Audit oversight, manipulation incentives and cost of capital

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Abstract

In this paper, I analyze the interplay of a manager, an auditor and an investor when audit oversight (for example by the PCAOB) is present. Discipline mechanisms (litigation and oversight) and manager characteristics influence audit quality as well as manipulation incentives of a manager and in turn cost of capital. Audit quality and manipulation incentives of a manager are analyzed as well as changes resulting from the influence of corporate culture, empire building incentives, reputation loss and costs following litigation are highlighted. Higher norm values lead to decreased incentives for manipulation on part of the manager and on the other hand to lower audit effort. Interestingly, cost of capital can also decrease as a reaction to increased empire building incentives for certain parameter values due to effective discipline mechanisms.

Keywords: Audit oversight, manipulation incentives, cost of capital

JEL Classification: D91, M42, M48

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1 Introduction

This paper analyzes a model framework including a manager-owner, an auditor and an investor. The model allows for implications with respect to manipulation actions, audit effort and cost of capital, when exogenous norms, empire building incentives and audit oversight in addition to litigation are considered. In a nutshell, the main question addressed in the paper is: How do manager and auditor coordinate their behavior if norm characteristics or discipline mechanisms change and what is the resulting effect on cost of capital (i.e., investor’s required rate of return)? Since investor protection is amongst other things defined as target in connection with audit oversight the cost of capital issue is of particular interest.

Many existing papers that analyze the influence of discipline mechanisms for the auditor do not consider the interaction of the manager’s and auditor’s actions, hence ignore an information advantage of the manager. In contrast, the auditor in my model uses the manager’s report to update his beliefs and to determine audit quality. As a consequence, my model complements existing literature by denying the auditor’s monopoly on information.

The behavior of the manager-owner is driven by norm considerations: A well-developed corporate culture or strong ethical beliefs make manipulation more costly for the manager. Furthermore, my model accounts for managerial empire building incentives, which have already been defined in the literature quite early. Jensen (1986) describes those as incentives that “cause their firms to grow beyond the optimal size. Growth increases managers’ power by increasing the resources under their control” (p. 323). These incentives, which are exogenous in my model, can also be interpreted as being subject to norms. In the same spirit as before, high norm values or a “good” corporate culture are able to deter empire building tendencies, whereas low norm standards have the opposite effect.

Coming to the discipline mechanisms for the auditor (legal litigation by courts and audit oversight by the regulatory authority), it is worth mentioning that during the last years a considerable number of reforms were made in the field of auditing. A recent regulatory requirement relates to audit oversight, which can also be described as audit inspection or audit enforcement. Pursuant to the EU Regulation No 537/2014 “appropriate oversight by competent authorities which are independent from the audit profession” (L 158/81) is compulsory for the member states since 2016. In line with the EU regulation, the “Abschlussprüferaufsichtsbehörde (APAB)” acts as independent auditing oversight body in Austria since October 2016 and is subject to supervision of the Federal Minister of Finance (“Bundesminister für Finanzen”).

In the US, the Public Company Accounting Oversight Board (PCAOB), which has been established in the early 2000s, pursues similar activities with the objective of investor and public interest protection. Inspections of the PCAOB “assess compliance with the Sarbanes-Oxley Act, the rules of the Board, the rules of the Securities and Exchange Commission, and professional standards, in connection with the firm’s performance of audits, issuance of audit reports, and related matters” (Public Company Accounting Oversight Board (PCAOB) 2018c). Inspection reports display whether deficiencies of the audit were noted. Whereas inspection reports do not mention the auditor’s client name, enforcement reports do.

Enforcement actions of the PCAOB in case of not meeting “professional obligations” range for example from imposing monetary fines on the auditor to a revocation of a company’s registration but may also include other consequences. The annual report 2016 of the PCAOB reported 54 disciplinary orders and an 8 million dollar fine against “Deloitte Touche Tohmatsu Auditores Independentes” (Brazil), where both numbers represent an all-time high in the history of the PCAOB (Public Company Accounting

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2As far as the collaboration between inspecting authorities is concerned, the Austrian Act on Quality Assurance of Audits on Financial Statements (“Abschlussprüfung-Qualitätssicherungsgesetz,” A-QSG) specifies that the enforcement bodies (Austrian Financial Market Authority, FMA and Austrian Financial Reporting Enforcement Panel, AFREP/OePR) have to report to the APAB if reasonable suspicion for deficiencies in the quality assurance measures of an auditor occurs.
Oversight Board (PCAOB) 2017, p. 16). As far as the frequency of violations of professional obligations is concerned, plenty of instances regarding inspection reports as well as enforcement reports can be found on the PCAOB’s website.\(^3\) Compared to the PCAOB the Austrian counterpart, APAB, has barely disclosed any information on inspections so far, which is obviously due to APAB’s short activity period.\(^4\) In my model, oversight of the competent authority creates a risk for the auditor that he will be punished by the authority if professional obligations are not met. The resulting penalty will be represented as a disutility component in the auditor’s objective function, in addition to possible disutility in case of “traditional” litigation.

**Related literature**

Analyzing the effects of audit oversight authorities, like the PCAOB in the US, has been the object of research of a few recent studies. Defond and Lennox (2017) analyze empirically whether the quality of internal control audits has improved as a result of PCAOB inspection. They highlight that recent efforts of the PCAOB, in order to improve audit quality, comprise focusing its inspections on “whether auditors were obtaining sufficient evidence to support their internal control opinions” (Defond & Lennox 2017, p. 598). Their results show that an increase in bad inspection reports concerning internal control audits also entails accordingly more adverse audit opinions. Furthermore, they observe that higher deficiency rates lead to increased audit fees and conclude that PCAOB inspections result in higher audit quality (ex post).

Using a unique data set, Aobdia (2016) analyzes how audit quality changes after an inspection by the PCAOB has been conducted. He studies the effect of a bad inspection report (“Part I Finding”) on audit quality and whether there exists a spillover effect on part of the auditor (i.e., impact on other engagements/partners of the audit firm). The results indicate that such a spillover effect exists, which might be interpreted as

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\(^3\)See Public Company Accounting Oversight Board (PCAOB) (2018a; 2018b).

\(^4\)See Abschlussprüferaufsichtsbehörde (APAB) (2018).
learning of the auditor from having been inspected and making use of information the
inspection has put forth. However, there is also some evidence that audit firms have
a tendency to just strive for meeting the pass/fail bar. Furthermore, reactions of the
inspected auditor’s clients are evaluated in the study: Clients are more likely to replace
the auditor if a bad inspection report has been issued.

In their empirical study, which uses data from Sweden, Sundgren and Svanström
(2017) hypothesize that audit quality is affected by two sources when audit oversight
is present: The risk of being penalized by losing clients or by having to pay fines
(preventive effect) and the learning of auditors, which changes reporting manners.
Their results don’t provide (much) evidence that sanctioned auditors experience a
decline in the number of clients nor that sanctioned auditors exhibit the tendency of
reporting more conservatively. However, they do find that Big Four auditors get a
lower salary after having been sanctioned. In total, Sundgren and Svanström (2017)
question the effectiveness of audit oversight for private firms in Sweden and point out
that the effects due to sanctions are rather small.

