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Session 7: Governance and Transparency

Algorithmic Governance in the Financial Sector

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Views expressed in this presentation are those of the presenter and do not necessarily reflect those of the Bank of Japan.

Widespread use of algorithms for decision-making in the financial sector

Algorithms: encoded procedure to transform input data into “desired output”, based on specific calculations (Gillespie 2013)

Customer-focused uses	Operations-focused uses	Trading and portfolio management	Regulatory compliance and supervision	DLT with no central authority
<ul style="list-style-type: none">• Credit scoring• Insurance• Client-facing chatbots	<ul style="list-style-type: none">• Capital optimization• Model risk management• Market impact analysis	<ul style="list-style-type: none">• Trading execution• Portfolio management	<ul style="list-style-type: none">• Regtech• Suptech	<ul style="list-style-type: none">• Cryptoassets• DAO

Source: Based on FSB “Artificial intelligence and machine learning in financial services” (November 2017)



Quantum computing and other technological developments are expected to further facilitate use of big data and AI/machine learning

While the use of algorithms bring benefits, its use for automated decision-making raise regulatory concerns

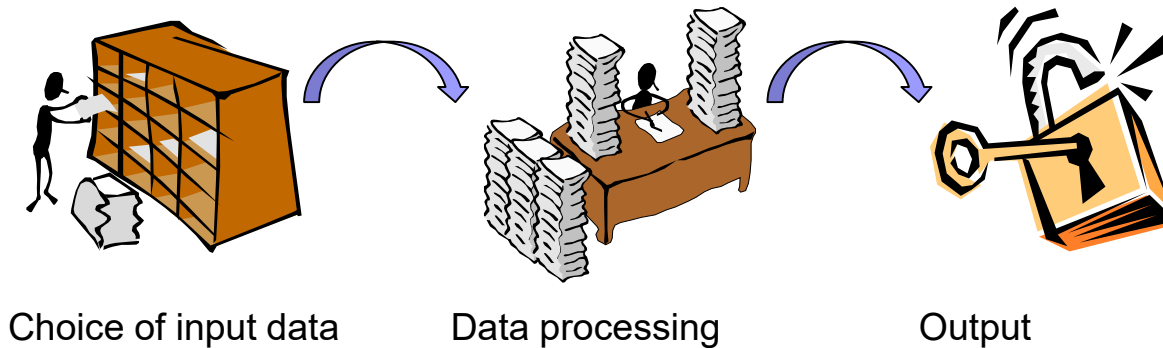
□ Decision-making by algorithms

- “Code is law” (Lessig, 1999)
- “Algorithmic harms” (Andrews, 2017)
 - ✓ Bias
 - ✓ Manipulation
 - ✓ Lawbreaking
 - ✓ Usage in propaganda
 - ✓ Brand contamination
 - ✓ Unknowns (“black-box”, “singularity”)

□ ...and thus the need for adequate “governance of algorithms”

Algorithmic decision-making

- Automation of the following processes:



Credit Scoring	SNS information Race Gender Occupation	Based on historical performance of default/repayment	Deny/approve a loan application	➔ Discriminatory lending
Investment decisions	Internal database Market information Other data sources	Based on highest return	Decision to buy/sell a financial asset	➔ Market manipulation

➔ *More problematic if AIs become homogenous (“model monoculture”)*

Approaches to “governance of algorithms”

■ *Self-governance*

- **Technological solutions** (eg. privacy by design, non-discriminatory data mining techniques), and **standardization** efforts
- **Internal governance** of the institution (eg. BCBS Principles for the Sound Management of Operational Risk)
- **Industry-level** self regulation
- Self-governance of the **(decentralized) network**

■ *Market mechanism* (enhancing accountability/transparency)

■ *Adequate allocation of liabilities* among involved parties

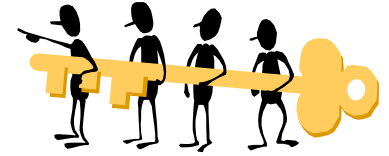
■ *Regulation*

- *Need to be mindful: i) not to stifle innovation; and ii) not to create “model monoculture”*

Enhancing accountability/transparency of algorithms is important, but not a panacea

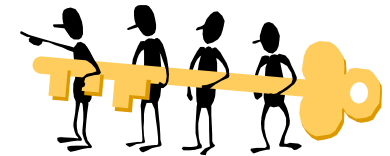
- Use of algorithms with **auditability** could increase scrutiny of interested parties
- **Regulation** can play a role
 - eg. HFT regulations requiring i) information on governance structure to develop/maintain IT systems; ii) test data; and iii) regular reporting
- However, full transparency is not a panacea
 - Constraints due to **trade secrets**, data **privacy** protection
 - **Complexity**
 - *Capacity and resource constraints of users, regulators/supervisors*

