beneficiary third parties, $[0,\ K]$, so as to solve the following constrained maximization problem, (P):

$$\max_{K \geq I \geq \underline{I}} \ \pi(a)p_1\left(R - \frac{1}{p_1}\right)I$$

$$\text{s.t.} \quad \pi(a)p_1\left(R - \frac{1}{p_1}\right)I \geq \pi(a)\beta[I + \Delta(a, I, K) - \underline{I}], \tag{5}$$

where inequality (5) is the no further borrowing constraint, and

$$\Delta(a, I, K) = \frac{p_0(p_1R - 1)I}{p_1(1 - p_0R)} + \frac{1 - \pi(a)}{1 - \pi(a)p_0R} \min \left[K - \frac{(p_1 - p_0)I}{p_1(1 - p_0R)},\ 0\right] \tag{6}$$

is the maximum additional loan size that the firm can borrow given the amount of initial borrowing, I (see Appendix A for the derivation of the no further borrowing constraint).

Note that constraint (5) resolves both the effort-incentive problem of the firm as well as its further borrowing incentives. In words, the left-hand side of inequality (5) is the expected residual payoff to the firm should it work and refrain from supplementary borrowing from lenders in $(I,\ N]$. The right-hand side is the maximum expected payoff to the firm had it deviated by borrowing further and then shirked. To see this, note that the project would have negative expected net present value had the firm shirked. New lenders fully anticipate this and are willing to lend only if they are adequately compensated. The amount that the firm can borrow from new lenders increases with the compensation received by new lenders. Thus, the maximum additional loan size is the one at which all the mispricing gains from the initial lenders go to new lenders. In this case, the firm only keeps the non-transferable private benefit, which is given on the right-hand side of inequality (5). It is evident from inequality (5) that, for a given I, the firm is less likely to work and refrain from supplementary borrowing the higher the maximum additional loan size, $\Delta(a, I, K)$. Thus, we can use $\Delta(a, I, K)$ to gauge the extent of the further borrowing incentive of the firm.

Solving the constrained maximization problem, (P), for I and K yields our first proposition (all proofs of propositions are given in Appendix B).

Proposition 1. *Suppose that the privity approach prevails and that the conjectured audit effort choice is a. The firm optimally identifies lenders in $[0,\ I_P(a)]$ by name to the auditor as the primary users of the audit report, borrows exclusively from these lenders at*

the interest factor, $1/p_1$*, and exerts the effort, where* $I_P(a)$ *is given by*

$$I_P(a) = \frac{\underline{I}}{1 + \{\pi(a)p_0/p_1[1 - \pi(a)p_0R] - 1/\beta\}(p_1R - 1)}. \tag{7}$$

Since the project has stochastic constant returns to scale, the first-best investment strategy for the working firm is to invest as much as possible. An immediate implication of Proposition 1 is that underinvestment is called for to resolve the dual incentive problems arising from the firm's unobservable effort choice and from sequential borrowing. By restricting the amount of investment, the firm reduces its private benefit from shirking to a level that no longer outweighs the efficiency gain from working, thereby credibly committing itself to working rather than shirking.

Now, we turn to the firm's optimal investment level under the more liberal Restatement approach. From Proposition 1, for a given conjectured audit effort choice, a, the optimal set of primary beneficiary third parties is $[0,\ I_P(a)]$ under the privity approach. If $M \leq I_P(a)$, the firm would optimally identify all intended users of the audit report (i.e., lenders in [0, M]) plus lenders in $(M,\ I_P(a)]$ by name to the auditor prior to the audit and borrow $I_P(a)$ exclusively from these lenders. In other words, the set of foreseen third parties becomes empty and the two judicial approaches are observationally equivalent. Thus, from the firm's point of view, the Restatement approach is indeed more liberal than the privity approach only when $M > I_P(a)$. In this case, there are some foreseen third parties whom the firm would like to exclude from having the right to sue the auditor in an audit failure. Since the tort law does not allow the firm to separate the class of primary beneficiary third parties from that of foreseen third parties in terms of their legal right in an audit failure, the choice of K by the firm is a matter of irrelevance in determining the optimal investment level as long as $K \leq M$. Thus, the firm's optimal investment level in this case is the same as the one under which the firm is obliged to choose $K = M$ under the privity approach. Setting $K = M$ in the constrained maximization problem, (P), and solving for I yields the following proposition.

Proposition 2. *Suppose that the Restatement approach prevails and that the conjectured audit effort choice is a. If $M \leq I_P(a)$, the firm's optimal decisions are the same as those under the privity approach. If $M > I_P(a)$, the firm identifies any subset of lenders in $[0,\ M]$ by name to the auditor as the primary users of the audit report, borrows exclusively from lenders in $[0,\ I_R(a,M)]$ at the interest factor, $1/p_1$, and exerts the effort, where $I_R(a,M)$ is given by*

$$I_R(a,M) = \begin{cases} I_P(a) - \frac{\beta[1-\pi(a)][M-I_P(a)]}{\beta\pi(a)(1-p_0/p_1)-[1-\pi(a)p_0R](p_1R-1)} & \text{if } M < \frac{(p_1-p_0)I_P(1)}{p_1(1-p_0R)}, \\ I_P(1) & \text{if } M \geq \frac{(p_1-p_0)I_P(1)}{p_1(1-p_0R)}. \end{cases} \tag{8}$$

Under the most liberal foreseeability approach, all lenders possess the right to sue the auditor in an audit failure irrespective of the firm's choice of K. Thus, the firm's optimal investment level in this case is the same as the one under which the firm is obliged to choose $K = N$ under the privity approach. Setting $K = N$ in the constrained maximization problem, (P), and solving for I yields the following proposition.