In their theoretical working paper, which adapts the audit quality model of Dye
(1993), Larmande and Lesage (2016) point out that audit effectiveness and audit effi-
ciency might be opposing goals under certain circumstances. In this context, Larmande
and Lesage (2016) as well as Knechel and Sharma (2012) define audit effectiveness5 as
“the mandated level of assurance” and audit efficiency as “the use of fewer inputs
(i.e., lower costs) to obtain a given level of assurance” (Larmande & Lesage 2016, p.
10). In their static model, the auditor suffers from reputation loss if a bad inspection
report is published. The auditor can choose among two audit technologies: safe or
risky. Information asymmetry between the auditor and the inspector has the conse-
quence that the inspector cannot observe the efficiency of the risky audit technology
directly and gives rise to “inspection risk”. Therefore, the auditor might choose the

5 In this context, “audit effectiveness” corresponds to the term “audit quality” that is frequently
used in many other research studies in the field of auditing.
efficient technology but might supply effort below the mandated level of assurance. Furthermore, Larmande and Lesage (2016) explicitly analyze the technology choice of an auditor between a safe technology and a more efficient but risky technology. They find out that the auditor might either chose the “risky technology as an excuse” or the “conservative strategy” due to inspection risk. The auditor will choose the former if reputation risk is low and the latter if reputation risk is high. From an efficiency perspective, the optimal technology will only be selected in the case of intermediate reputation risk.

The working paper of Ye and Simunic (2017) also uses an analytical model to examine the impact of audit oversight on audit quality, audit value and the audit market. In contrast to the model of Larmande and Lesage (2016), Ye and Simunic (2017) assume that audit technology can only differ between auditors but is individually fixed. The main result of Ye and Simunic (2017) is that even when a strong legal system is present, audit oversight can be beneficial with respect to audit value. Furthermore, an improvement in audit value is also documented when audit oversight is employed and the legal system is weak. However, audit oversight cannot compensate for a strong legal system entirely. Court and audit oversight authority have a different scope of enforcement in the model: Ye and Simunic (2017) assume that the legal system can enforce audit effort but not audit effectiveness (e.g. quality-control system), whereas the audit oversight authority can do both.

My model is most closely related to Larmande and Lesage (2016). However, in contrast to Larmande and Lesage (2016) my model depicts the interaction of several players and does not apply different audit technologies. Larmande and Lesage (2016) follow prior literature and assume that the manager always gives a favorable report to the auditor and that this report is ignored by the auditor because it is not informative. As mentioned earlier, the manager’s information is relevant in my model, which means that as opposed to Larmande and Lesage (2016) and other prior literature the report

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6See for example Nelson, Ronen, and White (1988), who assume that a manager always reports
of the manager is not uniformly good, but serves a source of information for the auditor. Relating to my model framework, Datar and Alles (1999) also analyze the interaction of manager-auditor behavior, but focus on the role of audit reputation. They find out that reputation development on part of the auditor can substitute for legal actions of the owners, costly contracting and monitoring. Moreover, Ewert and Wagenhofer (2016) research the interaction of a productive manager, a strategic auditor, and an enforcement body. Their results show that stronger enforcement strictly alleviates earnings management and that increased auditing can increase earnings management as well. They also analyze the effect of enforcement with respect to firm value and financial reporting quality, but do not explicitly consider implications in terms of cost of capital.

The paper proceeds as follows: Section 2 describes the model and its players; section 3 presents the results of the model; and section 4 concludes the paper.

2 Model

2.1 Players and game structure

The model includes three players: entrepreneur, who is the manager of the firm at the same time (in the following called manager), auditor and investor. A firm wants to raise external capital in order to expand its operations and undertake an investment project. With probability $\lambda$ the project is successful (good state and cash flow $X_G$), whereas it is unsuccessful with probability $1 - \lambda$ (bad state and cash flow $X_B$). The amount that the investors provide is denoted by $I$, where $X_G > I > X_B$ and $X_B$ is normalized to zero for simplicity. The cash flow of the investment project is split between the investor and the manager such that the investor gets a share $\alpha$ of the

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a high outcome and has no impact on the accuracy of the audit. They state that “[i]mplicit in this argument is the assumption that the benefit (in terms of higher wages) to managers of reporting high profits is greater than any expected personal legal liability” (Nelson et al. 1988, p. 258).
return and the manager a share $1 - \alpha$. $\alpha$ will be interpreted as the firm’s cost of capital (as for example in Laux & Stocken 2012). Following prior literature (see for example also Laux and Stocken (2012)) the investor is assumed to be risk-neutral, part of a competitive capital market, and therefore has to be content with making expected profits of zero. In order to obtain financing for the project, an auditor (risk-neutral) is hired by the firm. The manager provides a report about the project type (either a good one, $R_G$, or bad one, $R_B$), which gets checked by the auditor, who provides a truthful audit report ($A_G$ or $A_B$).\footnote{The investment project will only be financed by the investors if a good audit report, $A_G$, is provided.}

The manager is also assumed to be risk neutral. On the one hand, he derives benefit from retaining a share of the cash flow, on the other hand, he has empire building incentives, which means that he experiences an increase in utility if an investment project is undertaken. As a consequence, he has incentives to manipulate the report in order to increase his expected payoff. However, manipulation effort is costly for the manager and causes manipulation costs for him. Manipulation costs are rather low if the norm standards of the firm (i.e., the manager) are poor; in contrast, if high ethical standards prevail, manipulation costs are also high.

If the final audited report is positive (i.e., $A_G$), the project is financed because the investor expects a non-negative NPV (although the investor knows that there remains some probability that the project is bad and the audit might have failed). If an audit failure\footnote{In my model, an audit failure occurs if the auditor issues a good report, though the state of the project is bad and therefore the project eventually fails.} happens, the investor will sue the auditor and obtain $\gamma L$ as compensation, where $\gamma L < I$. As a consequence, the investor is not able to recover the whole investment amount but only a part of it. $\gamma$ can be interpreted as “litigation friction” that is retained by the lawyers as for example in Radhakrishnan (1999).\footnote{Radhakrishnan (1999) labels this friction “recovery friction”.} If a bad audit report ($A_B$) is issued, the project is not implemented (no legal liability) and the game ends. Figure 1 illustrates the sequence of events and figure 2 depicts the corresponding
probabilities.\textsuperscript{10}

Figure 1: Sequence of events

As far as the chronology of litigation and audit oversight is concerned, in practice, damages in connection with litigation against the auditor occur quite late compared to the event of damage. For example, as a consequence of auditing Lehman Brothers insufficiently, Ernst & Young had to pay over a 100 million dollars damages. Whereas the auditing deficiencies relate to the years prior to 2009, lawsuits were filed in December 2010 and resulted in settlements in 2014 and 2015 (Goldstein 2015). Concerning the PCAOB’s inspection report of Ernst & Young, it was published in 2010, though without explicit reference to Lehman Brothers (Public Company Accounting Oversight Board (PCAOB) 2010). Consequently, assuming that audit oversight takes place prior

\textsuperscript{10}The structure of the tree is similar to the one used by Schwartz (1997). However, my specification adds another level, namely the ability of the manager to manipulate the report. Furthermore, in the model of Schwartz (1997) the amount of investment, \( I \), is endogenous, whereas \( I \) is exogenous and fixed in my model.
to litigation seems to be appropriate. However, I do not explicitly consider the reliance of the court on the results of the audit oversight authority or vice versa (which also seems to apply for the previous example of Ernst & Young), but that both are able to determine audit quality.

