Interaction of voluntary disclosure and earnings management
A theoretical perspective

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Voluntary Disclosure and Earnings Management
2 ways to think about it

How does voluntary disclosure affect/is affected by earnings management in mandatory reports?

Do firms “manage” voluntary disclosures (such as earnings forecasts)? And, if so, how?
A simple model of earnings management (mandatory reports)

Voluntary disclosure: the unraveling result & how to overcome it

Putting it together
Earnings Management
A simple model

\[
\begin{align*}
\max & \quad P(r) \quad - \quad C(r, x) \\
& \quad r - 1 \quad - \quad \frac{1}{2}(r - x)^2 \\
\text{Stock price} & \quad \text{Cost of earnings management} \\
\text{FOC:} & \quad 1 - (r - x) = 0 \\
& \quad r(x) = x + 1 \\
& \quad P(r) = E[\tilde{x} | r] = r - 1
\end{align*}
\]

\[r: \text{reported earnings} \]
\[x: \text{“true” earnings} \]
\[\text{“true” value of the firm is } x\]
Earnings Management
A simple model: Truthful reporting in equilibrium

\[
\begin{align*}
\max & \quad P(\ r \ ) - C(r, x) \\
& \quad r - 1 - 2|r - x|
\end{align*}
\]

Stock price \quad Cost of earnings management

\[
\begin{align*}
r(x) &= x \\
P(r) &= E[\bar{x} | r] = r
\end{align*}
\]

r: reported earnings
x: “true” earnings
“true” value of the firm is x
Earnings Management
A simple model: What are C(r,x)?

Cost of discretionary accruals? Reputation? Litigation? Real earnings management costs?

\[
\max \ P(\ r \ ) - C(r, x) \\
\]

Stock price  
Cost of earnings management

r: reported earnings  
x: “true” earnings  
“true” value of the firm is x
Earnings Management
A simple model: What are C(r,x)?

Cost of discretionary accruals?
Reputation? Litigation? Real earnings management costs?

\[
\max E [ x - C(r, x) | r ]
\]

Unmanaged earnings

Cost of earnings management

Stock price

r: reported earnings
x: “true” earnings
“true” value of the firm is x
Earnings Management
A simple model: Loss of information

\[ \max \ P( \ r ) - C(r, x, \eta) \]

Stock price
Cost of earnings management

FOC: \[ b_1 - (r - x - \eta) = 0 \]

\[ r(x) = b_1 + x + \eta \]
\[ P(r) = \mathbb{E}[x | r] = \mu_x + \frac{\sigma_x^2}{\sigma_x^2 + \sigma_\eta^2}(r - b_1 - \mu_x) \]

r: reported earnings
x: “true” earnings
“true” value of the firm is x

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Earnings Management
A simple model: Loss of information (cont.)

\[
\max \eta^* P(\sigma^2) - \frac{1}{2}(r - x)^2
\]

\[
\eta^*(b_0 + b_1r)
\]

Stock price

Cost of earnings management

FOC: \[b_1 \eta - (r - x) = 0\]

\[
r(x) = b_1 \eta + x
\]

\[
P(r) = E[\bar{x} | r] = \mu_x + \frac{\sigma_x^2}{\sigma_x^2 + b_1^2 \sigma_\eta^2} (r - \mu_x)
\]

r: reported earnings
x: “true” earnings
“true” value of the firm is x

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Earnings Management
A simple model: Summary

- Significance of marginal costs
- Nature of misreporting costs
- Loss of information
Voluntary Disclosure and Earnings Management
Modeling tools

- A simple model of earnings management (mandatory reports)

- Voluntary disclosure: the unraveling result & how to overcome it

- Putting it together

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Voluntary Disclosure
The unraveling result: How voluntary is voluntary disclosure?

