

# Systemic cyber risk

*Economencafé*

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DeNederlandscheBank

EUROSYSTEEM

# Content

- Context
- Characteristics of cyber risk
- Vulnerabilities of the financial sector
- Cyber risk and financial stability

# Digitalization



Source: globallinker

# It brings advantages...



# ...but also new vulnerabilities

# Characteristics of cyber risk

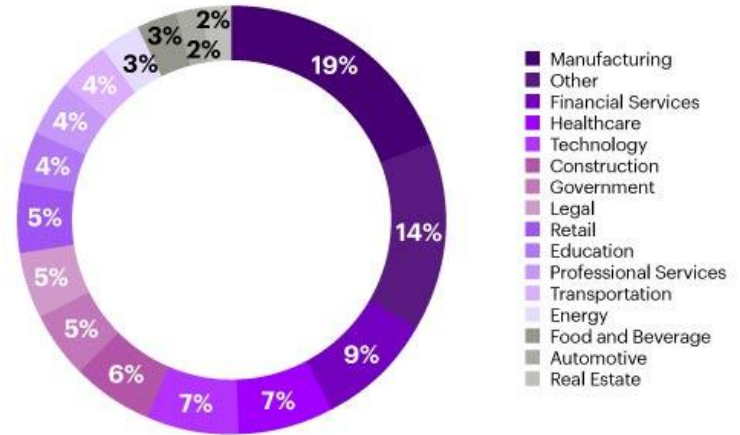
- Traditional sources of risk: operational risk (?)
- No correlation with financial cycle
- Hard to build (quantitative) models for cyber risk
- Cyber risk differs from traditional sources of risk:
  - Speed of propagation
  - Scale of propagation
  - Possible intent

Figuur 10 Cyberaanvallers en hun motivatie



# Financial sector is a key target

- Digitalisation of financial services
- Key economic functions to support the real economy (payments, lending, deposit taking and savings, etc).
- Presence of high value assets



# Threat landscape: structural trends



Threat level rising



threat moving upstream



more advanced methods



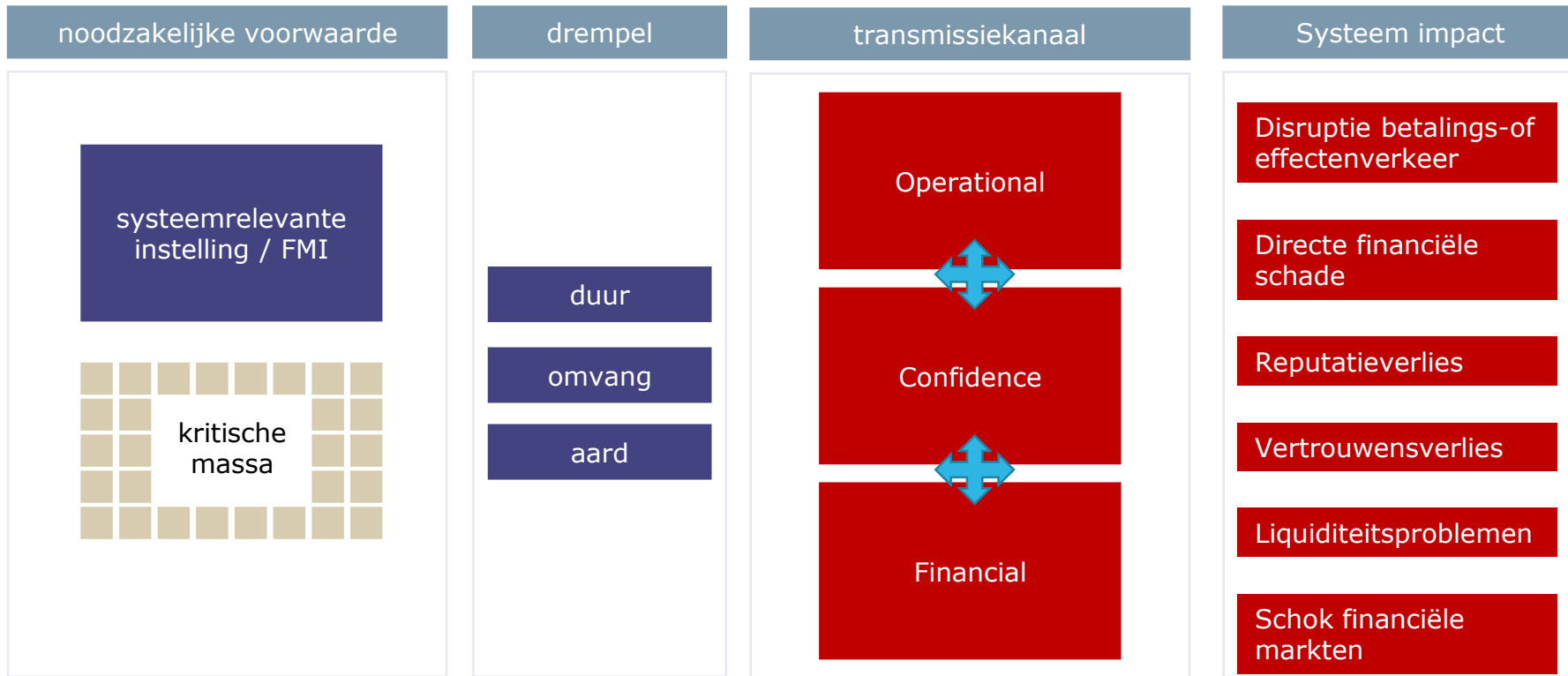
# Recent crises have further increased cyber risk