Similar to Ye and Simunic (2017), I assume that the players have common beliefs about the probability that a project is good or bad such that no ex ante adverse selection problem arises. Proofs and further formal results can be found in the appendix (section A).

2.2 Audit oversight versus litigation

Regarding the design of my model, determining criteria for how and when the oversight authority would set a penalty proves especially important. In my model, the costs for an auditor in case of a bad inspection report ($d$) arise in addition to potential
litigation costs \( (L) \) and need not to be monetary in nature, but also comprise for example reputational losses due to a negative inspection report. Compared to legal litigation audit oversight is not contingent on audit failure, but yet depending on whether the auditor is able to meet the professional requirements. Another difference within the framework of my model between penalties for the auditor resulting from oversight and litigation refers to the so-called “triangle effect” (Laux & Newman 2010, p. 263). Higher litigation costs entail increased audit fees to assure that the auditor breaks even. On part of the investor, a higher damage award from the auditor in case of audit failure leads to better financing conditions for the firm. Given a fixed level of audit effort, the lower cost of capital for the firm (i.e., the manager-owner) make up for the increased audit fee. This effect only applies to litigation damages but not to costs resulting from a bad audit oversight report. As such, oversight damages represent a dead weight loss. Those damages do not affect the cost of capital directly, though the manager has to compensate the auditor for the expected damages to fulfill the auditor’s participation constraint.

From a modelling perspective, compliance of the auditor with the professional requirements will be evaluated by using a quadratic function that accounts for the difference between the requested level of effort (standard) and the effort of the auditor. The bigger the deviation of the auditor in terms of effort from the standard, the more likely is the oversight punishment for the auditor:

\[
\text{Oversight punishment: } \frac{(s - e)^2}{2} d. \tag{1}
\]

To avoid the unrealistic case where the auditor experiences disutility if he provides more effort than the standard of the oversight authority stipulates and for simplicity, \( s \) is assumed to be equal to 1 within the framework of my equilibrium analysis.\(^{11}\) Furthermore, division by two simplifies the subsequent analysis. As indicated in equation (1),

\(^{11}\)As a result the equilibrium \( e \) will not exceed \( s \).
higher audit effort contributes to lowering the disutility component (i.e., the expected oversight punishment or costs resulting from audit inspection) by drawing nearer to the standard of the oversight authority. Furthermore, the vast number of PCAOB’s inspection and enforcement reports showing numerous shortcomings of virtually all audit firms worldwide indicate that it is rather unmanageable to adhere to PCAOB’s requests a hundred percent. As a consequence, it is also reasonable to assume a high standard \((s = 1)\), such that \(s \geq e\). Since audit firms in practice experience at least small (reputational) losses in the form of error publications if inspection takes place this aspect is reflected in my model setup and the consequent results.

### 2.3 Manager

In the following, \(\Pi_M(X_G)\) denotes the manager’s utility if he privately observes the good project state and \(\Pi_M(X_B)\) indicates his utility if he privately observes the bad project state (based on the conjectured audit effort, \(\hat{e}\)):

\[
\Pi_M(X_G) = (1 - \alpha(\hat{e}, \hat{b}))X_G + EB - F, \tag{2}
\]

\[
\Pi_M(X_B) = (1 - \alpha(\hat{e}, \hat{b}))b(1 - \hat{e}) \underbrace{X_B}_{X_B = 0} + b(1 - \hat{e})EB - \frac{kb^2}{2} - F. \tag{3}
\]

The manager retains a share \(1 - \alpha\) of the project’s cash flow, can manipulate the report and therefore increase the probability that the project is undertaken. In the model, \(b\) captures the probability that the manager manipulates the report, where \(b \in (0, 1)\). Manipulation costs are represented by the following convex function: \(\frac{kb^2}{2}\), where \(k\) is interpreted as a norm indicating parameter. The parameter \(k\), with \(k > 0\), can be interpreted as expressing the extent of how pronounced corporate culture or norms are in the firm. For example, a high \(k\) increases manipulation costs for the manager and therefore can be an indicator of a corporate culture of high ethical standards or a manager who exhibits a high personal norm. \(EB\) stands for empire building.
and depicts the manager’s desire for power, status and prestige, which are often the cause for excessive investment and in contrast to investor’s interest (see for example Hope & Thomas 2008). Relating to norm considerations, empire building can also be interpreted as being the outcome of corporate culture or as reflecting norm values at a different level than for example \( k \) does.

In case of getting \( X_G \) as private signal, the manager has no incentive to manipulate the report since the good project state is in his best interest. Therefore, \( b_G \), which denotes the manipulation effort of the manager if the project state is \( X_G \), is equal to zero. However, in the second case (equation (3)), the manager can increase his expected utility by choosing to manipulate the report and telling \( R_G \) instead of \( R_B \) to the auditor.

**Lemma 1.** The optimal levels of manipulation are:

\[
b_G = 0, \quad (4)
\]

\[
b_B(\hat{e}) \equiv b(\hat{e}) = \frac{(1 - \hat{e}) EB}{k}. \quad (5)
\]

The analysis shows that if the manager observes the bad project state, the optimal manipulation effort, \( b \), is independent of \( \alpha \), which means that the manager just pursues his empire building incentives without caring about the cost of capital. Moreover, it is obvious that the manager will manipulate less if the auditor increases his effort \((\frac{\partial b}{\partial \hat{e}} = -\frac{EB}{k} < 0)\). Further findings are summarized in the following corollary.

**Corollary 1.** Given the manager has observed the bad state of nature, the optimal manipulation effort is strictly increasing in the incentives for empire building (\( EB \)) and strictly decreasing in his personal manipulation costs (the norm parameter, \( k \)).
2.4 Auditor

The auditor gets a fee, $F$, and audits the report of the manager. Performing the audit incurs a cost of effort, $C(e)$, for the auditor, which is assumed to be quadratic in the form of: $\frac{e^2}{2}$. Given the auditor has accepted the engagement, the auditor’s expected payoff, which is conditional on the report of the manager, is denoted by $\Pi_A(R_G)$ if he receives a good report from the manager and denoted by $\Pi_A(R_B)$ if he receives a bad report:

\[
\Pi_A(R_G) = F - C(e) - P(X_B \mid R_G)(1 - e)\left(L + \frac{(s - e)^2}{2}d\right) \\
- (1 - P(X_B \mid R_G)) \frac{(s - e)^2}{2}d,
\]

\[
= F - \frac{e^2}{2} - \frac{(1 - \lambda) \hat{b}}{1 - \lambda} (1 - e) L - \frac{(s - e)^2}{2}d,
\]

where $\hat{b}$ is the conjectured level of the manager’s manipulation effort. The auditor will choose audit effort such that it maximizes his utility. On the one hand, incentives for the auditor to provide audit effort arise due the risk of litigation (third term in equation (6)). On the other hand, the risk of not being able to meet the standard of the oversight authority that will inspect the auditor (last term in equation (6)) also incentivizes the auditor to provide audit effort. The higher the audit effort, the higher are costs for the auditor. However, increased audit effort lowers the probability of a legal liability damage and contributes to meeting or coming closer to the standard $s$ of the oversight authority.\(^{12}\)

