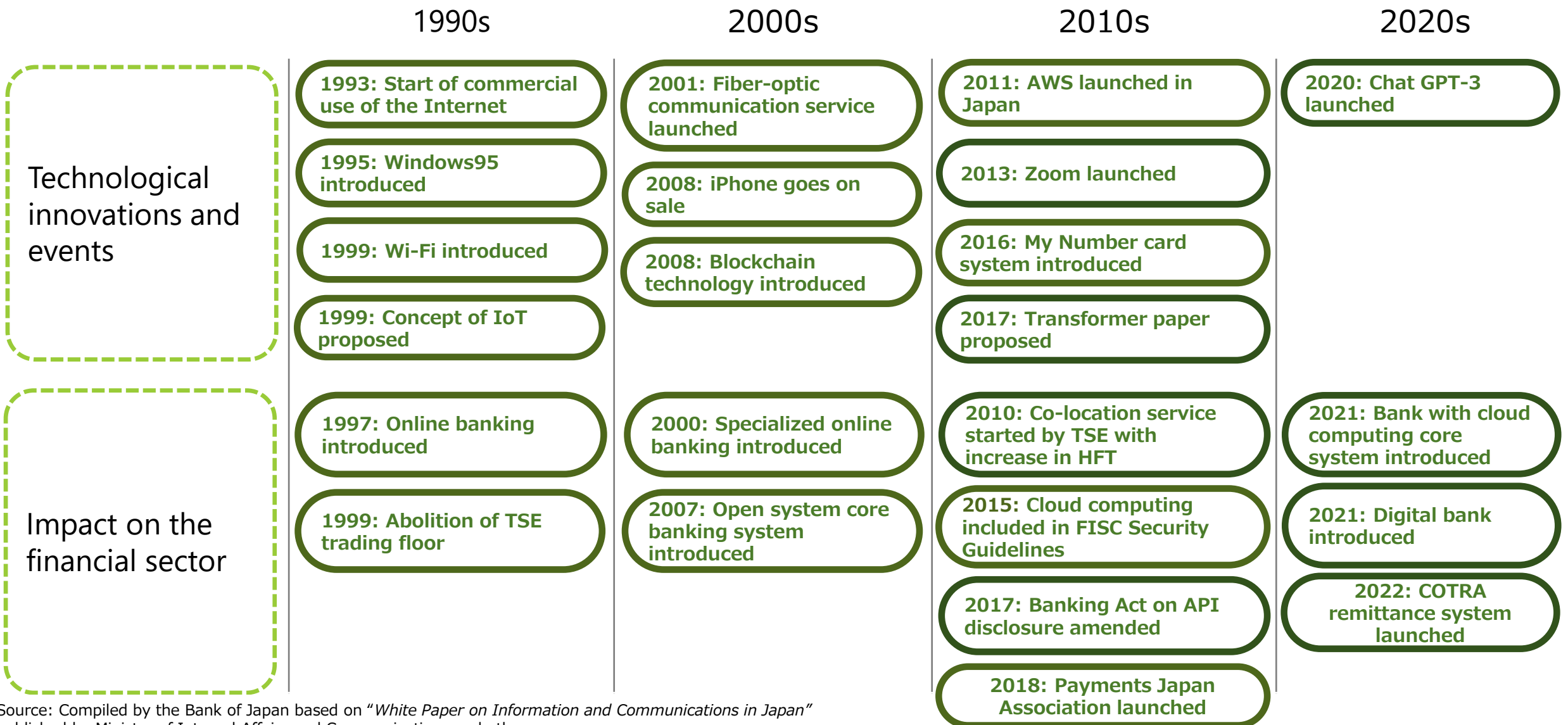# How Will Digitalization Change Japan's Financial Services and Economy?