Proposition 3. *Suppose that the foreseeability approach prevails and that the conjectured audit effort choice is a. The firm identifies any subset of lenders in $[0,\ N]$ by name to the auditor as the primary users of the audit report, borrows exclusively from lenders in $[0,\ I_F(a,N)]$ at the interest factor, $1/p_1$, and exerts the effort, where $I_F(a,N)$ is given by*

$$I_F(a,N) = \begin{cases} I_P(a) - \frac{\beta[1-\pi(a)][N-I_P(a)]}{\beta\pi(a)(1-p_0/p_1)-[1-\pi(a)p_0R](p_1R-1)} & \text{if } N < \frac{(p_1-p_0)I_P(1)}{p_1(1-p_0R)}, \\ I_P(1) & \text{if } N \geq \frac{(p_1-p_0)I_P(1)}{p_1(1-p_0R)}. \end{cases} \tag{9}$$

6. Full equilibria

In equilibrium, irrespective of which judicial approach governing the scope of auditors' liability to third parties prevails, the firm always borrows from those who have the right to

sue the auditor in an audit failure. The auditor, prior to the audit, fully anticipates this subsequent equilibrium behavior of the firm and lenders. Since court-awarded damages are on an "out-of-pocket" basis, the auditor equates his/her legal liability costs, D, with the firm's investment level, I, which is not yet known to, and thus has to be conjectured by, the auditor. In other words, $a(I)$, as implicitly defined in equation (3) with $D = I$, is always the auditor's reaction function, which dictates his/her optimal audit effort choice for a given conjectured investment level of the firm, I.

Rational expectations among agents imply that their conjectures about others' unobservable actions must be correct in equilibrium. A full Bayesian Nash equilibrium, in reduced form, is therefore a pair, $(I,\ a)$, which solves the firm's reaction function and the auditor's reaction function simultaneously. The following proposition shows the existence and uniqueness of a full Bayesian Nash equilibrium under each of the three judicial approaches governing the scope of auditors' liability to third parties.[28]

Proposition 4. *There exists a unique full Bayesian Nash equilibrium under each of the three judicial approaches governing the scope of auditors' liability to third parties. In particular, the equilibrium investment level and audit effort choice under the privity approach are weakly higher than those under the Restatement approach, which in turn are weakly higher than those under the foreseeability approach.*

To understand the intuition of Proposition 4, we consider the case where $N > (p_1 - p_0)I_P(1)/p_1(1 - p_0R) > M > I_P(1)$. Figure 2 depicts the reaction functions of the firm and the auditor in this case, together with the corresponding full Bayesian Nash equilibria, $(I_P,\ a_P)$, $(I_R,\ a_R)$, and $(I_F,\ a_F)$, under the privity, Restatement, and foreseeability approaches, respectively.

[28]The equilibrium is unique in the sense that there exists only one equilibrium outcome. As mentioned above, the firm's choice of K is irrelevant in determining the optimal investment level under the Restatement and the foreseeability approaches. Hence, the unique equilibrium outcome in these cases is supported by a continuum of K. However, there does exist a unique optimal level of K under the privity approach.

(Insert Figure 2 here)

It is evident from Figure 2 that $I_P(a) > I_R(a, M) > I_P(1) = I_F$ for $0 \leq a < 1$. That is, when the scope of auditors' liability to third parties is governed by the privity approach, the equilibrium investment level is higher than that under the Restatement approach, which in turn is higher than that under the foreseeability approach, except in the extremely unlikely event of a perfect audit. The driver behind this unambiguous ranking is the no further borrowing constraint, (5). Recall that the maximum additional loan size, $\Delta(a, I, K)$, measures the extent of the firm's further borrowing incentive. From equation (6), $\Delta(a, I, K)$ is non-decreasing in K. Given the assumption that $N > (p_1 - p_0)I_P(1)/p_1(1 - p_0R) > M > I_P(1)$, we know that the firm's further borrowing incentive is greatest under the foreseeability approach and least under the privity approach, with that under the Restatement approach taking the middle ground. This follows from the fact that the privity approach allows only identified lenders to sue the auditor in an audit failure in order to recoup their out-of-pocket losses. The Restatement approach makes this valuable insurance claim against the auditor's wealth available also to foreseen lenders, whereas the foreseeability approach extends the claim further to foreseeable lenders. Through pricing of loan contracts, the entire value of these insurance claims will be transferred from lenders to the firm. As a result, the firm would find supplementary borrowing most attractive under the foreseeability approach and least attractive under the privity approach. This translates into a heavier dosage of underinvestment being used to correct the firm's further borrowing incentive under the foreseeability approach than under the privity approach.

The auditor fully anticipates the incentive problems of the firm and the associated equilibrium consequences. For a given audit effort level, the auditor knows that his/her legal liability costs will be the highest under the privity approach and the lowest under the foreseeability approach. Thus, in the full Bayesian Nash equilibria under the three judicial approaches, the auditor exerts the highest audit effort under the privity approach and the lowest audit effort under the foreseeability approach.

The accounting profession argues that movement from privity increases liability and litigation risk (particularly when faced with multiple claimants for one perceived audit failure), and sends insurance costs skyrocketing (Coalition for the End of Abusive Security Suits, 1992). Auditors might decline to perform audits, especially of risky firms, which will have ramifications for capital markets (Holland *et al.*, 1993). In contrast, we assume that audits always take place. Movement from privity has perverse effects on capital investment and audit effort/quality because of the firm's dual incentive problems and the linkage of court-awarded damages and plaintiff-lenders' losses. The predictions of higher audit failure rate and lower investment as a result of movement from privity are in line with the conjectures made by the accounting profession, even though the underlying logic is rather different.

7. Welfare comparisons

Thus far, we have not yet made any welfare implications regarding the scope of auditors' liability to third parties. To this end, we follow the law and economics literature (see, e.g., Landes and Posner, 1987; Polinsky, 1989; and Posner, 1992) by employing an utilitarian social welfare function that assigns equal weights to the utilities of all agents in determining social welfare. Given universal risk-neutrality, social welfare can be expressed as the sum of the firm's expected residual payoff and the auditor's expected payoff, as all lenders break even on average in equilibrium.