Referring to equation (7) there exists no risk of litigation or audit enforcement if the project is not implemented. Since the manager already provided a bad report,

\(^{12}\text{Given the assumption that } s = 1 \text{ as discussed in the previous section.}\)
there is no need for the auditor to provide audit effort and he optimally chooses $e_B = 0$.\(^{13}\)

**Lemma 2.** The optimal audit effort levels are:

$$e_B = 0,$$

$$e_G(\hat{b}) \equiv e(\hat{b}) = \frac{1}{1 + d} \left( \frac{(1 - \lambda)\hat{b}}{(1 - \lambda)\hat{b} + \lambda} L + sd \right).$$

The ex ante demanded audit fee is:

$$F = P(R_G) \left( \frac{e_G^2}{2} + \frac{(1 - \lambda)\hat{b}}{P(R_G)} (1 - e_G) L + \frac{(s - e_G)^2}{2} d \right) + P(R_B) \frac{e_B^2}{2}. \quad (10)$$

As indicated above $e_G$ will be called $e$ to save notation. Assuming a competitive audit market, the auditor accepts the engagement if he breaks even, which means that the audit fee has to equal the expected costs of the auditor. Analyzing the effect of changing $L$, $d$ and $s$ on the optimal audit effort, $e$, and audit fee, $F$, while keeping $b$ fixed gives the following results:

**Corollary 2.**

- **The optimal audit effort is strictly increasing in the costs from litigation ($L$), the standard requested by the oversight authority ($s$) and the costs from inspection ($d$).**

- **The optimal audit fee is strictly increasing in the costs from litigation ($L$), the costs from inspection ($d$) and the standard requested by the oversight authority ($s$) (see appendix A, p. 26).**

\(^{13}\)A regulator might want to audit also or especially in that case. Since it is economically inefficient to force the auditor to provide audit effort even though the outcome (i.e., the state of nature) is clear and no party is harmed, I do not consider this possibility in my model.
2.5 Investor

Given a positive audit report, the investor updates his beliefs and has the following expected payoff, which is due to a competitive capital market equal to zero:

\[ \Pi_I(A_G) = \alpha(\hat{e}, \hat{b}) \left( P(X_G \mid A_G) X_G + P(X_B \mid A_G) \frac{X_B}{X_B = 0} \right) + P(X_B \mid A_G) \gamma L - I = 0 \]

\[ = \alpha(\hat{e}, \hat{b}) \frac{\lambda}{\hat{b}(1 - \hat{e})(1 - \lambda)} X_G + \frac{\hat{b}(1 - \hat{e})(1 - \lambda)}{\hat{b}(1 - \hat{e})(1 - \lambda) + \lambda} \gamma L - I = 0, \]

(11)

where \( \hat{e} \) represents the conjectured audit effort and \( \hat{b} \) the conjectured level of manipulation on part of the manager. Solving equation (11) for \( \alpha(\hat{e}, \hat{b}) \) yields:

\[ \alpha(\hat{e}, \hat{b}) = \frac{\hat{b}(1 - \hat{e})(1 - \lambda)(I - \gamma L) + \lambda I}{\lambda X_G}. \]

(12)

To perform comparative statics, it is sufficient to consider changes of the numerator of equation (12), since the denominator is given via the model parameters and always positive. Exploring how \( \alpha \), the firm’s cost of capital, varies with changes of \( L, \gamma \) or \( I \) provides further insights: If \( L \) increases, this leads to a decrease in the share of the cash flow for the investor. Also, if \( \gamma \) rises, this results in a decrease in the share requested. If \( I \) increases, \( \alpha \) also rises. Furthermore, keeping everything else fixed, the cost of capital increase as the manipulation effort of the manager rises, provided that the expected liability is smaller than the investment amount, which is plausible because investors will not be compensated for more than they invested in case of successful lawsuit. An increase in audit effort decreases the cost of capital given the same condition. Formally, these relations can be expressed as

\[ \frac{\partial \alpha}{\partial \hat{b}} > 0 \text{ given } I > \gamma L, \]

(13)
Corollary 3. The cost of capital of the firm, \( \alpha(\hat{e}, \hat{b}) \), is strictly decreasing in compensation following litigation, \( L \), also strictly decreasing in the share of this compensation payment following litigation, \( \gamma \), and strictly increasing in the required investment amount, \( I \).

3 Results

In equilibrium the conjectured levels of effort must equal the actual effort choice, i.e., \( b^* = \hat{b} \) and \( e^* = \hat{e} \). If the state of nature is good, the manager reports truthfully \( (b^*_G = 0) \). If the state of nature is bad, the manager chooses manipulation effort \( b^*_B \) \( (\equiv b^*) \). Given a good report from the manager, the auditor provides audit effort of \( e^*_G \) \( (\equiv e^*) \) and the investor demands a share of \( \alpha(b^*, e^*) \) of the cash flow. The equilibrium audit effort, \( e^* \), and manager’s manipulation, \( b^* \), can be obtained by using equation (9) and equation (5).

Proposition 1. In equilibrium the manager reports truthfully when he observes the good project state and chooses manipulation effort \( b^* \in (0, 1)^{14} \) when he observes the bad project state. The auditor chooses audit effort \( e^* \in (0, 1) \) after getting a report \( R_G \) from the manager and \( e^*_B = 0 \) after getting a report \( R_B \). The investor provides capital \( I \) in exchange for a share \( \alpha(b^*, e^*) \) of the cash flow when \( A = A_G \) and does not finance the project when \( A = A_B \).

Since the explicit results for \( b^* \), \( e^* \), \( \alpha(b^*, e^*) \) and \( F(b^*, e^*) \) are quiet complex, they are provided in the appendix (see section A, p. 28). Equilibrium effort levels can be derived by rearranging equation (5) and equating the result with equation (9), which yields the following condition:

\[
\frac{\partial \alpha}{\partial e} < 0 \text{ given } I > \gamma L. \tag{14}
\]
\[
1 - b^* \frac{k}{EB} = \frac{1}{1+d}\left(\frac{(1-\lambda)b^*}{(1-\lambda)b^* + \lambda L + sd}\right).
\] (15)

In order to show that \(b^* > 0\) (manipulation effort occurs), let’s assume \(b^* = 0\). Then the right-hand side of equation (15) would become \(\frac{d}{1+d}\), which is not equal to 1 and violates (15). As a result, \(b^*\) has to be strictly bigger than zero. Furthermore, increasing manipulation effort decreases the left-hand side of equation (15) and increases the right-hand side, such that there is apparently only positive level of manipulation, at which equation (15) is satisfied. Assuming that \(k > EB\) ensures that \(b < 1\). In the following, comparative statics will be presented.

