Auditing Standards, Professional Judgement, and Audit Quality

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Motivation: auditing standards

- auditors follow auditing standards to perform audit
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- the tightness of standards affects audit quality and audit value
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Motivation: auditing standards

- Auditors follow auditing standards to perform audit
- The tightness of standards affects audit quality and audit value
- PCAOB was established by SOX to increase auditor oversight
- What are the economic consequences of tightening auditing standards?
Two determinants of audit efficacy

- incentives: auditors may have misaligned incentives and conduct subpar audit
Two determinants of audit efficacy

- incentives: auditors may have misaligned incentives and conduct subpar audit
- professional judgement: tailor audit choices to circumstances
Main intuition: do more work v.s. do smarter work

Tightening auditing standards

- forces the rogue auditor to perform more work
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Tightening auditing standards

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- but restricts auditors’ exercise of professional judgement, resulting in
  - compliance mentality in short run
  - less expertise acquisition in long run
Main results: auditing standards’ economic consequences

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<th>Audit fee</th>
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<th>Social welfare</th>
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- A tighter standard could result in lower audit quality and lower social welfare.
Main results: auditing standards’ economic consequences

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- a tighter standard could result in **lower** audit quality and lower social welfare
- the consequences are more likely to be damaging in long run than in short run
Contributions and related literatures

- auditor professional judgment
- auditing standards and audit quality
- agency problems with endogenous pre-decision information acquisition
- delegation
The model
Timeline

- $t = 0$, auditor chooses expertise $e$ at cost $kK(e)$. 

- $t = 1$, the auditor negotiates fee $\xi$.

- $t = 1$, after observing engagement details, the auditor chooses audit level $a$ and issues audit report $r$. 

- $t = 2$, the rm invests upon report $r$. The project pays out. 

The auditor pays damage in event of audit failure.
Timeline

- $t = 0$, auditor chooses expertise $e$ at cost $kK(e)$.
- $t = \frac{1}{2}$, the auditor negotiates fee $\zeta$. 
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- $t = 0$, auditor chooses expertise $e$ at cost $kK(e)$.
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- $t = 1$, after observing engagement details, the auditor chooses audit level $a$ and issues audit report $r$.
- $t = 2$, the firm invests upon report $r$. The project pays out. The auditor pays damage in event of audit failure.
The project

- initial investment $I$ and random payouts $\omega \in \{G, B\}$
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    \[(1 - p) G > I > pB \equiv 0\]
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- prior: $\Pr(\omega = B) = p$
- audit value: provide info to avoid bad investment
  - without knowing $\omega$, it is optimal to invest
    $$(1 - p)G > I > pB \equiv 0$$
  - knowing $\omega$, it is optimal to invest iff $\omega = G$
The audit technology

- audit report: \( r \in \{g, b\} \)
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- audit failure: \( \{r = g, \omega = B\} \)
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- audit a reduces audit failure risk

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\begin{align*}
\Pr(r = g | \omega = G, a) &= 1, \\
\Pr(r = g | \omega = B, a) &= 1 - \gamma a.
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- audit failure probability: \( p(1 - \gamma a) \)
- cost of audit \( C(a) \)
The auditor payoff

\[ U = \underbrace{\zeta_{\xi}}_{\text{audit fee}} - E_{\gamma, \theta}[C(a) + p(1 - \gamma a) \underbrace{\theta I}_{\text{liability}}] - \underbrace{kK(e)}_{\text{expertise cost}} \]

- hired for an endogenously bargained fee \( \zeta \) at \( t = \frac{1}{2} \)
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- bears the audit cost $C(a)$ at $t = 1$
- liability in event of audit failure: $\theta I$
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\[ U = \xi - E_{\gamma, \theta} [C(a) + p(1 - \gamma a) \theta l] - kK(e) \]

- hired for an endogenously bargained fee \( \xi \) at \( t = \frac{1}{2} \)
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  - \( s < 1 \) captures auditor’s incentive alignment with investors
- acquires expertise \( e \) at cost \( kK(e) \) at \( t = 0 \)
The firm payoff

\[ W = (1 - p) (G - I) - E_{\gamma, \theta}[p(1 - \gamma a)(1 - \theta)I] - \zeta \]

\[ \blacktriangleright \text{invests if and only if } r = g \]
The firm payoff

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- invests if and only if \( r = g \)
- receives NPV from the good project
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- loses out on the bad project in event of audit failure
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  - pays investment cost \( I \)
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- loses out on the bad project in event of audit failure
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  - receives damage \( \theta I \) with audit failure
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  - net cost is \( (1 - \theta)I \)
The firm payoff

\[ W = (1 - p)(G - l) - E_{\gamma,\theta}[p(1 - \gamma a)(1 - \theta)l] - \zeta \]