If the auditor issues an unmodified opinion, the firm's expected residual payoff in equilibrium would be $\pi(a)p_1(R-1/p_1)I$, where $(I,\ a) = (I_P,\ a_P)$, $(I_R,\ a_R)$ and $(I_F,\ a_F)$ under the privity, Restatement, and foreseeability approaches, respectively. On the other hand, if the auditor issues a modified opinion, the quality of the project is certainly bad, rendering zero investment in this case. The expected residual payoff to the firm prior to the audit is

therefore given by

$$\Pr(\mathcal{A}|a)\pi(a)p_1\left(R-\frac{1}{p_1}\right)I-f=\phi p_1\left(R-\frac{1}{p_1}\right)I-f, \tag{10}$$

since $\Pr(\mathcal{A}|a)=\phi+(1-a)(1-\phi)$. Likewise, the auditor expects to receive

$$f-C(a)-(1-a)(1-\phi)I. \tag{11}$$

Adding expressions (10) and (11) yields the equilibrium social welfare:

$$W(I,a)=(\phi p_1 R-1)I+a(1-\phi)I-C(a). \tag{12}$$

The first term on the right-hand side of equation (12) is the expected net present value of the project. The second term is the savings in the investment outlay which were made due to the avoidance of investing in the bad project as recommended by the informative audit. The final term is the audit effort cost.

The following proposition makes welfare comparisons among the three judicial approaches governing the scope of auditors' liability to third parties. This proposition holds when changes in social welfare are split with a nonzero fraction going to both the auditor and the client firm.

Proposition 5. *The equilibrium social welfare, audit fee, and expected payoffs to the firm and the auditor under the privity approach are weakly higher than those under the Restatement approach, which in turn are weakly higher than those under the foreseeability approach.*

The intuition of Proposition 5 is as follows. From Proposition 4, we know that the equilibrium investment level and audit effort under the privity approach are no less than those under the Restatement approach, which, in turn, are no less than those under the foreseeability approach. A higher equilibrium investment level and audit effort contribute

to a higher efficiency gain so that society as a whole benefits. The firm is better off because it does not have to forgo too much of the lucrative project, notwithstanding paying a higher audit fee. The auditor is better off because of the increased audit fee, which is more than enough to compensate for the rise in his/her audit effort cost. Thus, the firm and the auditor unanimously prefer the privity approach to the other two approaches. This provides an explanation for the lobbying activities of auditors to reduce their exposure to legal liability to third parties for ordinary negligence.

8. Conclusions

Since the 1960s, the accounting profession has been besieged with an increasing number of third-party lawsuits for ordinary negligence.[29] Estimates of damage claims facing the profession have soared to $30 billion.[30] Bialkin and Cooper (1986) warn that the trend of expanding the scope of auditors' liability to third parties could reduce the quality and scope of services that the profession now provides and that society will not benefit should this occur. In late 1985, the American Institute of Certified Public Accountants formed a special committee to develop a legislative program for liability reform. One of the major goals of the program is to limit the scope of auditors' liability to third parties by retaining the privity standard. Two years later, the same matter was also raised by the Committee to Review Accountants' Liability of the Canadian Institute of Chartered Accountants.

This paper has examined this timely issue by providing a formal analysis on the three prevailing judicial approaches governing the scope of auditors' liability to third parties: the privity approach, the Restatement approach, and the foreseeability approach. Taking the non-exclusivity of debt contracts as given, we have shown that the privity approach provides a credible mechanism by which firms can assure that they will not exploit their existing

[29] See, for instance, Minow (1984), Kothari *et al.* (1988) and Lys and Watts (1994).

[30] The Big Six (now there are only Five) declared that "liability claims against them total $30 billion, which exceeds their total partners' capital by a sizable amount" (Wall Street Journal, November 3, 1993, p. A8).

lenders by supplementary borrowing from other sources. From an efficiency perspective, the privity approach dominates the Restatement approach, which in turn dominates the foreseeability approach. Although the ranking among the three judicial approaches governing the scope of auditors' liability to third parties may not be too surprising, we believe that the source of inefficiency is important. The perverse effects on capital investment and audit effort/quality as a result of movement from privity have not been rigorously demonstrated in the academic literature.

While our model suggests an unambiguous ranking of the three prevailing judicial approaches governing the scope of auditors' liability to third parties, caution should be taken. There are many other variables, not captured in the model, that would determine the optimal liability rules. For instance, a transaction between the auditor's client and a known third party may fall through, the client may not be sure whether he/she is going to engage in a transaction with someone else, the client may use the financial statements in a variety of ways, and the privity approach may give too much power to the known third party, which will create a hold-up problem between the client and the known third party. In such cases, more liberal approaches may afford standardization, which reduces the costs of repetitive private contracting by requiring fewer contracts and making the contract shorter, and may mitigate the hold-up problems. Also, they may be enacted to ensure that "naive" parties are not exploited. To understand the role of government legislation in general, and auditors' liability in particular, we must have a good understanding of contracting costs. This paper, however, does demonstrate an important factor missing in the privity debate. While this paper focuses on the auditor's liability for third-party lenders, the general insight should be applicable to other types of third parties as well. If the benefit of the privity approach being a commitment mechanism were overlooked, a fair and complete consideration of the scope of auditors' liability exposure for ordinary negligence could not be given.

Appendix A. Derivation of the No Further Borrowing Constraint

For the interest factor, $1/p_1$, to be a break-even one for lenders in $[0,\ I]$, hence acceptable to them, the firm must work rather than shirk. A necessary condition for this is the following incentive compatibility constraint:

$$\pi(a)p_1\left(R-\frac{1}{p_1}\right)I \geq \pi(a)p_0\left(R-\frac{1}{p_1}\right)I+\pi(a)\beta(I-\underline{I}), \tag{A.1}$$

where the left-hand side of inequality (A.1) is the expected residual payoff to the firm if it works, and the right-hand side is the sum of the expected residual payoff and the expected private benefit to the firm if it shirks.