### 3.1 Audit quality with and without audit oversight

In order to highlight the influence of audit oversight on audit quality, the just obtained results are compared with a scenario without inspections. The explicit equilibrium actions for the benchmark case without oversight can be found in the appendix (see section A, p. 32). Given that the auditor has no incentive to provide more effort than the standard requires, he will always provide higher effort\(^{15}\) in a scenario with audit oversight compared to one where only legal liability is present, except for the case, where audit effort and required standard coincide.\(^{16}\) This is not surprising since the auditor’s utility (see equation (7)) includes an additional disutility component if oversight is considered. Figure 3 provides a graphical illustration for the parameters \(k = 3, d = 1, s = 1, EB = 1\) and \(\lambda = 0.55\).

\(^{15}\)For this assertion the assumption that \(s = 1\) is critical because otherwise the auditor could end up in the unrealistic case where he for instance increases effort as a reaction to a high \(L\) and is punished in case of “over-compliance.”

\(^{16}\)This will happen in equilibrium provided that the manager’s empire building component equals \(k\lambda s\)\(\frac{1}{(\lambda-1)(s-1)(L-s)}\).
3.2 Equilibrium manipulation and audit effort

In equilibrium, the extent with which the manager manipulates (i.e., $b^*$) after having observed the bad project state depends directly on his costs for manipulation (norm parameter) and empire building incentives as well as indirectly on the liability and inspection risk the auditor faces.

**Proposition 2.** The manager’s equilibrium manipulation effort, $b^*$, is

- increasing in empire building incentives, $EB$,
- decreasing in the norm parameter, $k$,
- decreasing in the auditor’s oversight damage, $d$, and
- decreasing in the auditor’s liability payment, $L$.

As indicated in section 2.3, the higher the manager’s incentives for empire building, the higher is his level of manipulation effort. Also, a comparatively low norm parameter contributes to a higher manipulation effort. In addition, higher audit quality as a reaction to an increased oversight or litigation loss is able to deter the manager from manipulation.
Audit quality in equilibrium (i.e., $e^*$) is on the one hand affected by the discipline mechanisms the auditor faces and on the other hand indirectly by the manager’s characteristics. Taken together, Proposition 3 highlights the effects.

**Proposition 3.** The auditor’s equilibrium effort (audit quality), $e^*$, is

- increasing in the expected costs following oversight inspection, $d$,
- increasing in the liability payment, $L$,
- decreasing in the manager’s norm parameter, $k$, and
- increasing in the manager’s empire building incentives, $EB$.

As a reaction to higher expected costs due to audit oversight, the auditor increases audit quality (at most he will choose audit effort to equal to the oversight standard and in consideration of the corresponding litigation consequences). Similarly, the auditor increases audit effort if the liability payment increases. Furthermore, a manager with low norm values is less reluctant to manipulating the report, which induces the auditor to provide a higher audit quality. In a related fashion, high empire building incentives on part of the manager incentivize the auditor to increase audit effort.

### 3.3 Cost of capital

In the following, the effect of the manager’s characteristics on the share that investor’s request is analyzed.

**Proposition 4.** In equilibrium, there exists a threshold, denoted $\bar{k}_\alpha$, such that for all $k < \bar{k}_\alpha$ ($k > \bar{k}_\alpha$), the cost of capital is decreasing (increasing) in the manager’s empire building incentives. Furthermore, there exists a threshold, denoted $\bar{EB}_\alpha$, such that for all $EB < \bar{EB}_\alpha$ ($EB > \bar{EB}_\alpha$), the cost of capital is decreasing (increasing) in the manager’s norm values.
Intuitively, one would expect that the cost of capital are always increasing in the empire building incentives of the manager. However, with an auditor and the outlined discipline mechanisms (litigation, oversight) present, this presumption is not always true. A sufficiently low $k$ together with for example a high $L$ results in cost of capital that are decreasing in the manager’s empire building incentives. The reason for this result is the following:

If the manager exhibits low norm values (small $k$), as a reaction, the auditor would increase audit effort because he would assume manipulation on part of the manager. On the one hand and considered in isolation, the heightened manipulation incentives for the manager that come with a small $k$ would increase the cost of capital. On the other hand, the auditor responses with increased audit quality that would decrease cost of capital (as indicated in the results of section 2.5). Whether the auditor’s increase in audit effort is sufficiently high, depends on the underlying discipline mechanisms. A sufficiently high oversight damage, $d$, or a sufficiently high litigation amount, $L$, ensures that the auditor works hard enough to compensate for the increased empire building incentives of the manager.

Conversely, if the manager has high norm values, the lowered effort of the auditor leads to higher cost of capital in case of a too small $d$ or $L$. This means that the auditor doesn’t provide enough effort if even though $EB$ increases (because discipline mechanisms are too weak), which gives reason for the increased cost of capital.

![Figure 4: Equilibrium cost of capital and empire building incentives](image-url)
Figure 5: Financial statement quality and empire building incentives

Given the manager’s empire building incentives are low, the auditor would react by providing reduced audit effort, which would in turn trigger an enlargement in the share required by investors. However, the auditor’s incentives are improved if oversight damage, $d$, or litigation amount, $L$, is sufficiently high even if high norm values of the manager are present (higher $k$), which in turn triggers a reduction in the share required by investors.

If high empire building incentives on part of the manager exist, the auditor normally compensates for that by increasing audit quality. However, this happens only as long as the discipline mechanisms in place are strong enough. Given weak penalties form oversight or litigation, an increase in the norm values would also increase the firm’s cost of capital because investors demand a higher share as a reaction to decreased audit quality.

Figure 4 shows examples relating to Proposition 4. The values used in 4a are: $k = 1$, $L = 3$, $s = 1$, $\lambda = 0.4$, $d = 2$, $X_G = 5.5$, $I = 3.5$ and $\gamma = 0.7$. The only parameter that is altered under 4b is $k$, where $k = 8$. In addition, examining the effect on the expected financial statement quality provides further insights. Financial statement quality can be defined as $P(A_G \cap X_G \mid A_G) = \frac{\lambda}{(1-\lambda)b^* (1-e^*)+\lambda}$. Figure 5 shows how the accuracy of the financial statement quality is affected by $EB$ for the same parameter values as in figure 4. Further graphics relating to changes in $\alpha$ regarding the manager’s norm values can be found in the appendix (see section B, p. 36).

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4 Conclusion

In this paper, a scenario with three players (manager, auditor, investor) considering audit oversight is analyzed. Importantly, the manager is privately informed and the auditor uses the manager’s report to determine audit quality. Equilibrium outcomes are presented and effects in case of changes of the model parameters are highlighted. As such, non surprisingly audit effort increases as a reaction to more severe discipline mechanisms (litigation and oversight). The manipulation choice of the manager is also indirectly affected by changes in litigation and oversight: Higher amounts of litigation and oversight damages result in higher audit quality, which entails less manipulation on part of the manager. Furthermore, the characteristics of the manager play an important role. In the model empire building incentives as well as manipulation costs are considered. If a manager experiences high costs from manipulation, this portends “good” norm values. In my model a high norm parameter leads to relatively less manipulation of the manager, which in turn results in less audit effort needed. In this sense reduced audit quality needs not to be necessarily bad.