- invests if and only if \( r = g \)
- receives NPV from the good project
- loses out on the bad project in event of audit failure
  - pays investment cost \( l \)
  - receives damage \( \theta l \) with audit failure
  - net cost is \( (1 - \theta)l \)
- pays audit fee \( \zeta \)
The concept of professional judgement

- we augment the standard model with auditors’ professional expertise.
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- an effective audit balances the benefit of improving audit quality with the increased audit cost.
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The concept of professional judgement

- we augment the standard model with auditors’ professional expertise.
- an effective audit balances the benefit of improving audit quality with the increased audit cost.
- this cost-benefit analysis involves professional judgement.
- the auditor could develop professional expertise at a cost
- auditing standards cannot address every specific situation that can arise in an audit engagement.
Operationalize the professional judgement

\[ \Pr(r = g | \omega = B, a) = 1 - \tilde{\gamma} a \]

- audit effectiveness \( \tilde{\gamma} \): random over \([0, 1]\) with mean \( \gamma_0 \)
Operationalize the professional judgement

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- audit expertise \( e \): \( \Pr(\tau = i) = e \) and \( \Pr(\tau = u) = 1 - e \)
  - with prob \( e \), the auditor is informed with posterior
    \[ m_i = E[\tilde{\gamma} | \Omega_i] \]
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  - with prob \( e \), the auditor is informed with posterior \( m_i = E[\tilde{\gamma}|\Omega_i] \)
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  - with prob \( 1 - e \), the auditor is uninformed with posterior \( m_u = E[\tilde{\gamma} | \Omega_u] \)
- \( \Omega_i \) is finer than \( \Omega_u \), equivalently, \( m_i \) is mean-preserving spread of \( m_u \)
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  - \( \Omega_i \) is finer than \( \Omega_u \), equivalently, \( m_i \) is mean-preserving spread of \( m_u \)

- before contracting, the auditor chooses observable expertise \( e \) at cost \( kK(e) \)
$Q \in (0, 1)$ is a minimum audit requirement, i.e., $a \geq Q$
Auditing standard/regulation

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- $Q$ is a constant, in particular, it is not contingent on audit effectiveness $\tilde{\gamma}$
Auditing standard/regulation

- $Q \in (0, 1)$ is a minimum audit requirement, i.e., $a \geq Q$
- $Q$ is a constant, in particular, it is not contingent on audit effectiveness $\tilde{\gamma}$
- enforcement of standards influences the de facto standards
The equilibrium
The investment decision

- The firm invests iff observing an unqualified report \( r = g \).
The investment decision

- The firm invests iff observing an unqualified report \( r = g \).
  - \( r = b \): \( \Pr(\omega = G|r = b)G - l = -l < 0 \)
The investment decision

- The firm invests iff observing an unqualified report \( r = g \).
  - \( r = b \): \( \Pr(\omega = G| r = b)G - l = -l < 0 \)
  - \( r = g \): \( \Pr(\omega = G| r = g)G - l > (1 - p)G - l > 0 \)
The audit choice - benchmark

- social welfare

\[ V = U + W = (1 - p) G - I + E_{m_\tau, \theta} [pm_\tau a_l - C(a)] - kK(e). \]
The audit choice - benchmark

- social welfare

\[ V = U + W = (1 - p) \, G - I + E_{m_\tau, \theta}[pm_\tau aI - C(a)] - kK(e). \]

- ex post audit value

\[ \pi(a, m_\tau) = pm_\tau aI - C(a). \]
The audit choice - benchmark

- social welfare

\[ V = U + W = (1 - p) G - I + E_{m_\tau, \theta}[pm_\tau a_l - C(a)] - kK(e). \]

- ex post audit value

\[ \pi(a, m_\tau) = pm_\tau a_l - C(a). \]

- the socially optimal level of audit \( a^S(m_\tau) \):

\[ a^S(m_\tau) = C^{-1}(pm_\tau I) \]
The audit choice - benchmark

- **social welfare**

\[
V = U + W = (1 - p) G - I + E_{m,\theta}[pmal - C(a)] - kK(e).
\]

- **ex post audit value**

\[
\pi(a, m_\tau) = pmal - C(a).
\]

