Overview

- Motivation
- Introduction of the Model
- Solution Concepts
- Real-World Examples
- Evaluation

Motivation

Reporting security breaches is good...

- Users can take action to protect their data from further exploitation
- Authorities and other firms can leverage interdependence to prevent further breaches
- Mandatory reporting incentivises preventative measures

Motivation

Reporting security breaches is good...

- Users can take action to protect their data from further exploitation
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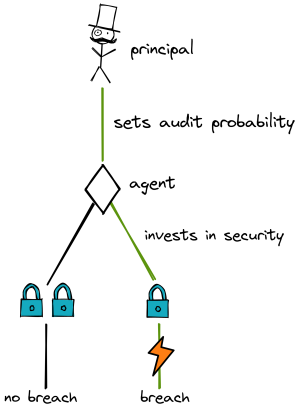
- Mandatory reporting incentivises preventative measures

... But security breaches are expensive to the companies that are victim to them.

Model – Costs

Probability of a Security Breach:

$$P_i(x_i, x_{1-i}, t_{1-i})$$

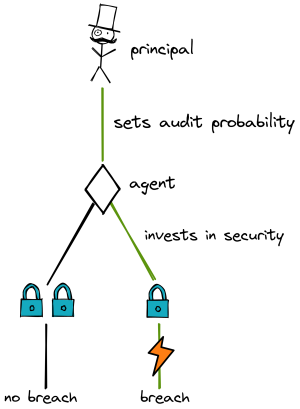


Model – Costs

Probability of a Security Breach:

$$P_i(x_i, x_{1-i}, t_{1-i})$$

x_i = Security investment of company i



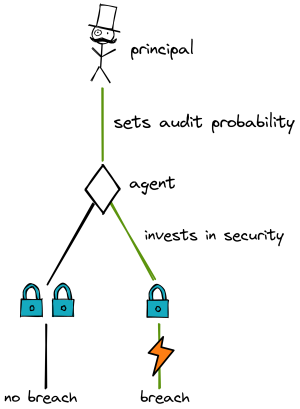
Model – Costs

Probability of a Security Breach:

$$P_i(x_i, x_{1-i}, t_{1-i})$$

x_i = Security investment of company i

x_{1-i} = Security investment of other company



Model – Costs

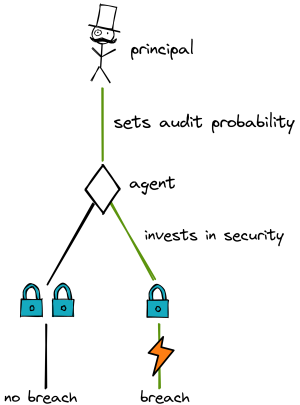
Probability of a Security Breach:

$$P_i(x_i, x_{1-i}, t_{1-i})$$

x_i = Security investment of company i

x_{1-i} = Security investment of other company

t_{1-i} = Truthful reporting of other company



Model – Costs

Probability of a Security Breach:

$$P_i(x_i, x_{1-i}, t_{1-i})$$

$$= 1 - (1 - P(x_i)) \cdot (1 - \gamma \cdot P(x_{1-i}) \cdot [1 - b \cdot (1 - \epsilon) \cdot t_{1-i}])$$

x_i = Security investment of company i

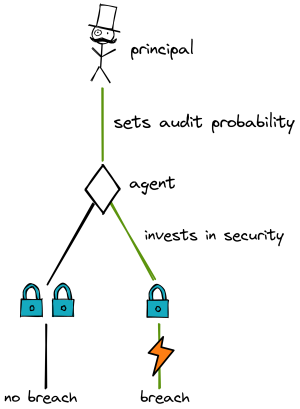
x_{1-i} = Security investment of other company

t_{1-i} = Truthful reporting of other company

$\gamma \in [0, 1]$ = Interdependence between the two companies

b = Authority's dissemination of knowledge

ϵ = Error rate of detective controls, fixed at $\epsilon = 20\%$



Sources

[1] Stefan Laube and Rainer Böhme. The economics of mandatory security breach reporting to authorities. *Journal of Cybersecurity*, 2(1):29–41, 12 2016.

[2] Huseyin Cavusoglu, Birendra K. Mishra, and Srinivasan Raghunathan. The effect of internet security breach announcements on market value. *International Journal of Electronic Commerce*, 9:104 – 70, 2004.

[3] Inés Macho-Stadler and David Pérez-Castrillo. *Principal-Agent Models*, pages 6977–6990. Springer New York, New York, NY, 2009.

[4] Jane K. Winn. Are better security breach notification laws possible. *Berkeley Tech. L.J.. Berkeley Technology Law Journal*, 24(IR):1133.

[5] GDPR compliance guidelines. `https://gdpr.eu/`.

Appendix: Additional slides

The appendix command can be used to create additional slides which will not be listed in the total number of slides

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