Interestingly, analyzing the effect of higher empire building incentives on part of the manager shows that the share that investors demand (cost of capital) can also be decreasing (increasing) in the manager’s empire building incentives (norm values) given sufficiently low manipulation costs (sufficiently high empire building tendency). This happens because the disciple mechanisms for the auditor work sufficiently well (insufficiently well).

For future research, establishing a “first best” scenario, where players are induced to act in a way that is preferable from a social welfare point of view might be helpful to allow for additional comparison. Following up on that considering the oversight authority as a strategic player could also enhance the model. Another extension could include multiple auditing tasks as well as different auditing technologies like for example
in Ye and Simunic (2017) or Larmande and Lesage (2016).

Furthermore, the manipulation cost of the manager could be private information and would together with the firm’s corporate culture determine the manipulation environment. In addition, since empirical studies report a change in audit quality after an inspection has been conducted (see for example Aobdia 2016), a model that covers several periods, could contribute to the understanding of inter-temporal effects.
Appendices

A Proofs and further explanations

Manager

At $b_B$ (optimal manipulation effort after observing the bad state) the following first-order condition has to be satisfied:

$$\frac{\partial \Pi_M(X_B)}{b_B} = (1 - \hat{e})EB - b_B k = 0. \quad (A.1)$$

Checking the second-order condition of equation (A.1) proves that the manager’s payoff is maximized at $b^*$:

$$\frac{\partial^2 \Pi_M}{\partial b^2} = -k < 0. \quad (A.2)$$

Corollary 1

Using equation (5), and keeping $\hat{e}$ fixed, it follows that:

$$\frac{\partial b}{\partial EB} = \frac{(1 - \hat{e})}{k} > 0, \quad (A.3)$$

$$\frac{\partial b}{\partial k} = -\frac{(1 - \hat{e})EB}{k^2} < 0. \quad (A.4)$$

Auditor

At the optimal audit effort level, the following first-order condition has to be satisfied:

$$\frac{\partial \Pi_A(R_G)}{\partial e} = -e \frac{(1 - \lambda)\hat{b}}{(1 - \lambda)b + \lambda} L + d(s - c) = 0. \quad (A.5)$$
Checking the second-order condition of equation (A.5) proves that the auditor’s payoff is maximized at $e^*$:

$$\frac{\partial^2 \Pi_A(R_G)}{\partial e^2} = -d - 1 < 0,$$  \hspace{1cm} (A.6)

because $d \geq 0$.

**Corollary 2**

Using equation (9), and keeping $\hat{b}$ fixed, it follows that the optimal audit effort changes as described in the following equations:

$$\frac{\partial e}{\partial L} = -\frac{\hat{b}(1 - \lambda)}{(-d - 1)(\hat{b}(1 - \lambda) + \lambda)} > 0,$$  \hspace{1cm} (A.7)

$$\frac{\partial e}{\partial s} = -\frac{\hat{b}d(1 - \lambda) - d\lambda}{(-d - 1)(\hat{b}(1 - \lambda) + \lambda)} > 0,$$  \hspace{1cm} (A.8)

$$\frac{\partial e}{\partial d} = -\left( \frac{\partial^2 \Pi_A(R_G)}{\partial e \partial d} \right) \left( \frac{\partial^2 \Pi_A(R_G)}{\partial e^2} \right)^{-1} = \frac{s - e}{1 + d} > 0,$$  \hspace{1cm} (A.9)

where $s = 1$.

Using equation (10), and keeping $e$ and $\hat{b}$ fixed, it follows that:

$$\frac{\partial F}{\partial L} = be(\lambda - 1) + \hat{b}(1 - \lambda) > 0,$$  \hspace{1cm} (A.10)

$$\frac{\partial F}{\partial d} = \frac{1}{2}(s - e)^2 > 0,$$  \hspace{1cm} (A.11)

$$\frac{\partial F}{\partial s} = (s - e) d > 0,$$  \hspace{1cm} (A.12)

given $s > e$.  

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Investor

\[
\frac{\partial \alpha}{\partial b} = \frac{(1 - \hat{e})(1 - \lambda)(I - \gamma L)}{X_G\lambda} > 0 \text{ given } I > \gamma L, \tag{A.13}
\]

\[
\frac{\partial \alpha}{\partial e} = -\frac{\hat{b}(1 - \lambda)(I - \gamma L)}{X_G\lambda} < 0 \text{ given } I > \gamma L. \tag{A.14}
\]

Corollary 3

Using equation (11), and keeping \(\hat{e}\) and \(\hat{b}\) fixed, it follows that:

\[
\frac{\partial \alpha(\hat{e}, \hat{b})}{\partial L} = -\frac{\hat{b}\gamma(1 - \hat{e})(1 - \lambda)}{X_G\lambda} < 0, \tag{A.15}
\]

\[
\frac{\partial \alpha(\hat{e}, \hat{b})}{\partial \gamma} = -\frac{\hat{b}L(1 - \hat{e})(1 - \lambda)}{X_G\lambda} < 0, \tag{A.16}
\]

\[
\frac{\partial \alpha(\hat{e}, \hat{b})}{\partial I} = \frac{\hat{b}(1 - \hat{e})(1 - \lambda) + \lambda}{X_G\lambda} > 0. \tag{A.17}
\]
Equilibrium

The equilibrium actions are obtained by solving equation (9) and equation (5) simultaneously for $b$ and $e$. Note that model parameters are specified as $\lambda \in (0, 1)$, $\alpha \in (0, 1)$, $\gamma \in (0, 1)$, $k > 0$, $L > 0$, $d > 0$, $s \in (0, 1)$, $X_G > I > 0$ and $X_B = 0$.

$$b^* = -\frac{1}{2(d+1)k(\lambda - 1)}$$

$$\times \left( \sqrt{EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda}^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1) 
+ EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda \right)$$

(A.18)

$$e^* = \frac{1}{2(d+1)EB(\lambda - 1)}$$

$$\times \left( \sqrt{EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda}^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1) 
+ EB(\lambda - 1)(d(s + 1) + L + 1) - (d + 1)k\lambda \right)$$

(A.19)

Inserting the just obtained $b^*$ and $e^*$ into equation (12) yields $\alpha(b^*, e^*)$:

$$\alpha(b^*, e^*) = \frac{1}{4(d + 1)^2EBX_Gk(\lambda - 1)\lambda}$$

$$\times \left( \gamma L \left( \sqrt{EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda}^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1) 
+ EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda \right)^2 
- I \left( \sqrt{EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda}^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1) 
+ EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda \right)^2 + 4(d + 1)^2EBk(\lambda - 1)\lambda I \right)$$

(A.20)
Furthermore the equilibrium audit fee $F^*$ can be computed by inserting $b^*$ and $e^*$ into equation (10).