Indeed, the incentive compatibility constraint, (A.1), is necessary but not sufficient to induce the firm to work when it borrows I from lenders in $[0,\ I]$ at the interest factor, $1/p_1$, in the presence of other unrelated lenders in $(I,\ N]$. To see this, suppose the contrary wherein the incentive compatibility constraint, (A.1), binds and $K = I$. Consider the additional loan contracts with the interest factor, $1/\pi(a)p_0$, offered to lenders in $(I,\ I+I']$, who are not primary beneficiary third parties given that $K = I$. Under the privity approach, these lenders have no rights to sue the auditor in an audit failure and thus $1/\pi(a)p_0$ is the break-even interest factor for them when the firm shirks. For I' sufficiently small, the firm should remain solvent with the additional loan contracts if the project succeeds, i.e., $R(I+I') \geq I/p_1 + I'/\pi(a)p_0$. Alternatively put, for I' sufficiently small, enough subsidy can be drawn from the existing loan contracts to repay the new lenders in full if the project succeeds, i.e., $(R-1/p_1)I \geq [1/\pi(a)p_0 - R]I'$, where $1/\pi(a)p_0 > R > 1/p_1$. Evidently, lenders in $(I,\ I+I']$ are more than happy to accept the additional loan contracts as they will at worse break even when the firm shirks and at best make positive profits when the firm works.

It remains to show that the firm also finds it advantageous to offer the additional loan contracts and shirk. By doing so, the firm receives

$$\pi(a)p_0\left[R(I+I')-\frac{I}{p_1}-\frac{I'}{\pi(a)p_0}\right]+\pi(a)\beta(I+I'-\underline{I}).$$

Using the binding incentive compatibility constraint, (A.1), the above expression can be written as

$$\pi(a)p_1\left(R-\frac{1}{p_1}\right)I+\pi(a)\beta I'+[\pi(a)p_0R-1]I'. \tag{A.2}$$

The first term in expression (A.2) is the expected residual payoff to the firm if it does not offer the additional loan contracts. The second term is the extra expected private benefit from shirking. The third term is the negative expected net present value of the project from the additional investment, I'. Since $\phi \leq \pi(a) \leq 1$, $\beta > (p_1 - p_0)R$, and $\phi p_1 R > 1$, we have $\pi(a)\beta > \phi(p_1 - p_0)R > 1 - \pi(a)p_0R$. Thus, the sum of the second and third

terms in expression (A.2) is unambiguously positive. That means, once the firm receives the additional loan contracts from lenders in $(I,\ I+I']$, it would optimally choose to shirk, thereby making the existing loan contracts at the interest factor, $1/p_1$, no longer break even, a contradiction.

Bizer and DeMarzo (1992) refer to an environment where an agent borrows sequentially from more than one lender as "sequential banking" (see also Wong, 1993; and Kahn and Mookherjee, 1998). Our model clearly falls into this category. As shown above, sequential banking unravels the existing loan contracts with the interest factor, $1/p_1$, which are supposed to preserve the firm's working incentive. The crux of this unraveling stems from the "public good" nature of the firm's moral hazard problem under which contracting with lenders in $(I,\ N]$ imposes negative externalities on lenders in $[0,\ I]$. Since lenders in $(I,\ N]$ do not care about the well-being of lenders in $[0,\ I]$, the former are willing to lend as long as they expect to at least break even. An additional loan contract with the interest factor, $1/\pi(a)p_0$, which is higher than the gross return of the project in the successful state, R, would remain a break-even one for lenders in $(I,\ N]$, as it is heavily subsidized by the existing loan contracts which become mispriced when the firm shirks rather than works.

Given the dual incentive problems arising from the firm's unobservable effort choice and from sequential banking, to induce the firm to work when it borrows I from lenders in $[0,\ I]$ at the interest factor, $1/p_1$, the firm must credibly commit itself to refraining from supplementary borrowing from other sources. Alternatively put, relative to the optimum loan contracts which maximize the working firm's expected residual payoff, any additional loan contracts which make the firm better off would cause it to shirk. As such, these additional loan contracts must break even at the high-risk odds.

Suppose that the firm deviates by borrowing an additional amount, I', from lenders in $(I,\ I+I']$. If $I \le K < I+I'$, lenders in $(I,\ K]$ are primary beneficiary third parties while lenders in $(K,\ I+I']$ are not, so that the break-even interest factors at the high-risk odds for these two groups of lenders are $1/p_0$ and $1/\pi(a)p_0$, respectively. If $K \ge I+I'$, lenders in $(I,\ I+I']$ are all primary beneficiary third parties so that the break-even interest factor at the high-risk odds is $1/p_0$. Let $K^- = \min\,[K,\ I+I']$. The expected payoff to the shirking firm can be written compactly as

$$\pi(a)p_0\ \max\left[R(I+I') - \frac{I}{p_1} - \frac{K^- - I}{p_0} - \frac{I+I'-K^-}{\pi(a)p_0},\ 0\right] + \pi(a)\beta(I+I'-\underline{I}),$$

since the firm is protected by limited liability.

If the firm remains solvent when the project succeeds, the above expression reduces to

$$\pi(a)p_0\left(R - \frac{1}{p_1}\right)I + \pi(a)\beta(I+I'-\underline{I}) + [\pi(a)p_0R - 1]I' + [1-\pi(a)](K^- - I), \quad \text{(A.3)}$$

which is strictly increasing in I' since $\pi(a)\beta > 1 - \pi(a)p_0R$ and $K^- = \min\,[K,\ I+I']$. Thus, if the firm ever seeks supplementary borrowing, it would borrow up to the point where the cash flow from the project in the successful state is just enough to cover the total

debt repayments. Using this fact to solve the maximum additional loan size, we establish the following lemma.

Lemma 1. *For a given conjectured audit effort choice, a, a given amount of initial borrowing, I, and a given set of primary beneficiary third parties, $[0,\ K]$, the maximum additional size, $\Delta(a, I, K)$, which the firm can borrow is given by equation* (6).

