The Economics of Investment in Information Assurance: An Empirical Investigation

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Information Assurance

- Protect information from reaching competitors and unauthorized parties
- Detect information security breaches
- Assure integrity of organization’s database
- Assure availability of information to authorized users upon demand
General Research Questions

Q1: Do firms use net present value models in determining investments in information security?

Q2: What are the driving factors in utilizing NPV models, and more generally in utilizing an economics approach, for determining investments in information security?

Q3: What effect do information security breaches have on firm performance?
Methodology

Survey

- **Survey Design**
  - Experts in field
  - Structural questionnaire with 7-point Likert scale and open ended questions

- **Sample**
  - 199 firms
  - Intersection of S&P 500 and InformationWeek.com’s list of tech savvy firms (gave names of senior IT managers)

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Q2: What are the driving factors in utilizing NPV models, and more generally in utilizing an economics approach, for determining investments in information security?
Methodology

Event Study

Q3: What effect do information security breaches have on firm performance?

\[ R = \alpha + \beta R_m + \gamma_1 D_1 + \gamma_2 D_2 + \gamma_3 D_3 + \gamma_4 D_4 + \gamma_5 D_5 + \gamma_6 D_6 + \gamma_7 D_7 + \varepsilon \]
Preliminary Results

Conventional Wisdom: NPV for Information Security is Voodoo Economics

Survey Findings  (38 out of 199 vs SAIC -1997, 6 out of 100)

• The data shows that a large number of firms use NPV in at least some cases, but not all. However, there is high variation.

• Key reason firms do not use NPV is due to the fact that they cannot accurately estimate future benefits.

• Even among non-NPV users, expected loss is an important factor in driving the level of investments in information security (i.e., many non-NPV firms take an economic approach to info security investments).

• The shape we have assumed of the Information Security Breach Function is confirmed. This includes the fact that no amount of information security can completely prevent a breach.

Event Study Findings

An information Security breach has no impact on stock market returns.
Work-In-Progress

Case Studies
• Theory Building
• Hypothesis Testing

Final Analysis & Drafting Papers
Potential Future Extensions

• Information Assurance Investments to Protect the Infrastructure of Telecommunications Carriers: An Empirical Study of the Airline and Healthcare Industries
  • Estimate expected loss (i.e., risk exposure) from carriers losing connectivity
  • What is the appropriate level of investment in information security to protect infrastructure of carriers?
  • How does insurance affect the above issues?

• Expand on Event Study
  • Large study not restricted to WSJ announcements
  • Assess effect of breaches on accounting numbers
  • Case studies