Keynote Speech at the Workshop Hosted by the Center for Advanced Financial Technology, Bank of Japan

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January 31, 2025

Chart 1. Progress of digital technology in Japan

	1990s	2000s	2010s	2020s
Technological innovations and events	1993: Start of commercial use of the Internet	2001: Fiber-optic communication service launched	2011: AWS launched in Japan	2020: Chat GPT-3 launched
	1995: Windows95 introduced	2008: iPhone goes on sale	2013: Zoom launched	
	1999: Wi-Fi introduced	2008: Blockchain technology introduced	2016: My Number card system introduced	
	1999: Concept of IoT proposed		2017: Transformer paper proposed	
Impact on the financial sector	1997: Online banking introduced	2000: Specialized online banking introduced	2010: Co-location service started by TSE with increase in HFT	2021: Bank with cloud computing core system introduced
	1999: Abolition of TSE trading floor	2007: Open system core banking system introduced	2015: Cloud computing included in FISC Security Guidelines	2021: Digital bank introduced
			2017: Banking Act on API disclosure amended	2022: COTRA remittance system launched
			2018: Payments Japan Association launched	

Source: Compiled by the Bank of Japan based on "*White Paper on Information and Communications in Japan*" published by Ministry of Internal Affairs and Communications and other sources.

Chart 2. Impact of digitalization on financial services

Benefits of digitalization
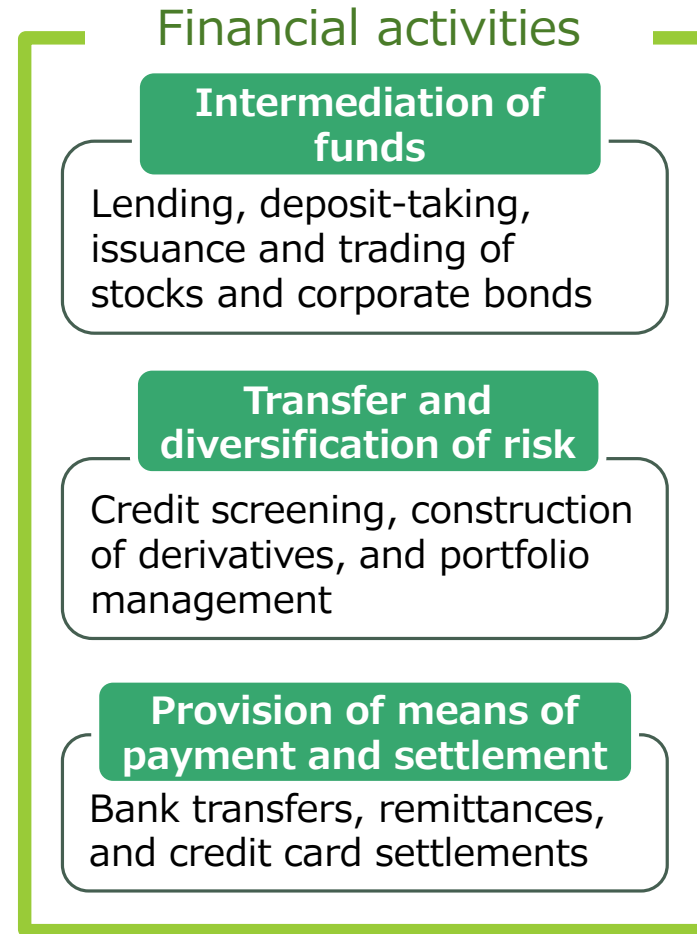
Improving the efficiency of financial services

- Automation, labor and time savings
- Online paperless
  (accounting, bookkeeping, etc.)
- Identification by face, public personal authentication

High value-added financial services

- Mobile/Internet trading
  （transfers, investments, etc.）
- Consulting using generative AI
- Risk management using big data and highly granular data

Creating a new business model?

- Tokenization

Financial activities

Intermediation of funds
Lending, deposit-taking, issuance and trading of stocks and corporate bonds

Transfer and diversification of risk
Credit screening, construction of derivatives, and portfolio management

Provision of means of payment and settlement
Bank transfers, remittances, and credit card settlements

Risks from digitalization

Cyber risks

Third party risks, concentration risks

Privacy and information security

Generative AI-related risks

Transmission risks, spread of herd behavior

Chart 3. Impact of generative AI on financial intermediary activities

	Settlement	Lending	Insurance	Asset management
Common benefits	Improving efficiency of back-office operations; virtual support; fraud prevention; legal compliance			
Sectoral benefits	Liquidity management, anti-money laundering	Credit risk analysis, financial inclusion	Risk assessment, pricing, handling complaints	Portfolio building, algorithmic trading, robo-advisors
Common risks	Lack of accountability, data silos, reliance on third parties, algorithmic resonance, disinformation, hallucination, cyber risk			
Sectoral risks	Liquidity risk, advanced fraud, cyber attacks	Algorithmic discrimination, privacy violation		Zero sum, herd behavior, algorithmic resonance
Financial stability risks	Herd behavior, interconnectedness and pro-cyclicality, single point of failure, misjudgments based on inaccurate information, spillover from the real economy			