Possible regulatory approaches



- Require **storage of data/records, disclosure**
- Require certain **program designs**
 - Auditability
 - Exclusion of certain data input
 - Obligation to ensure compliance with market integrity regulation
- Require adequate **management framework** (internal governance and control)
 - eg. Japan Financial Instruments and Exchange Act on HFT systems, MiFIDII regulation of algorithmic trading systems

Possible regulatory approaches (cont'd)

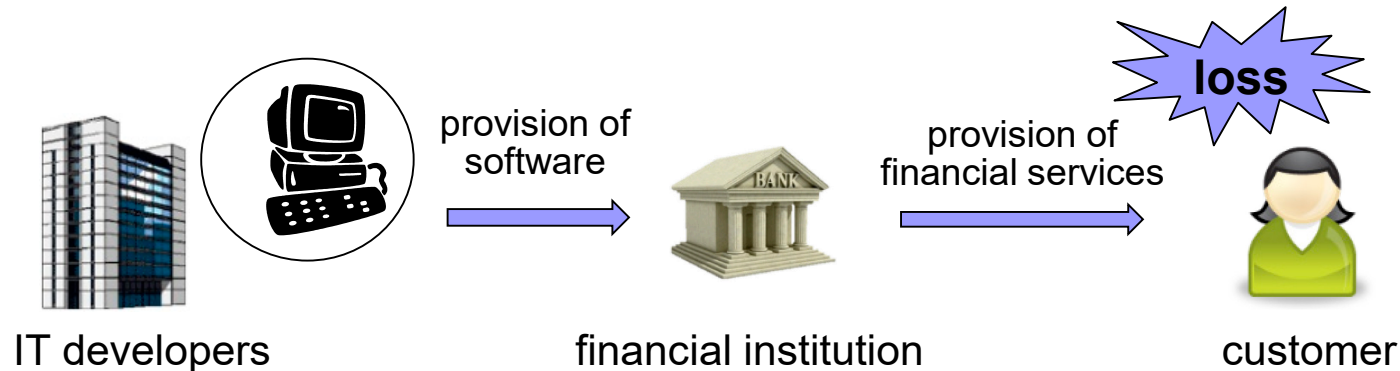


- ❑ **Registration requirements for FI staff** designing/approving IT systems
- ❑ Expand **scope of regulated entities** to those responsible for designing the algorithm (Eg. IT developers)
- ❑ Reconsider **subjective grounds** for market conduct regulations



Focus on enhancing auditability, ensuring robust processes and control mechanisms for development/management of the algorithm.

Allocation of liabilities



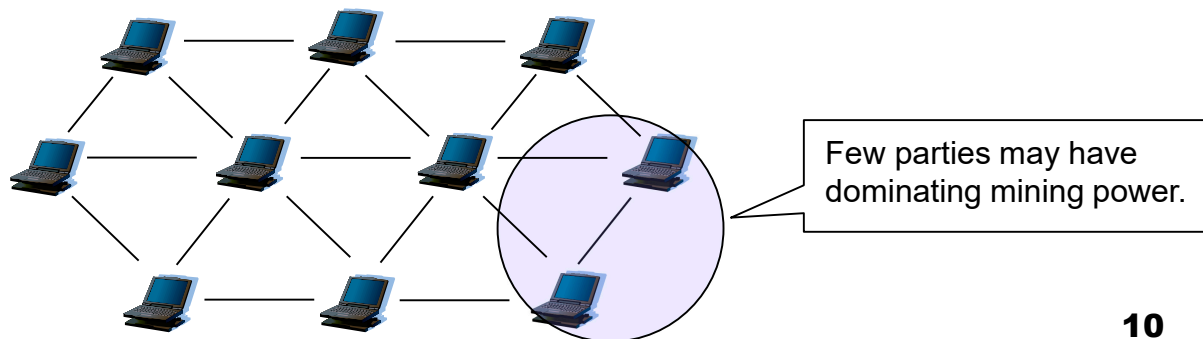
- ❑ Allocation of liability should be clear to:
 - give parties ex-ante incentive
 - ensure adequate compensation of the customer
- ❑ How should liability be allocated?
 - Guidance based on “cheapest cost avoider” test
 - Complexity could arise in the case of AIs (“black-box”)
 - How to avoid stifling innovation while ensuring adequate customer protection?

Challenges in the case of distributed networks



- The aforementioned regulatory approaches are plausible only when a **regulatable intermediary** exists
 - How can regulators ensure regulatory goals are achieved?
 - Are self-governance and market mechanisms sufficient?
 - Should the government consider ways to influence the technical code?
 - Need to require a central authority for critical operations (eg. FMIs)?

- Decision-making for modifying protocols could be challenging
 - Rule-making *de facto* controlled by few persons (eg. core developers, few miners)... change of rules may favor specific members
 - How can the governance framework be strengthened?



Thank you !



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