Proof. Define the following function:

$$F(I') = R(I + I') - \frac{I}{p_1} - \frac{K^- - I}{p_0} - \frac{I + I' - K^-}{\pi(a)p_0},$$

where $K^- = \min\ [K,\ I + I']$. Clearly, F is continuous and is everywhere differentiable except at $I' = K - I$. In particular, for $I' < K - I$, $F'(I') = R - 1/p_0 < 0$, and for $I' > K - I$, $F'(I') = R - 1/\pi(a)p_0 < 0$. Thus, F is strictly decreasing in I'. It then follows from $F(0) = (R - 1/p_1)I > 0$ and $F(\infty) = -\infty$ that there exists a unique solution, I^*, at which $F(I^*) = 0$.

Consider first the case where K is sufficiently large such that $K \geq I + I^*$ and thus $K^- = I + I^*$ at $I' = I^*$. Using this assumption to solve $F(I^*) = 0$ yields $I^* = p_0(p_1R - 1)I/p_1(1 - p_0R)$, which is independent of K. In other words, for

$$K \geq I + \frac{p_0(p_1R - 1)I}{p_1(1 - p_0R)} = \frac{(p_1 - p_0)I}{p_1(1 - p_0R)},$$

$\Delta(a, I, K)$ defined in equation (6) is indeed a solution for $F(I^*) = 0$.

Now consider the case where $K < (p_1 - p_0)I/p_1(1 - p_0R)$. Suppose that $K < I + I^*$ and thus $K^- = K$ at $I' = I^*$. Using this assumption to solve $F(I^*) = 0$ yields

$$I^* = \frac{\pi(a)p_0(p_1R - 1)I}{p_1[1 - \pi(a)p_0R]} + \frac{[1 - \pi(a)](K - I)}{1 - \pi(a)p_0R},$$

which is $\Delta(a, I, K)$ defined in equation (6). Using the above equation, we have

$$I + I^* - K = \frac{\pi(a)(1 - p_0R)}{1 - \pi(a)p_0R}\left[\frac{(p_1 - p_0)I}{p_1(1 - p_0R)} - K\right],$$

which is positive from the restriction on K, implying that it is indeed $K^- = K$ at $I' = I^*$. □

Since the project has negative expected net present value when the firm shirks, any I' above $\Delta(a, I, K)$ would cause insufficient subsidy from the existing loan contracts to make the required additional loan contracts at least break even.

To credibly commit itself to refraining from supplementary borrowing from other sources and to working, the firm borrows from lenders in $[0,\ I]$ at the interest factor, $1/p_1$, such that the following no further borrowing constraint is satisfied:

$$\pi(a)p_1\left(R-\frac{1}{p_1}\right)I \geq \pi(a)\beta[I+\Delta(a,I,K)-\underline{I}],$$

where the right-hand side of the constraint is obtained by substituting $I'=\Delta(a,I,K)$ into expression (A.3).

Appendix B. Proofs of Propositions

Proof of Proposition 1. Since the working firm's expected residual payoff, $\pi(a)p_1(R-1/p_1)I$, is strictly increasing in I, the optimal investment level, $I(a,K)$, must be the maximum amount which satisfies the no further borrowing constraint, (5), and $I\leq K$ simultaneously.

Define the following function:

$$\begin{aligned} G(I) &= (p_1R-1)I-\beta(I-\underline{I})-\frac{\beta p_0(p_1R-1)I}{p_1(1-p_0R)} \\ &\quad -\frac{\beta[1-\pi(a)]}{1-\pi(a)p_0R}\min\left[K-\frac{(p_1-p_0)I}{p_1(1-p_0R)},\ 0\right]. \end{aligned} \tag{A.4}$$

Clearly, $G(I)$ is continuous and is everywhere differentiable except at $I=p_1(1-p_0R)K/(p_1-p_0)$. In particular, for all $I<p_1(1-p_0R)K/(p_1-p_0)$,

$$G'(I)=p_1R-1-\beta-\frac{\beta p_0(p_1R-1)}{p_1(1-p_0R)}<0,$$

since $\beta>(p_1-p_0)R$ and $p_0R<1$. On the other hand, for all $I>p_1(1-p_0R)K/(p_1-p_0)$,

$$\begin{aligned} G'(I) &= p_1R-1-\beta-\frac{\beta p_0(p_1R-1)}{p_1(1-p_0R)}+\frac{\beta[1-\pi(a)](p_1-p_0)}{p_1[1-\pi(a)p_0R](1-p_0R)} \\ &= p_1R-1-\frac{\beta\pi(a)(p_1-p_0)}{p_1[1-\pi(a)p_0R]}. \end{aligned} \tag{A.5}$$

Note that

$$p_1R(p_1R-1)=\frac{p_1[\pi(a)p_1R-\pi(a)p_0R](p_1R-1)}{\pi(a)(p_1-p_0)}>\frac{p_1[1-\pi(a)p_0R](p_1R-1)}{\pi(a)(p_1-p_0)},$$

where the inequality follows from the fact that $\phi p_1R-1>0$ and $\pi(a)\geq\phi$. Note also that

$$p_1-p_0-p_1(p_1R-1)>2p_1-p_0-\frac{p_1^3}{p_0(2p_1-p_0)}=\frac{(p_1-p_0)[p_1p_0-(p_1-p_0)^2]}{p_0(2p_1-p_0)},$$

where the inequality follows from the fact that $R < p_1/p_0(2p_1 - p_0)$, which is implied by assumption (1). Since $1/2 \leq p_0 < p_1 \leq 1$, $p_1 p_0 - (p_1 - p_0)^2 > p_0^2 - (1/2)^2 \geq 0$. Thus, we have

$$\beta > (p_1 - p_0)R > p_1 R(p_1 R - 1) > \frac{p_1[1 - \pi(a)p_0 R](p_1 R - 1)}{(p_1 - p_0)\pi(a)}.$$

It follows from equation (A.5) that $G'(I) < 0$ for all $I > p_1(1 - p_0 R)K/(p_1 - p_0)$. Hence, $G(I)$ is strictly decreasing in I. Furthermore,

$$G(\underline{I}) = \left[1 - \frac{\beta p_0}{p_1(1 - p_0 R)}\right](p_1 R - 1)\underline{I} - \frac{\beta[1 - \pi(a)]}{1 - \pi(a)p_0 R} \min\left[K - \frac{(p_1 - p_0)\underline{I}}{p_1(1 - p_0 R)},\ 0\right],$$

which is positive since $\beta < p_1(1 - p_0 R)/p_0$ by assumption (1). On the other hand, $G(I) < 0$ when I is sufficiently large. Hence, we can conclude that there exists a unique solution, $I^* > \underline{I}$, at which $G(I^*) = 0$ or, equivalently, the no further borrowing constraint, (5), binds.