$$F^* = d \left( s - \left( \sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1)} 
+\right.\right.
+ EB(\lambda - 1)(d(s + 1) + L + 1) - (d + 1)k\lambda \left. \right) \frac{1}{2(d + 1)EB(\lambda - 1)} \right)^2
+ \left( \sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1)} 
+\right.\right.
+ EB(\lambda - 1)(d(s + 1) + L + 1) - (d + 1)k\lambda \left. \right) \frac{1}{8(d + 1)^2EB^2(\lambda - 1)^2}
\left. \right) \left( L \left( \sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1) - dEB\lambda 
+ dEB\lambda s - dEBs + dEB - dk\lambda - EB\lambda + EB\lambda L - EBL + EB - k\lambda \right) \right)^2 \right) \right)^2
+\right.\right.
+ EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda \left. \right) \frac{1}{2(d + 1)EB(\lambda - 1)}

\right) \left( \sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1)} 
+\right.\right.
+ EB(\lambda - 1)(d(s + 1) + L + 1) - (d + 1)k\lambda \left. \right) \frac{1}{2(d + 1)EB(\lambda - 1)}

\right) \left( \sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1)} 
+\right.\right.
+ EB(\lambda - 1)(d(s + 1) + L + 1) - (d + 1)k\lambda \left. \right) \frac{1}{2(d + 1)EB(\lambda - 1)}

(A.21)

To establish the claim that $e^*$ and $b^*$ are unique, one can just look at the explicit results of $e^*$ and $b^*$ and observe that those are the only outcomes that satisfy $e^* \in (0, 1)$ and $b^* \in (0, 1)$. Furthermore, to focus on interior solutions with $b^* < 1$, I assume that $k > k$, where

$$k \equiv \frac{EB(-d(s - 1) + (\lambda - 1)L + 1)}{d + 1}.$$ 

The following proves that $b^*$ and $e^*$ maximize the manager’s and auditor’s utility. To begin with, the manager’s utility is analyzed:

$$H = \begin{pmatrix}
\frac{\partial^2 \Pi_M(e, b)}{\partial e^2} & \frac{\partial^2 \Pi_M(e, b)}{\partial e \partial b} \\
\frac{\partial^2 \Pi_M(e, b)}{\partial b \partial e} & \frac{\partial^2 \Pi_M(e, b)}{\partial b^2}
\end{pmatrix} = \begin{pmatrix}
-k & -EB \\
-EB & 0
\end{pmatrix}$$

(A.22)
The the determinants of the minors of equation (A.22) are calculated by:

\[ A_1 = \frac{\partial^2 \Pi_M(e, b)}{\partial^2 b} = -k < 0 \]

\[ A_2 = \frac{\partial^2 \Pi_M(e, b)}{\partial^2 b} \frac{\partial^2 \Pi_M(e, b)}{\partial^2 e} - \left( \frac{\partial^2 \Pi_M(e, b)}{\partial be} \right)^2 \]

\[ = -EB^2 < 0 \]

The next step is to analyze the auditor’s utility:

\[ H = \left( \frac{\partial^2 \Pi_A(e, b)}{\partial^2 e} \frac{\partial^2 \Pi_A(e, b)}{\partial be} - \frac{\partial^2 \Pi_A(e, b)}{\partial^2 b} \right) \]

\[ = \begin{pmatrix} -d - 1 & -\frac{(\lambda - 1)\lambda L}{(b(-\lambda) + b + \lambda)^2} \\ \frac{(\lambda - 1)\lambda L}{(b(-\lambda) + b + \lambda)^2} & 2\frac{(e - 1)(\lambda - 1)^2\lambda L}{(b(-\lambda) + b + \lambda)^4} \end{pmatrix} \] (A.23)

The the determinants of the minors of equation (A.23) are calculated by:

\[ A_1 = \frac{\partial^2 \Pi_A(e, b)}{\partial^2 e} = -d - 1 < 0 \]

\[ A_2 = \frac{\partial^2 \Pi_A(e, b)}{\partial^2 e} \frac{\partial^2 \Pi_A(e, b)}{\partial^2 b} - \left( \frac{\partial^2 \Pi_A(e, b)}{\partial be} \right)^2 \]

\[ = -\frac{(\lambda - 1)^2\lambda L(2bd(e - 1)(\lambda - 1) + \lambda(L - 2d(e - 1)))}{(b(-\lambda) + b + \lambda)^4} - 1 < 0 \]

As a consequence, \( b^* \) and \( e^* \) maximize the players’ corresponding utilities (q.e.d).

**Equilibrium audit effort and oversight standard**

As indicated in section 2.2, in the term accounting for audit oversight in the auditor’s utility function, \((s - e)^2 d\), \(s\) is assumed to be equal to 1, such that \(e \leq s\). If \(s\) is not restricted by default, the following demonstrates that for standards falling in the range of \(s \in (\bar{s}, 1)\), \(e \leq s\) is always true.

The threshold, \(\bar{s}\), above which audit effort is strictly below the standard in equilibrium, can be obtained by determining the intersection of the equilibrium audit effort...
function and the function $e = s$:

\[
\sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1)} + EB(\lambda - 1)(d(s + 1) + L + 1) - (d + 1)k\lambda \right) \frac{1}{2(d + 1)EB(\lambda - 1)} = s.
\]

Solving for $s$ yields the relevant threshold, $\bar{s}$:

\[
\bar{s} = \frac{1}{2} \left( -\sqrt{\frac{(EB(\lambda - 1)(L + 1) - k\lambda)^2}{EB^2(\lambda - 1)^2}} - 4L + \frac{k\lambda}{EB - EB\lambda} + L + 1 \right). \tag{A.24}
\]

As a consequence, if $s > \bar{s}$, then $e^* < s$. Figure 6 provides a graphical illustration, whereby the parameter values used are $k = 3$, $d = 2$, $EB = 1$, $\lambda = 0.45$ and $L = 2$. 
Benchmark case without audit oversight

\[
b^*_BM = \frac{EB(\lambda - 1)(1 - L) + k\lambda - \sqrt{(EB(\lambda - 1)(L - 1) - k\lambda)^2 - 4EBk(\lambda - 1)\lambda}}{2k(\lambda - 1)}\\
\]

\[
e^*_BM = \frac{EB(\lambda - 1)(L + 1) - k\lambda + \sqrt{(EB(\lambda - 1)(L - 1) - k\lambda)^2 - 4EBk(\lambda - 1)\lambda}}{2EB(\lambda - 1)}
\]

(A.25) (A.26)

Proposition 2

Manipulation effort and empire building incentives

\[
\frac{db^*}{dEB} = \frac{k\lambda T_1 + EB(\lambda - 1)(-d(s - 1) + L + 1) - (d + 1)k\lambda}{2EB^2(\lambda - 1)T_1} > 0,
\]

\[
T_1 = \sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1)},
\]

\[
\Rightarrow T_1 > 0.
\]

(A.27) (A.28)

Manipulation effort and norm parameter

\[
\frac{db^*}{dk} = \frac{\lambda \left( \frac{EB(1-\lambda)(-d(s-1)+L+1)+(d+1)k\lambda}{T_1} - 1 \right)}{2EB(\lambda - 1)} > 0.
\]

(A.29)

Manipulation effort and litigation payment

\[
\frac{db^*}{dL} = \frac{EB(\lambda-1)(d(s-1)+L-1)-(d+1)k\lambda}{T_1} + 1 < 0.
\]

(A.30)

Manipulation effort and audit oversight damage

\[
\frac{db^*}{dd} = \frac{EB(\lambda-1)(d(s-1)+L-1)-(d+1)k\lambda}{T_1} + 1 < 0.
\]

(A.31)

Alternatively, the positive relation as illustrated in equation (A.31) can also be shown
by analyzing the following total derivative:

\[
\frac{db(e)}{dd} = \frac{\partial b}{\partial d} \bigg|_{d=0} + \frac{\partial b(e)}{\partial e} \frac{de}{dd}.
\]  

(A.32)

Since the direct effect as indicated in equation (A.32) is zero, the last to terms on the right hand side determine the sign of the total effect. From Corollary 2 we know that \( \frac{de}{dd} > 0 \) for a sufficiently high \( s \). Furthermore, \( \frac{\partial b(e)}{\partial e} = -\frac{EB}{k} < 0 \). As a result, the optimal manipulation effort is decreasing in \( d \).