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Disclosures are costless</td>
<td>Jovanovic (1982)</td>
</tr>
<tr>
<td></td>
<td>Verrecchia (1983)</td>
</tr>
<tr>
<td>(2) Investors know that firms have, in fact, private information</td>
<td>Dye (1985)</td>
</tr>
<tr>
<td></td>
<td>Jung/Kwon (1988)</td>
</tr>
<tr>
<td>(3) Firms know how investors will interpret the disclosure</td>
<td>Dutta/Trueman 2002</td>
</tr>
<tr>
<td></td>
<td>Fishman/Hagerty 2003</td>
</tr>
<tr>
<td>(4) Managers want to maximize share price</td>
<td>Einhorn (2007)</td>
</tr>
<tr>
<td>(5) Firms can credibly disclose their private information</td>
<td>Korn (2004)</td>
</tr>
<tr>
<td></td>
<td>Beyer/Guttman (2012)</td>
</tr>
<tr>
<td>(6) Firms cannot commit ex-ante to a specific disclosure policy.</td>
<td>Vives 1984</td>
</tr>
<tr>
<td></td>
<td>Goex/Wagenhofer 2009</td>
</tr>
</tbody>
</table>

Full disclosure

Partial disclosure

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A simple model of earnings management (mandatory reports)

Voluntary disclosure: the unraveling result & how to overcome it

Putting it together
Voluntary Disclosure and Earnings Management
A simple model

\[ \max P(r) - \frac{1}{2}(r - x)^2 \]

\[ r(x) = x + 1 \]

\[ P(r) = E[\tilde{x} | r] = r - 1 \]

\[ r = x + 1 \]

\[ x \]

\[ 45^0 \]

\[ \text{`true' earnings} \]

<table>
<thead>
<tr>
<th>Report</th>
<th>Payoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eq. report ( r = x + 1 )</td>
<td>( x - 0.5 )</td>
</tr>
<tr>
<td>Truthful report ( r = x )</td>
<td>( x - 1 )</td>
</tr>
<tr>
<td>No disclosure</td>
<td>(-\infty)</td>
</tr>
</tbody>
</table>

Report Payoff

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Voluntary Disclosure and Earnings Management
A simple model

\[ \begin{align*}
\max P(r) - \frac{1}{2}(r - x)^2 \\
r(x) &= x + 1 \\
E[r | x] &= r - 1
\end{align*} \]

\[ \begin{align*}
\text{Report} & \quad \text{Payoff} \\
\text{Eq. report } r &= x + 1 \quad x - 0.5 \\
\text{Truthful report } r &= x \quad x - 1 \\
\text{No disclosure} & \quad 0.5
\end{align*} \]

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Voluntary Disclosure and Earnings Management
A simple model

\[
\max P(r) - \frac{1}{2} (r - x)^2
\]

\[P'(r) - (r - x) = 0\]

\[P(r(x)) = x\]

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<td>( 0 )</td>
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\[\text{No disclosure} \quad P_{ND} = 0.5\]

\[\text{`true' earnings} \quad x\]

\[\text{x = 0} \quad 1\]

\[\text{45°}\]

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Voluntary Disclosure and Earnings Management
A simple model

\[ r = x + 1 \]

\[ x \]

Report Payoff

\[
\begin{array}{|c|c|}
\hline
\text{Report} & \text{Payoff} \\
\hline
\text{Eq. report} r = x + 1 & x - 0.5 \\
\text{Truthful report} r = x & x - 1 \\
\text{No disclosure} & 0 \\
\hline
\end{array}
\]

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- Equilibria with
  - Partial disclosure
  - Full disclosure

- Disclosure is a social ‘bad’
  - Disclosure cost

- Can there be a benefit to disclosure?
A simple model of earnings management (mandatory reports)

Voluntary disclosure: the unraveling result & how to overcome it

Putting it together
- Simple model
- Model with real effects
The owner/manager
• learns the value of his firm’s assets in place, $x$.
• has investment opportunity that requires $I$ of (equity) capital and generates return $\mu > 0$

The manager decides
• whether to raise capital, number of shares $\alpha$ offered to investors

Cash flows are realized and paid out.
• Pursued new investment opportunity:
  • Investors: $\alpha(x + I + \mu)$
  • Manager: $(1 - \alpha)(x + I + \mu)$
• Did not pursue new investment opp.
  • Manager: $x$