Consider first the case where K is sufficiently large such that

$$K \geq \frac{(p_1 - p_0)I^*}{p_1(1 - p_0 R)}. \tag{A.6}$$

By this assumption, $I^* < K$ and $I^* = I_P(1)$, where $I_P(a)$ is defined in equation (7) and is independent of K. Thus, for $K \geq (p_1 - p_0)I_P(1)/p_1(1 - p_0 R)$, assumption (A.6) holds at $I^* = I_P(1)$, implying that $I_P(1)$ is indeed the maximum investment level which satisfies the no further borrowing constraint, (5), and $I \leq K$ simultaneously.

Now, consider the case where $K < (p_1 - p_0)I_P(1)/p_1(1 - p_0 R)$. It follows from equation (A.4) that $G[I_P(1)] > 0$ and thus $I^* > I_P(1)$. In this case, I^* decreases with an increase in K since

$$\frac{\partial I^*}{\partial K} = \frac{\beta[1 - \pi(a)]}{1 - \pi(a)p_0 R} \Big/ \left\{p_1 R - 1 - \frac{\beta\pi(a)(p_1 - p_0)}{p_1[1 - \pi(a)p_0 R]}\right\} < 0.$$

If K is very close to $(p_1 - p_0)I_P(1)/p_1(1 - p_0 R)$, from the above analysis we know that I^* would be very close to $I_P(1)$, implying that $K > I^*$. If $K = \underline{I}$, since $I^* > \underline{I}$, we have $K < I^*$. Thus, there must exist a unique I^* such that $K = I^*$. Substituting this into the binding no further borrowing constraint, (5), yields $I^* = I_P(a)$, where $I_P(a)$ is defined in equation (7). Thus, for $\underline{I} \leq K \leq I_P(a)$, the no further borrowing constraint, (5), is slack while the constraint, $I \leq K$, is binding, implying that $I(a, K) = K$. For $I_P(a) < K < (p_1 - p_0)I_P(1)/p_1(1 - p_0 R)$, the no further borrowing constraint, (5), is binding while the constraint, $I \leq K$, is slack. Solving the binding constraint, (5), yields

$$I(a, K) = I_P(a) - \frac{\beta[1 - \pi(a)][K - I_P(a)]}{\beta\pi(a)(1 - p_0/p_1) - [1 - \pi(a)p_0 R](p_1 R - 1)}.$$

(Insert Figure 3 here)

Figure 3 shows graphically the relationship between the optimal investment level, $I(a, K)$, and the set of primary beneficiary third parties, $[0,\ K]$. Inspection of Figure 3 reveals that $I(a, K)$ reaches a unique maximum at $I_P(a)$ when $K = I_P(a)$. Since K is a choice variable of the firm and the working firm's expected residual payoff, $\pi(a)p_1(R - 1/p_1)I$, is strictly increasing in I, it is optimal for the firm to identify lenders in $[0,\ I_P(a)]$ by name to the auditor prior to the audit and borrow $I_P(a)$ exclusively from these lenders. Hence, $I_P(a)$ is the firm's optimal investment level for a given conjectured audit effort choice, a. □

Proof of Proposition 2. Analogous to the proof of Proposition 1 by setting $K = M$. □

Proof of Proposition 3. Analogous to the proof of Proposition 1 by setting $K = N$. □

Proof of Proposition 4. Since $a(I)$, implicitly defined in equation (3), is strictly increasing in I, there exists an inverse function, $\Phi(a)$, such that $\Phi[a(I)] = I$ and $\Phi'(a) > 0$. Consider first the case under the privity approach. Define $T_P(a) = I_P(a) - \Phi(a)$, where $I_P(a)$ is defined in equation (7). Note that $T_P(0) = I_P(0) > 0$ and $T_P(1) = I_P(1) - \infty < 0$. Furthermore,

$$I'_P(a) = -\frac{p_0(1-\phi)}{\phi \underline{I}}\left[\frac{\pi(a)I_P(a)}{1-\pi(a)p_0R}\right]^2\left(R - \frac{1}{p_1}\right) < 0.$$

Thus, $T'_P(a) = I'_P(a) - \Phi'(a) < 0$, implying that there exists a unique $a_P \in (0,\ 1)$ such that $T(a_P) = 0$. The unique full Bayesian Nash equilibrium, in reduced form, is therefore $(I_P,\ a_P)$, where $I_P = I_P(a_P)$. The case under the Restatement approach can be proved analogously and the unique full Bayesian Nash equilibrium, in reduced form, is $(I_R,\ a_R)$, where $I_R = I_R(a_R, M)$. In fact, if $M \leq I_P$, the equilibrium under the Restatement approach will be the same as that under the privity approach. Finally, the case under the foreseeability approach can also be proved analogously. In fact, if $N \geq (p_1 - p_0)I_P(1)/p_1(1 - p_0R)$, the proof is trivial because $I_F(a, N) = I_P(1)$, which is invariant to a. Hence, the unique full Bayesian Nash equilibrium, in reduced form, is $(I_F,\ a_F)$, where $I_F = I_P(1)$ and $a_F = a(I_F)$. □