**Proposition 3**

**Audit effort and audit oversight damage**

\[
\frac{de^*}{dd} = \frac{LT_1 - EB(\lambda - 1)(L - s)(d(s - 1) + L - 1) + (d + 1)k\lambda(L + s) - sT_1}{(d + 1)^2T_1} > 0.
\]

(A.33)

**Audit effort and audit litigation payment**

\[
\frac{de^*}{dL} = \frac{EB(\lambda - 1)(L - s)(d(s - 1) + L - 1) - (d + 1)k\lambda}{2(d + 1)} + 1 > 0.
\]

(A.34)

**Audit effort and norm parameter**

\[
\frac{de^*}{dk} = \lambda \left( \frac{EB(\lambda - 1)(s - 1) + L - 1)}{T_1} \right) - 1 < 0.
\]

(A.35)

**Audit effort and empire building incentives**

\[
\frac{de^*}{dEB} = \frac{k\lambda (T_1 + EB(\lambda - 1)(-d(s - 1) + L + 1) - (d + 1)k\lambda)}{2EB^2(\lambda - 1)T_1} > 0.
\]

(A.36)

**Proposition 4**

The following provides the formal results of Proposition 4, where \( s = 1 \):
\[
\frac{d\alpha(b^*, e^*)}{dEB} = \frac{(\gamma L - I)((d + 1)k\lambda + EB(\lambda - 1)(L - 1))T_4^2}{4XGk(\lambda - 1)\lambda(dEB + EB)^2T_3} < 0,
\]

given that \( k < \bar{k}_\alpha \), where

\[
T_3 = \sqrt{(EB(\lambda - 1)(L - 1) - (d + 1)k\lambda)^2 - 4(d + 1)EBk(\lambda - 1)\lambda},
\]

\[
T_4 = T_3 + EB(\lambda - 1)(L - 1) - (d + 1)k\lambda, \text{ and}
\]

\[
\bar{k}_\alpha = \frac{EB(\lambda - \lambda L + L - 1)}{d\lambda + \lambda}.
\]

(A.37)

\[
\frac{d\alpha(b^*, e^*)}{dEB} = \frac{(\gamma L - I)((d + 1)k\lambda + EB(\lambda - 1)(L - 1))T_4^2}{4XGk(\lambda - 1)\lambda(dEB + EB)^2T_3} > 0,
\]

given that \( k > \bar{k}_\alpha \).

(A.38)

\[
\frac{d\alpha(b^*, e^*)}{dk} = \frac{(T - \gamma L)((d + 1)k\lambda + EB(\lambda - 1)(L - 1))T_4^2}{4EBG(\lambda - 1)\lambda(dk + k)^2T_3} < 0
\]

given that \( EB < \overline{EB}_\alpha \), where

\[
\overline{EB}_\alpha = \frac{(-d - 1)k\lambda}{(1 - \lambda)(1 - L)}.
\]

(A.40)

\[
\frac{d\alpha(b^*, e^*)}{dk} = \frac{(T - \gamma L)((d + 1)k\lambda + EB(\lambda - 1)(L - 1))T_4^2}{4EBG(\lambda - 1)\lambda(dk + k)^2T_3} > 0
\]

given that \( EB > \overline{EB}_\alpha \).

(A.41)

(A.42)

The following provides a more general representation referring to Proposition 4,
with $s$ being included:

$$
\frac{d\alpha(b^* , e^*)}{dEB} = \frac{(\gamma L - I)(EB(\lambda - 1)(d(s - 1) + L - 1) + (d + 1)k\lambda)T_2^2}{4X_Gk(\lambda - 1)\lambda(dEB + EB)^2T_1} < 0,
$$

(A.43)

given that $k < \bar{k}_{\alpha_s}$, where

$$
T_1 = \sqrt{(EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda)^2 + 4(d + 1)EBk(\lambda - 1)\lambda(d(s - 1) - 1)},
$$

$$
T_2 = T_1 + EB(\lambda - 1)(d(s - 1) + L - 1) - (d + 1)k\lambda,
$$

and

$$
\bar{k}_{\alpha_s} = \frac{EB(\lambda - 1)(d(1 - s) - L + 1)}{d\lambda + \lambda}.
$$

(A.44)

$$
\frac{d\alpha(b^* , e^*)}{dEB} = \frac{(\gamma L - I)(EB(\lambda - 1)(d(s - 1) + L - 1) + (d + 1)k\lambda)T_2^2}{4X_Gk(\lambda - 1)\lambda(dEB + EB)^2T_1} > 0,
$$

(A.45)

given that $k > \bar{k}_{\alpha_s}$.

$$
\frac{d\alpha(b^* , e^*)}{dk} = \frac{(\gamma L - I)(EB(\lambda - 1)(d(s - 1) + L - 1) + (d + 1)k\lambda)T_2^2}{4X_GEB(\lambda - 1)\lambda(dk + k)^2T_1} < 0,
$$

(A.46)

given that $EB < \overline{EB}_{\alpha_s}$, where

$$
\overline{EB}_{\alpha_s} = \frac{(d + 1)k\lambda}{(1 - \lambda)(d(s - 1) + L - 1)}.
$$

(A.47)

$$
\frac{d\alpha(b^* , e^*)}{dk} = \frac{(\gamma L - I)(EB(\lambda - 1)(d(s - 1) + L - 1) + (d + 1)k\lambda)T_2^2}{4X_GEB(\lambda - 1)\lambda(dk + k)^2T_1} > 0,
$$

(A.48)

given that $EB > \overline{EB}_{\alpha_s}$.
B  Additional graphics

![Equilibrium cost of capital and norm values (high EB)](image1)

**Figure 7:** Equilibrium cost of capital and norm values (high $EB$)

![Equilibrium cost of capital and norm values (low EB)](image2)

**Figure 8:** Equilibrium cost of capital and norm values (low $EB$)

The model parameters for figure 7 are: $EB = 10$, $L = 7$, $s = 1$, $\lambda = 0.4$, $d = 3$, $X_G = 8$, $I = 5$ and $\gamma = 0.3$. In figure 8 the manager’s empire building incentives are reduced. Specifically: $EB = 2$, $L = 7$, $s = 1$, $\lambda = 0.4$, $d = 3$, $X_G = 8$, $I = 5$ and $\gamma = 0.3$. 

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