

The Economics of Investment in Information Assurance: An Empirical Investigation

By

Dr. Lawrence A. Gordon*

and

Dr. Martin P. Loeb*

* Robert H. Smith School of Business, University of Maryland

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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Methodology

Event Study



$$\mathbf{R} = \alpha + \beta \mathbf{R}_m + \gamma_1 \mathbf{D}_1 + \gamma_2 \mathbf{D}_2 + \gamma_3 \mathbf{D}_3 + \gamma_4 \mathbf{D}_4 + \gamma_5 \mathbf{D}_5 + \gamma_6 \mathbf{D}_6 + \gamma_7 \mathbf{D}_7 + \varepsilon$$

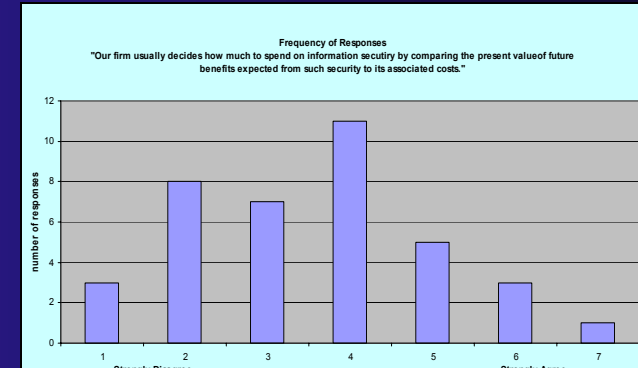
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Preliminary Results

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**