Proof of Proposition 5. Given that changes in social welfare are split with a nonzero fraction going to the auditor and the client firm, it suffices to show that $W_P \geq W_R \geq W_F$. First, we compare W_P with W_R, where $W_P = W(I_P, a_P)$ and $W_R = W(I_R, a_R)$. By Proposition 4, we know that $(I_R,\ a_R)$ is the same as $(I_P,\ a_P)$ if $M \leq I_P$. Thus, we have $W(I_P, a_P) = W(I_R, a_R)$ if $M \leq I_P$. It remains to show that $W(I_P, a_P) > W(I_R, a_R)$ if $M > I_P(a)$. Differentiating $W(I_P, a)$ with respect to a yields

$$\frac{\partial W(I_P, a)}{\partial a} = (1 - \phi)I_P - C'(a).$$

It follows from equation (3) that a_P maximizes $W(I_P, a)$. Thus, $W(I_P, a_P) > W(I_P, a_R)$. Furthermore, we have

$$W(I_P, a_R) - W(I_R, a_R) = [\phi p_1 R - 1 + a_R(1-\phi)](I_P - I_R) > 0,$$

where the inequality follows from the fact that $\phi p_1 R > 1$ and $I_P > I_R$ should $M > I_P$. Hence, we have $W_P \geq W_R$. The remaining parts of the proposition can be proved analogously. □

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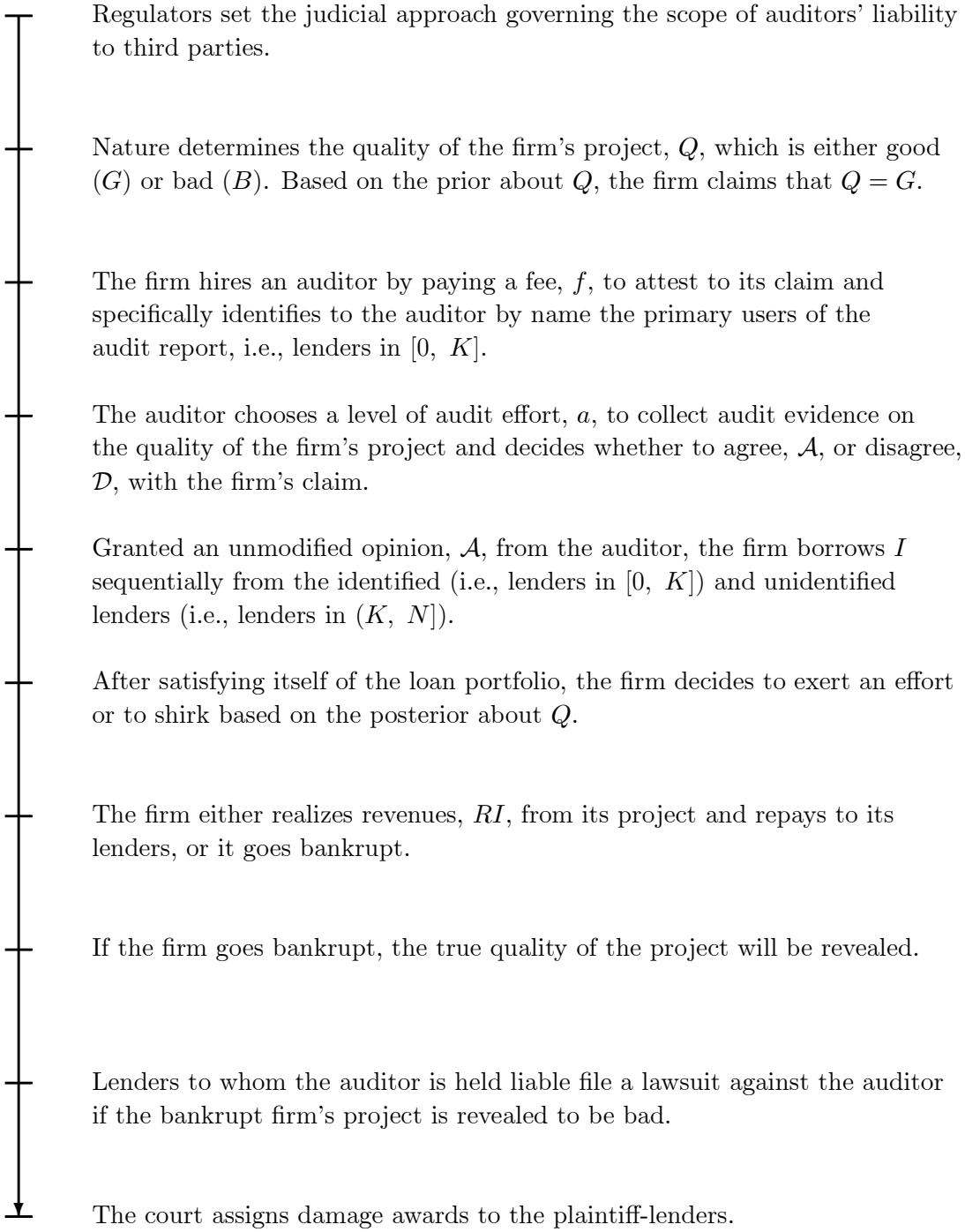