- **the socially optimal level of audit** \(a^S(m_\tau)\):

\[
a^S(m_\tau) = C'(pmal)
\]

- **PJ matters**: \(a^S(m_\tau)\) is increasing in \(m_\tau\).
The audit choice

- after observing $m_\tau$ and $\theta$, auditor chooses $a$:

$$\max_a -p(1 - m_\tau a)\theta l - C(a)$$

s.t. $a \geq Q > 0$. 
The audit choice

- after observing $m_\tau$ and $\theta$, auditor chooses $a$:
  \[
  \max_a -p(1 - m_\tau a)\theta I - C(a)
  \]
  \[
  s.t. \quad a \geq Q > 0.
  \]

- special case with $Q = 0$:
  \[
  a^{**}_\theta(m_\tau) = C'^{-1}(pm_\tau \theta I)
  \]
The audit choice

- after observing $m_\tau$ and $\theta$, auditor chooses $a$:

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- special case with $Q = 0$:

$$a_\theta^{**}(m_\tau) = C'^{-1}(pm_\tau \theta I)$$

- $a_\theta^{**}$ is increasing in incentive $\theta$
The audit choice

- after observing $m_\tau$ and $\theta$, auditor chooses $a$:

$$\max_a -p(1 - m_\tau a)\theta l - C(a)$$

s.t. $a \geq Q > 0$. 

- special case with $Q = 0$:

$$a^{**}_\theta(m_\tau) = C'^{-1}(p m_\tau \theta l)$$

- $a^{**}_\theta$ is increasing in incentive $\theta$
  - the good auditor chooses social optimum: $a^{**}_{1\theta}(m_\tau) = a^S(m_\tau)$
The audit choice

- after observing $m_\tau$ and $\theta$, auditor chooses $a$:

$$\max_a -p(1 - m_\tau a)\theta l - C(a)$$

$$s.t. \quad a \geq Q > 0.$$ 

- special case with $Q = 0$:

$$a^{**}(m_\tau) = C'^{-1}(pm_\tau \theta l)$$

- $a^{**}$ is increasing in incentive $\theta$
- the good auditor chooses social optimum: $a_1^{**}(m_\tau) = a^S(m_\tau)$
- the bad auditor chooses a lower level: $a_0^{**}(m_\tau) < a^S(m_\tau)$
The audit choice

- after observing $m_\tau$ and $\theta$, auditor chooses $a$:

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\max_a -p(1 - m_\tau a)\theta I - C(a)
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- special case with $Q = 0$:

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a_{\theta}^{**}(m_\tau) = C^{-1}(pm_\tau \theta I)
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  - $a_{\theta}^{**}$ is increasing in incentive $\theta$
  - the good auditor chooses social optimum: $a_{1}^{**}(m_\tau) = a^{S}(m_\tau)$
  - the bad auditor chooses a lower level: $a_{0}^{**}(m_\tau) < a^{S}(m_\tau)$

- the privately optimal choice when $Q > 0$

\[
a_{\theta}^{*}(m_\tau) = \max\{a_{\theta}^{**}(m_\tau), Q\} = \max\{C^{-1}(pm_\tau \theta I), Q\}.
\]
Whose regulatory constraint binds?

\[ a^*_\theta(m_\tau) = \max\{a^*_\theta(m_\tau), Q\} = \max\{C'^{-1}(pm_\tau\theta l), Q\}. \]

\[ m_\tau\theta \leq \hat{m} \equiv \frac{C'(Q)}{pl}. \]

- all bad auditors: \( 0 < \hat{m} \)
Whose regulatory constraint binds?

\[ a_\theta^*(m_\tau) = \max\{a_\theta^{**}(m_\tau), Q\} = \max\{C'^{-1}(pm_\tau\theta I), Q\}. \]

\[ m_\tau\theta \leq \hat{m} \equiv \frac{C'(Q)}{pl}. \]

- all bad auditors: \( 0 < \hat{m} \)
- some good auditors with \( m_\tau < \hat{m} \)
The consequences of binding regulatory constraint

- increase audit level: \( \frac{da^*_\theta(m_\tau)}{dQ} > 0 \)
The consequences of binding regulatory constraint

- Increase audit level: \( \frac{da^*_\theta(m_\tau)}{dQ} > 0 \)
- Mixed efficiency consequences

\[
\frac{d\pi^*_\theta(m_\tau)}{dQ} \propto \left( a^S(m_\tau) - a^*_\theta(m_\tau) \right) \frac{da^*_\theta(m_\tau)}{dQ}.
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- positive for the bad auditor, i.e., \( a^S(m_\tau) > a^*_\theta(m_\tau) \), iff \( Q < \bar{Q} \equiv a^S(\gamma_0) \).
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- negative for the good auditor, i.e., \( a^S(m_\tau) < a_1^*(m_\tau) \)