Source: Compiled by the Bank of Japan based on Bank for International Settlements (2024), "Artificial Intelligence and the Economy: Implications for Central Banks," BIS Annual Economic Report, Chapter III. and others.

Chart 4. Impact of generative AI on the real economy

【Acemoglu (2024)】

The impact of AI on TFP growth and GDP growth will be about 0.53% and 0.93% within 10 years, assuming that AI will affect the economy only through cost savings and productivity improvements in specific tasks.

$TFP\ growth\ within\ the\ next\ 10\ years$
$= Ratio\ of\ Easy\ Tasks\ Affected\ by\ AI\ to\ GDP(0.033)$
$\quad \times Labor\ Share\ of\ the\ Business(0.535)$
$\quad \times Cost\ Saving\ in\ the\ Business\ by\ AI\ (0.27)$
$+$
$Ratio\ of\ Hard\ Tasks\ Affected\ by\ AI\ to\ GDP(0.013)$
$\quad \times Labor\ Share\ of\ the\ Business(0.535)$
$\quad \times Cost\ Saving\ in\ the\ Business\ by\ AI\ (0.07)$
$\cong 0.0053$

$GDP\ growth\ within\ the\ next\ 10\ years =$
$TFP\ growth\ within\ the\ next\ 10\ years + Capital\ stock\ growth$

Source: Daron Acemoglu (2024) "The Simple Macroeconomics of AI," Economic Policy, 39(120).

【Filippucci *et al.* (2024)】

Automated and augmented tasks by Generative AI language models, as a share of the total amount of time spent on all tasks*, by industry, US (2022)

