Cyber-Threat in Securities Markets

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What is cyber-crime?

Cyber-crime is a harmful activity executed through computers, IT systems and/or the internet and targeting the confidentiality, integrity and accessibility of computer systems, IT infrastructures and/or internet presence.

It can include:

- traditional crimes e.g. fraud, forgery executed over the internet;
- publication of harmful information via electronic media;
- specifically internet-based crimes e.g. denial of service, hacking;
- and ‘platform crimes’ which use computer and information systems as a platform for performing other crimes e.g. use of botnets to control another user’s computer.
What is cyber-crime?

The evolving nature of cyber-crime

• As society and our securities markets rely increasingly on cyber-infrastructure, the potential reach of cyber-crime expands.

• Currently most households and businesses are online and there is increasing use of social media for financial purposes.
Myth #1: Perpetrators of cyber-crime in the financial system are simply criminals looking for financial gain.
Motives

• Thieves/fraudsters looking for *financial gain*.

• ‘Hactivists’, motivated by a *political ideal or ideology*.

• Cyber spies, stealing *political or economic secrets* from firms and nations.

• Nation states or terrorist groups, using the cyber vector to *disrupt or destroy*.

• Insiders seeking to *steal or sabotage*.

• Individuals looking to *wreak havoc for fun*. 
Targets

<table>
<thead>
<tr>
<th>Money</th>
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<tbody>
<tr>
<td>Information</td>
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<td>Critical systems</td>
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Myth #2: Cyber-crime is a passing nuisance
... a growing threat

- Potential to reap *massive reputational damage* across whole sectors

- *Debilitating effects* on market availability and integrity.

- A potential *systemic* risk.

“This is a rapidly rising area of risk with potentially systemic implications.”

-- Andrew Haldane, executive director of financial stability at the BoE
Myth #3: Cyber-crime is an IT issue
Vulnerabilities

Source: IOSCO Research Department
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Cyber-crime and systemic risk


• Impact factors to inform analysis:
  – Size of the threat
  – Complexity
  – Incentive structure
  – Effect on market integrity and efficiency
  – Infiltration of non-substitutable and/or interconnected services
  – Transparency and awareness
  – Level of cyber-security and cyber-resilience
  – Effectiveness of existing regulation
Case study: the world’s exchanges

Size of the threat, complexity of attacks

• 53% of exchanges reported suffering a cyber-attack(s) in 2012.

• A mix of simplistic (e.g. DDOS) and sophisticated (e.g. malicious code) attacks.

Motive, effect on market integrity and efficiency, attacks on non-substitutable and/or interconnected services

• Majority of attacks disruptive in nature.

• Attacks against exchanges which are non-substitutable infrastructure and heavily interconnected.

• No impact on market integrity and efficiency.... yet.
Case study: the world’s exchanges

Transparency and awareness

• 93% of exchanges report that cyber-crime is generally understood and discussed by senior management

• 89% of exchanges report having a formal plan/documentation addressing cyber-threats

• 70% of exchanges share information with authorities, regulators and other actors – on a national basis.
Case study: the world’s exchanges

Level of cyber-security and cyber-resilience

- All exchanges have *detection and prevention* measures in place.
- 94% have *disaster recovery* measures in place for cyber-attacks.
- 85% of exchanges have *training* for general staff
- 89% of exchanges report having a *formal plan/documentation* addressing cyber-threats
- 70% of exchanges *share information* with authorities, regulators and other actors – on a *national* basis.
- General perception that a large-scale attack with potential for widespread damage will eventually *breach*.
- 22% have cyber-crime *insurance* or something similar.
Case study: the world’s exchanges

Effectiveness of existing regulation

• 59% report *sanction regimes* in place for cyber-crime

• Of these only half suggesting these are *effective in deterring* cyber-criminals.

• Doubt due to *cross-jurisdictional nature* of cyber-crime and issue of attribution.
Case study: the world’s exchanges

A systemic risk?

89% of exchanges view cyber-crime as a systemic risk.

- *Halting* trading activity or *affecting* the ability of a clearing house to act as a central counter party within the settlement window
- *Moving markets* through takeover of accounts and unauthorized trading
- *Targeting* telecommunication networks supporting financial structures
- Ongoing *data manipulation* and compromise of financial data integrity
- *Leaking of insider information* on an ongoing basis
- *Attacking multiple, interconnected financial actors* in different jurisdictions simultaneously
Case study: the world’s exchanges

Conclusions:

Cyber-crime:
• Threatens the orderly and efficient markets;
• Is a truly global problem;
• Is growing in size, sophistication, potential for disruption and destruction;
• And therefore a potential systemic risk.
“This is a rapidly rising area of risk with potentially systemic implications.”
-- Andrew Haldane, executive director of financial stability at the BoE

“It’s a big deal; it’s going to get worse”
-- Jamie Dimon, CEO of JP Morgan

"The financial services industry is one of the more attractive targets for cyberattacks, and, unfortunately, the threat is growing"
-- Thomas Curry

“This issue has emerged as arguably the top systemic threat, facing not only the global financial markets and associated infrastructures, but also world governments and military establishments.”
-- DTCC, Beyond the Horizon White Paper, Aug 2013

“Will the next systemic shock spring from a liquidity crunch or inherent capital weakness... or is it more likely to come from an as yet unforeseen event or network of events such as a massive payment outage or a new breed of cyber attack?“
-- KPMG
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Measures and Response

IOSCO Board appointed a cyber-coordinator on cyber-resilience:

• Committee 2 is considering cyber-crime under its mandate for work on the ‘Robustness of Electronic Trading Systems and Markets’.

• Committee 3 is considering cyber-crime under its mandate for work on ‘Business Continuity for intermediaries’.

• Committee 4 is considering information exchange on cyber-attacks, determined MMOU is apt for use.

• Affiliate Members Consultative Committee is preparing a report on a survey among its members.

• CPMI-IOSCO Committee created to deliver guidance/principles on cyber resilience.