Investors require $\alpha$ shares:

$$I = \alpha E[\tilde{x} + I + \mu | \Omega]$$

Manager prefers to invest iff:

$$x < (1 - \alpha)(x + I + \mu)$$
Manager’s payoff

Without raising capital: \( x \)

When raising capital: \((1-\alpha)(x+I+\mu)\)

Value of the firm’s assets in place: \( x \)

→ Inefficient: Underinvestment

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Investment decision and disclosure decision
Beyer and Guttman (2012)

- **t=1**
  - The owner/manager
    - learns the value of his firm's assets in place, $x$.
    - has investment opportunity that requires $I$ of (equity) capital and generates return $\mu > 0$

- **t=2**
  - The manager decides
    - whether to raise capital, number of shares $\alpha$ offered to investors
    - whether to voluntarily disclose information and if so what report, $r$, to issue.

- **t=3**
  - Cash flows are realized and paid out.
    - Pursued new investment opportunity:
      - Investors: $\alpha(x + I + \mu)$
      - Manager: $(1-\alpha)(x + I + \mu)$
    - Did not pursue new investment opp.
      - Manager: $x$

---

Investors require $\alpha$ shares:

$$I = \alpha \mathbb{E}[\tilde{x} + I + \mu | \Omega]$$

Manager prefers to invest iff:

$$x < (1-\alpha)(x + I + \mu)$$
Voluntary Disclosure and Earnings Management
Model with real effects

EM

Report r(x)

EM(x)

 Assets in place, x

 Assets in place, x

r(x)

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Voluntary Disclosure and Earnings Management
Model with real effects

Cost of EM > \( \mu \)

Cost of EM < \( \mu \)

Disclosure

EM(\( x \))

Assets in place, \( x \)
Voluntary Disclosure and Earnings Management
Model with real effects

Cost of EM > $\mu$

Cost of EM < $\mu$

EM($x$)

Disclosure

No Disclosure

Investment & Disclosure

No Investment & No Disclosure

Investment & Disclosure

Assets in place, $x$

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Model with real effects

Cost of EM > µ
Cost of EM < µ

Disclosure
No Disclosure

EM(x)

Disclosure & Investment

Assets in place, x

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Voluntary Disclosure and Earnings Management
Model with real effects

Cost of EM > \( \mu \)
Cost of EM < \( \mu \)

Indifference curve

\( EM(x) \)

Disclosure
No Disclosure

Investment & No Disclosure
Investment & Disclosure

Assets in place, \( x \)
Voluntary Disclosure and Earnings Management
Model with real effects

Cost of EM > µ
Cost of EM < µ
EM(x)

Disclosure
No Disclosure

Inv. & Discl. No Investment & No Disclosure Investment & Disclosure

Assets in place, x
Voluntary Disclosure and Earnings Management
Model with real effects

Indifference curve
Cost of EM > µ
Cost of EM < µ
EM(x)

Disclosure
No Disclosure

Investment & No Disclosure
Investment & Disclosure

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Voluntary Disclosure and Earnings Management
Model with real effects

Cost of EM > μ
Cost of EM < μ

Indifference curve

EM(x)

Disclosure & No Disclosure
No Investment & No Disclosure
Investment & Disclosure

Assets in place, x

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Voluntary Disclosure and Earnings Management
Model with real effects

Indifference curve

Cost of EM > \( \mu \)
Cost of EM < \( \mu \)

EM(\( x \))

Disclosure

No Disclosure

Assets in place, \( x \)

Investment & Disclosure

No Investment & No Disclosure

Inv. & D

Inv. & ND

\( x_1 \)

\( x_4 \)

\( x_2 \)

\( x_D \)

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Voluntary Disclosure and Earnings Management
Model with real effects

- **Interdependence of**
  - Decision whether to disclose and earnings management
  - Disclosure decision and investment decision

- **Equilibrium is more complex than threshold strategy**
  - Disclosure decision
  - Investment decision
Future Research
Some themes

- **Earnings**
  - Accounting standards

- **Earnings management**
  - Manipulation vs. Information

- **Voluntary disclosure**
  - Reputation

- **Interdependencies: disclosure and…**
  - …investing, financing