■ Automated tasks   ■ Augmented tasks

(Industries, left to right): Agri, Forestry & Fish; Care & Social Work; Med & Health Svcs; Consumer Goods Prod; Mining & Metals; Chem & Adv Materials; Edu & Training; Employment Svcs; Adv Manufacturing; Biz Support & Maint; Water & Waste Mgmt; Eng & Construction; Supply Chain & Trans; Arts, Ent & Rec; Gov & Public Sect; Personal Care Svcs; Auto & Aerospace; Accomm & Food Svcs; Media & Publishing; Elec Manufacturing; Non-Profit & Unions; Energy & Utilities; Oil & Gas; Real Estate; Rental & Leasing Svcs; Retail & Wholesale; R&D and Biz Mgmt; Insur & Pension Mgmt; Info & Tech Svcs; Telecomms; FinServ & Capital Mkts
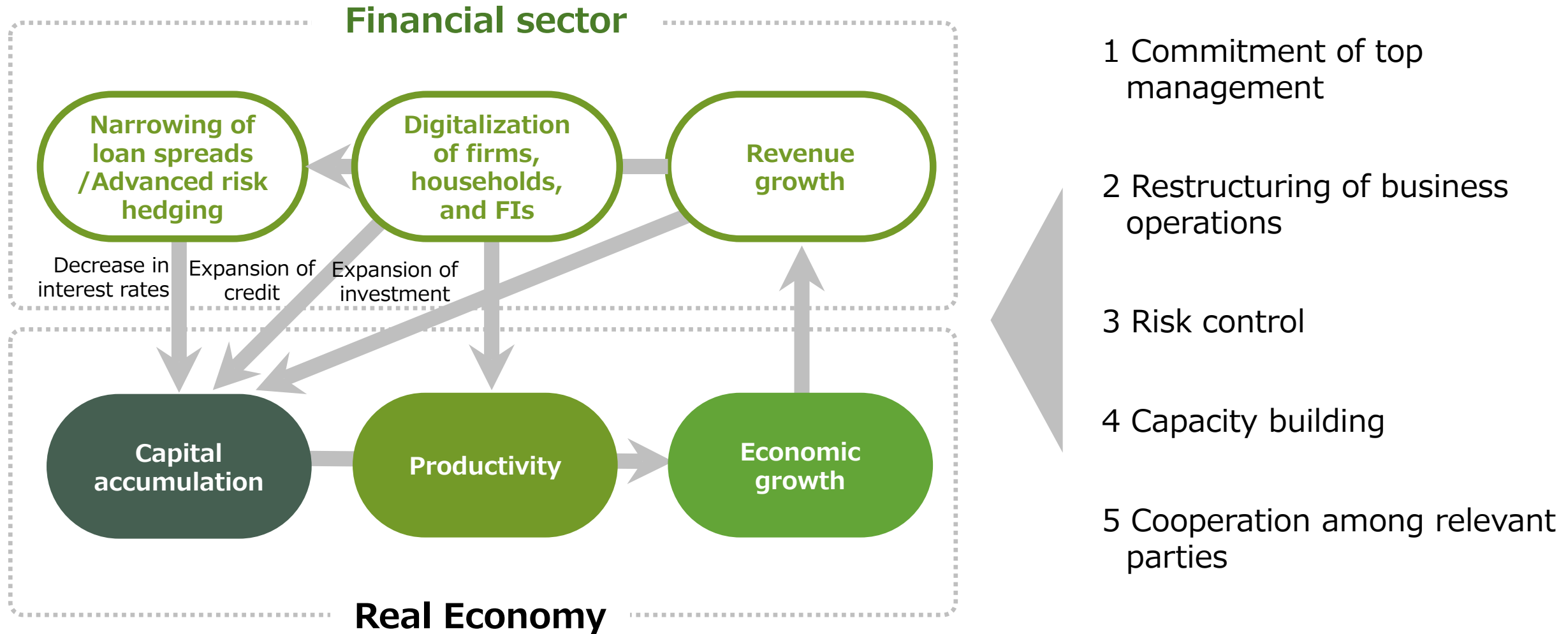
Notes: *The remaining share of tasks includes non-AI exposed ones, where AI has an undetermined ambiguous impact. Knowledge-intensive service occupations are marked by bordered bars.
The chart is taken from Filippucci, F, P Gal, C Jona-Lasinio, A Leandro, and G Nicoletti (2024), "The Impact of Artificial Intelligence on Productivity, Distribution and Growth: Key Mechanisms, Initial Evidence and Policy Challenges," OECD Artificial Intelligence Papers, No. 15.

Source: The World Economic Forum (2023), "Jobs of Tomorrow: Large Language Models and Jobs," The World Economic Forum White Papers.
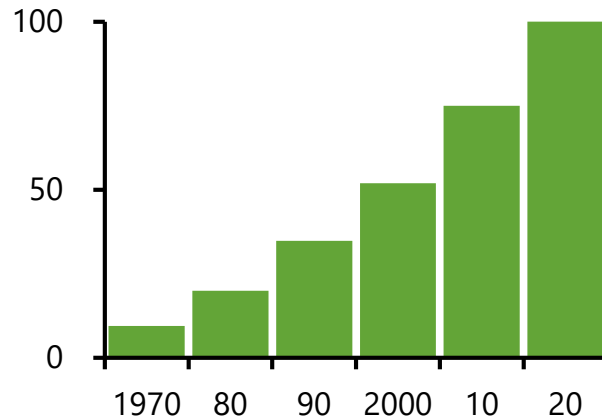
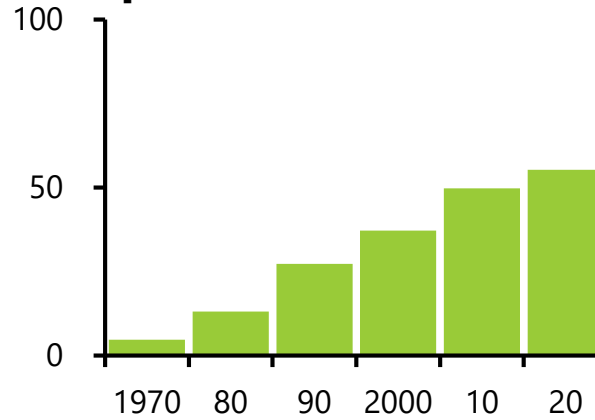# Chart 5. Financial services and the real economy