- compliance mentality: the good auditor with binding constraint doesn’t utilize her judgement
- a standard is mild if \( Q < \bar{Q} \)
The negotiation of audit fee

- audit creates surplus $E_{m_τ, θ}[\pi^*_θ(m_τ)]$
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\[
\zeta(a^\ast) = E_{m_\tau, \theta} [C(a^\ast_\theta(m_\tau)) + pm_\tau(1 - a^\ast_\theta(m_\tau))\theta l + t\pi^*_\theta(m_\tau)].
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The auditor’s expertise acquisition decision

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- expertise is useful because it is a single-person decision
Compliance mentality leads to less expertise acquisition

Proposition 1: \( e^* \) is strictly decreasing in \( Q \), i.e., \( \frac{de^*}{dQ} < 0 \).

- auditing standards lead to compliance mentality: when one has to perform a procedure, her expertise in judging its effectiveness is irrelevant.
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- diminished value of expertise results in less acquisition.
The economic consequences of auditing standard \( Q \)
Three measures

- audit fee $\xi^*(Q)$
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- the direct and indirect effects:

$$\frac{dX}{dQ} = \frac{\partial X}{\partial Q} + \frac{\partial X}{\partial e^*} \frac{de^*}{dQ}.$$
Three scenarios

- simple audit that doesn’t require expertise: $\Pr(\hat{\gamma} = \gamma_0) = 1$
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- simple audit that doesn’t require expertise: \( \Pr(\tilde{\gamma} = \gamma_0) = 1 \)
- short-run: exogenous expertise
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Proposition

Assuming mild initial auditing standard \((Q \leq \bar{Q})\). When the audit is simple \((i.e., \bar{\gamma} \equiv \gamma_0)\), an increase in auditing standard \(Q\)

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- the cost increase is outweighed by the accompanying improvement in audit quality, resulting in higher social welfare.
Short-run consequences

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Assuming mild initial auditing standard \((Q \leq \tilde{Q})\). In the short run when the auditor’s expertise is fixed, an increase in auditing standard \(Q\)

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- additional audit by binding good auditors reduces welfare
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At $e = e^*$, if $t < 1$, an equilibrium increase in audit expertise

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Proposition

Assuming mild initial auditing standards ($Q \leq \bar{Q}$). In the long run when the auditor’s expertise acquisition is endogenous, an increase in auditing standard $Q$

1. increases the audit fee;
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\(\text{tighter standards reduce expertise acquisition } \left( \frac{d e^*}{dQ} < 0 \right)\)
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- lower expertise reduces audit quality \(\left(\frac{d A^*}{d e^*} > 0\right)\)
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- tighter standards reduce expertise acquisition \(\frac{de^*}{dQ} < 0\)
- lower expertise reduces audit quality \(\frac{dA^*}{de^*} > 0\)
- auditors do more work but do it in a less smarter way, resulting in lower audit quality
## Summary of the standard’s consequences

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Excessive Standards

Proposition

When the initial standard is excessively high \((Q > \bar{Q})\), an increase in standard \(Q\)

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- quadratic costs: $C(a) = \frac{c}{2} a^2$, $kK(e) = \frac{k}{2} e^2$
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Proposition

Assuming the quadratic-uniform specification.

1. There exists a unique optimal auditing standard \( Q^* \).
2. The optimal auditing standard \( Q^* \) is mild, i.e., \( Q^* \leq \bar{Q} \).
3. \( \frac{dQ^*}{ds} < 0, \frac{dQ^*}{dn} < 0, \frac{dQ^*}{dt} < 0, \frac{dQ^*}{dk} > 0 \).
Empirical and policy implications

- a tighter auditing standard increases audit fees
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If the regulator cares excessively about audit quality, tightening standards may not be optimal if the standard's consequences are less damaging in the short-term than in the long-term.
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Takeaways

1. tighter auditing standards have a trade-off
   - increase the rogue auditor’s audit
   - restrict the exercise of PJ, resulting in
     - compliance mentality in short run
     - less expertise acquisition in long run

2. tighter auditing standards increase audit fee, but could reduce both welfare and audit quality.

3. consequences are more damaging in long run than in short run