

ISC 2019 第七届互联网安全大会

网络安全经济：成本和国际方面

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2011年诺贝尔经济学奖得主

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托马斯·萨金特
Thomas J. Sargent

2011年诺贝尔经济学奖得主
Winner of the 2011 Nobel Memorial Prize in Economic Sciences





Cybersecurity Economics: Costs and International Aspects

Thomas J. Sargent





Big picture

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- ▶ Economic analysis gathers insights by giving the same name to many different things
- ▶ This helps identify common underlying forces, causes, and cures

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A Race

Between

- ▶ **Offense: criminal technologies and criminal enterprises**
- ▶ **Defense: security software and protocols produced by service providers and deployed by customers**

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Incentives

- ▶ Positive financial rewards from criminal activity, **versus**
- ▶ Dangers from detection and punishment



Incentives

- ▶ As value of online activities grows, . . .
- ▶ Payoffs from crimes grow

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Incentives

- ▶ As detection and conviction probabilities grow and as punishments grow in severity . . .
- ▶ Expected payoffs from internet crimes decline

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Technologies

- ▶ TOR (The Onion Router) and other dark web services
- ▶ Bitcoin and cryptocurrencies
- ▶ Development of sophisticated black markets for trading stolen data and malevolent software
- ▶ Development of intermediaries that supply malevolent software and hardware



Sources of Skilled Criminals

- ▶ Current and former employees of national intelligence services and internet companies
 - ▶ Recent case of former Amazon employee who hacked Capitol One
 - ▶ Wikileaks and other US breaches
- ▶ State trained and paid hackers



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Measurement problems

Detrimental incentives to under-report breaches

- ▶ Adverse legal and reputational consequences of revealing that data and services have been stolen or compromised



Costs of crime

- ▶ **Expenses to develop and deploy deterrence technologies**
- ▶ **Substituting away from internet toward "paper and pencil" and "local" (non-cloud) technologies**
- ▶ **Financial losses from being successfully attacked**
- ▶ **Reputational losses from being successfully attacked**



Cost Estimates – Global

- ▶ 2016 estimate: internet economy approximately \$4200 billion
- ▶ 2016 estimate: internet crime costs approximately \$600 billion
- ▶ Implicit “tax rate”: 14.5%

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Cost Estimates – US

- ▶ Total – about \$100 billion
- ▶ Intellectual property theft – approximately \$20 billion



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Room for International Cooperation

- ▶ **Success story: Presidents Xi-Obama Agreement of 2015**
 - ▶ Take steps to prohibit industrial espionage
 - ▶ Acknowledge or “allow” military and diplomatic espionage
 - ▶ Sophisticated deal that from US side seems to be working according to reports from US intelligence leader in 2017

- ▶ **Room for more international cooperation and trade in expertise and enforcement**

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谢谢!

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