Figure 1. Time Line

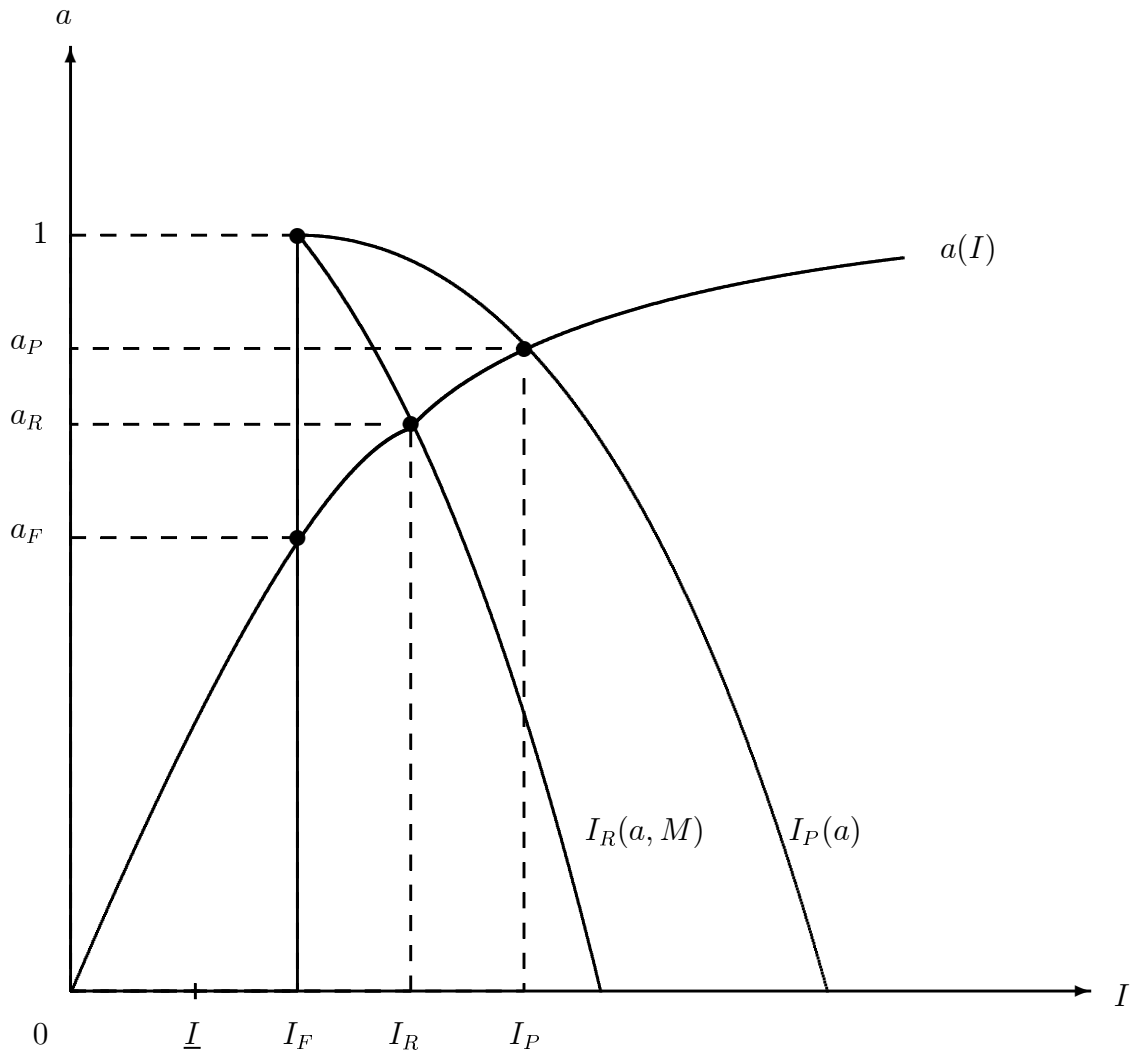

Figure 2. Full Equilibria

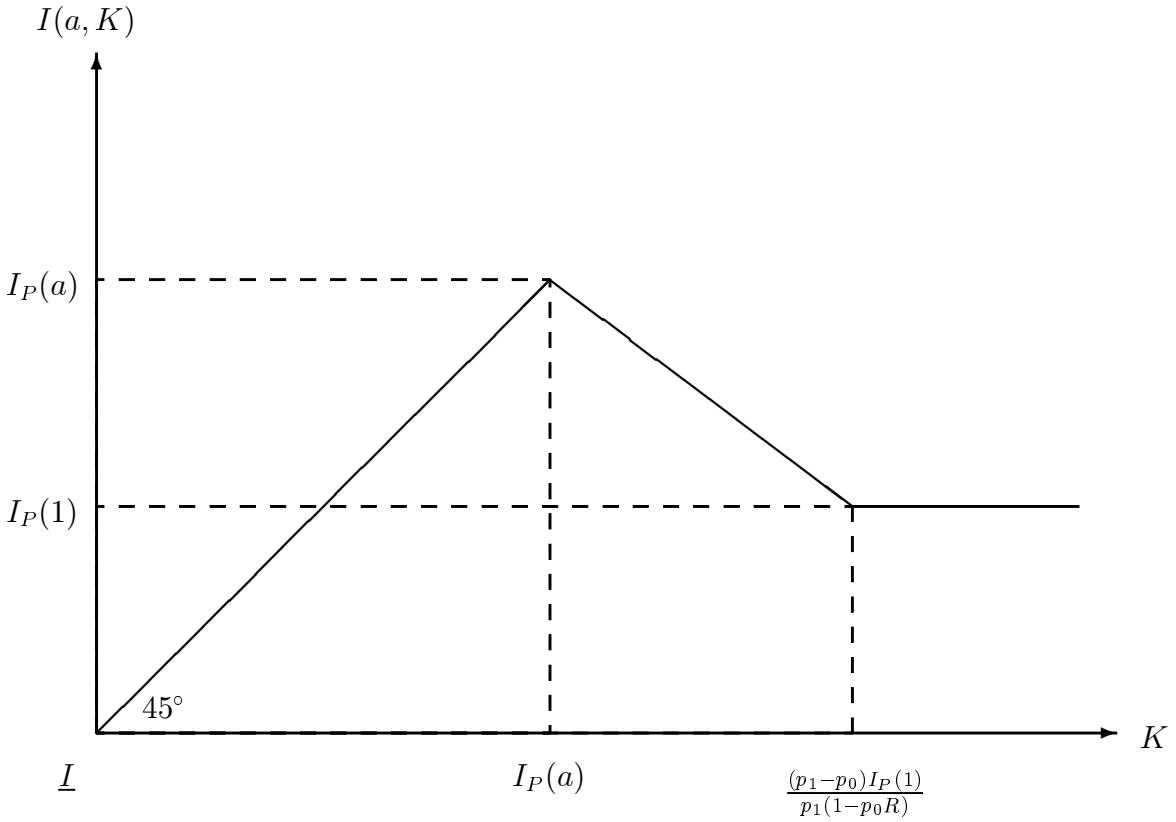

Figure 3. Equilibrium Investment