Financial sector

- Narrowing of loan spreads /Advanced risk hedging
- Digitalization of firms, households, and FIs
- Revenue growth

Decrease in interest rates

Expansion of credit

Expansion of investment

Real Economy

- Capital accumulation
- Productivity
- Economic growth

1 Commitment of top management

2 Restructuring of business operations

3 Risk control

4 Capacity building

5 Cooperation among relevant parties

Chart 6. Annual labor productivity per person
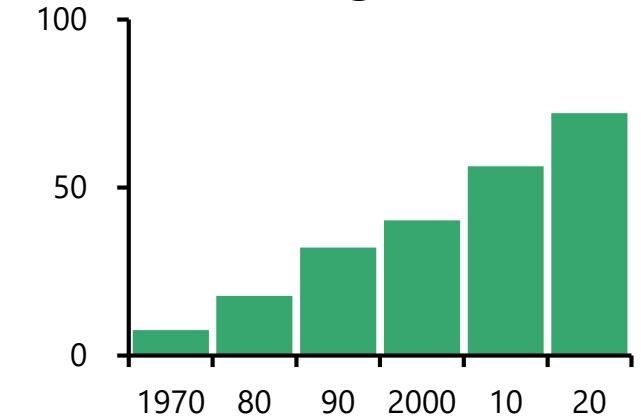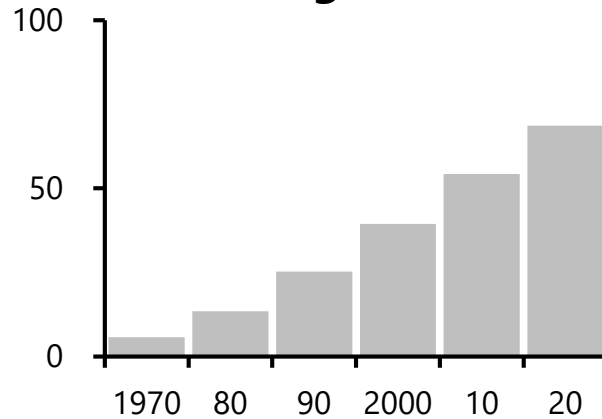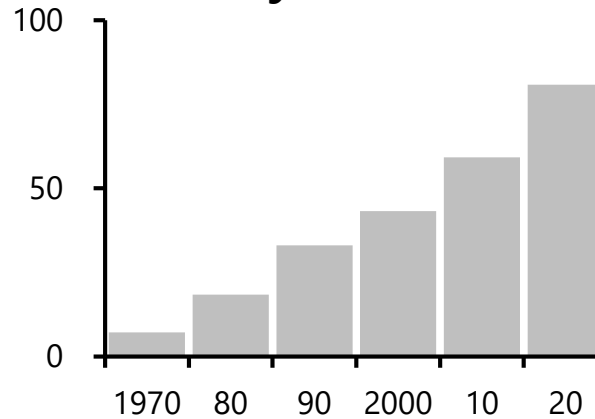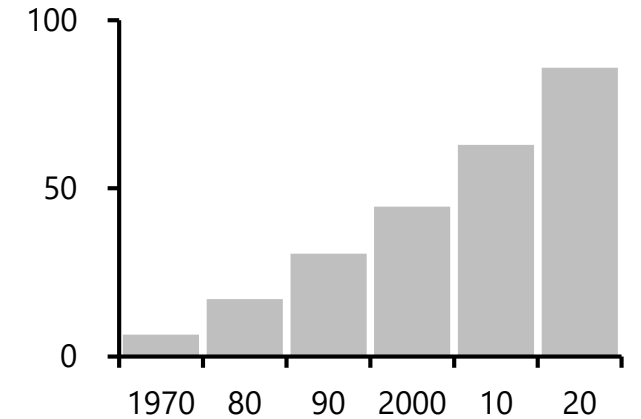

Notes: United State in 2020 = 100.
Converted to U.S. dollars at purchasing power parity. OECD average is a weighted average of member countries for each year.
Source: Japan Productivity Center, "International Comparison of Labor Productivity 2024"