- Coronacrisis gave impetus to cyber threats
  - Working from home
  - Lower cyber hygiene
  - Lower network capacity to signal rogue activities
  - Work-arounds increased the risk of intruders
- - Covid as a topic to receive personal information
- The war in Ukraine has given a further stimulus to cyber risk
  - Nation state actors instead of cyber criminals

# Cyber risk and financial stability

- Crucial factor: does a cyber incident escalate from a mere operational incident into a harm of confidence?
- A systemic event requires not only a large shock, but also amplification through e.g. bank runs, liquidity issues or fire sales.
- Financial stability is particularly threatened if critical functions are (temporarily) lost: payments, inter-bank transfer, etc.

# Cyber risk and financial stability

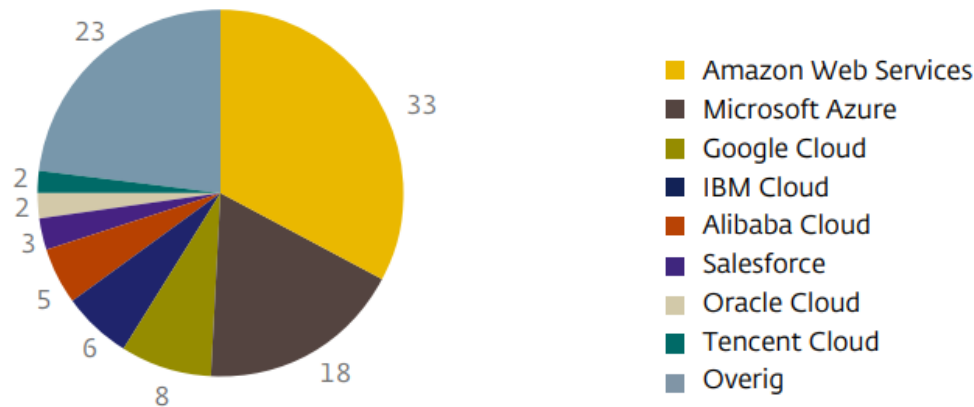


## Transmission within and between contagion channels (with examples)

	Operational	Confidence	Financial
Operational	<b>O ► O</b> : operational disruption in one part of a system results in operational disruption in other parts	<b>O ► C</b> : operational disruption results in a loss of confidence or trust in the affected entity, the services it provides (affected or not), or the financial system as a whole	<b>O ► F</b> : operational disruption results in failure to perform financial activity in line with stakeholder needs or requirements leading to financial impacts
Confidence	<b>C ► O</b> : a loss in confidence results in operations being unintentionally or intentionally degraded or ceased	<b>C ► C</b> : a loss of confidence in one part of a system results in loss of confidence in other parts	<b>C ► F</b> : a loss of confidence leads to a change in financial activity with negative consequences
Financial	<b>F ► O</b> : financial impacts result in operations being unintentionally or intentionally degraded or ceased	<b>F ► C</b> : financial impacts result in a loss of confidence or trust in the affected entity, the services it provides (affected or not), or the financial system as a whole	<b>F ► F</b> : financial disruption in one part of a system results in financial disruption in other parts

# Dependence on 3rd parties

Figuur 11 Markt voor clouddiensten zeer geconcentreerd  
Procenten



Bron: Financial Stability Board,  
Synergy Research Group

Noot: de grafiek rapporteert het aandeel van elk bedrijf in de *Cloud Infrastructure-as-a-Service* (IaaS) markt, in alle industrieën, in het vierde kwartaal van 2019.

# DNB Cyber Stress Test

- To be published first week of June
- Testing two transmission channels of cyber risk
  - 1) Operational problems with interbank payment system TARGET2
  - 2) Cyber-induced loss of confidence, sparking a bank run
- These amplification channels in isolation can lead to a systemic event, but only in rather extreme scenarios.
- Follow-up work would have to involve a broader set of amplification channels, and the interaction between them.

# TIBER: Threat Intelligence Based Ethical Red Teaming



Geheime testaanvallen op  
financiële infrastructuur moeten  
digitale veiligheid vergroten

## Toezihtouder DNB gaat banken hacken

# Wrap up

- Cyber risk is increasing and becoming more advanced
- When several amplifiers are at work, cyber risk can become systemic
- Financial stability is particularly at risk when confidence is hurt, which can e.g. spillover in liquidity stress.



Thanks for you attention!