

History of Banking

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Table of Contents

History of Banking	3
Early Developments	4
Early Middle Ages in Europe	9
Late Medieval Europe	11
Modern Times	17
The Great Cycles of Capitalism	23
The Steam Engine	24
The Train	27
The Internal Combustion Engine, Electricity and Magnetism	30
Automobiles and the Petro-Chemical Industry	33
The Electronic Computer and the Internet	36
Artificial Intelligence	39
Modern Banks	42
How banks operate	43
Overview of Banking Institutions	46

History of Banking: a subjective selection

History of Banking: a subjective selection

Early Developments

Grain loans supported agriculture

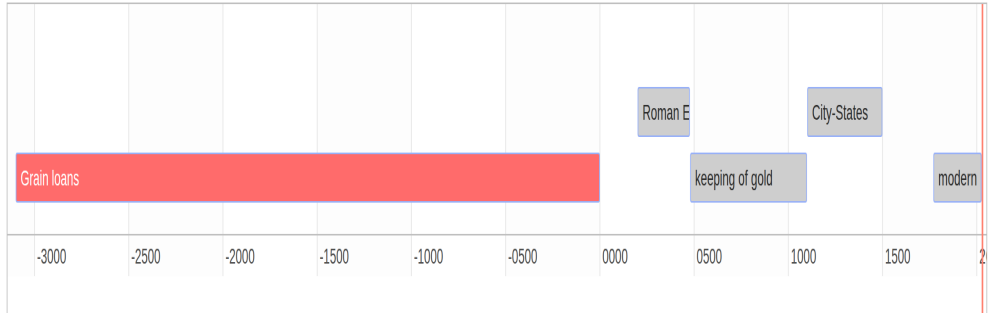


Figure: The timeline of banking shows a long and stable phase in agrarian societies.

Mesopotamia 2,000 BCE

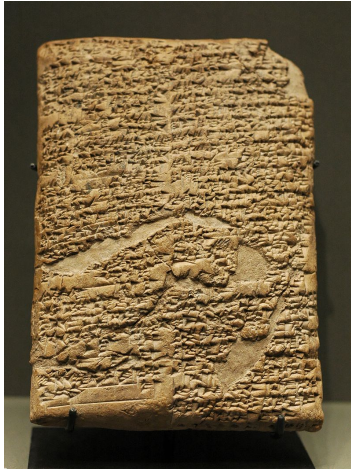


Figure: The Hammurabi Code (Law 100) describes interest-bearing loans. Commissioned by Hammurabi, the king of Babylon (ca. 1792–1750 BCE) – source: [wikimedia.org](https://www.wikimedia.org)

Jesus of Nazareth flips over tables and whips money changers and merchants



Figure: Christ driving the money changers from the temple by Jan Sanders van Hemessen. –

source [wikimedia.org](https://www.wikimedia.org)

Bankers in Ancient Rome

- ◆ **Professional Bankers** distinct social group (*equites* class).
- ◆ **Public Bankers (*Mensarii*)**
 - State-appointed officials (economic stability).
 - Public loans from the treasury (*aerarium*) (from crisis in 352 BC).
- ◆ **Currency Controllers (*Nummularii*)**
 - Test coins and manage currency circulation (1st century BC – 4th century AD).
- ◆ **Private Bankers (*Argentarii*)**
 - Freemen in a professional guild (*collegium*).
 - Operated *tabernae argentariae* (banking shops) offering credit and financial services (mid-2nd century BC – mid-2nd century AD).

Social Status

Successful bankers gained wealth and influence.

money transfers - Permutatio

move large sums across distances by adjusting bank ledgers

History of Banking: a subjective selection

Early Middle Ages in Europe

The Dark Ages

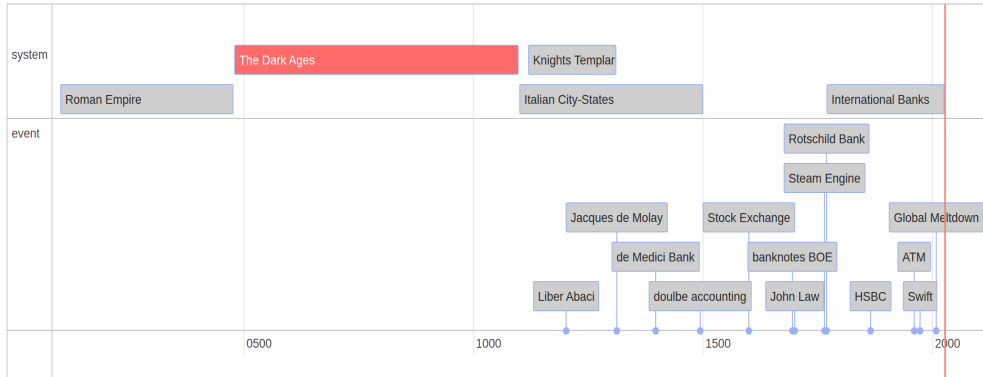


Figure: Balance Sheet more than 4,000 years old.

History of Banking: a subjective selection

Late Medieval Europe

The late medieval period

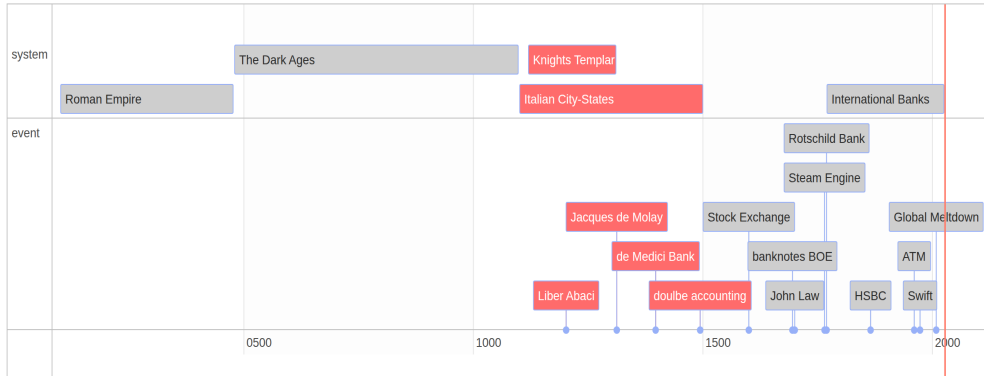


Figure: The late middle ages saw steady progress in science, trade, and economic development.

Liber Abaci: progress from mathematics



Figure: "Liber Abaci" (1202) by Leonardo di Pisa (posthumously Fibonacci) introduces the Modus Indorum, the Hindu–Arabic numeral system (base-10 notations) in section 1. In section 2 the advantages for business problems: currency conversions, profit and interest calculations -

The real bankers: The Knights Templar



The Medici

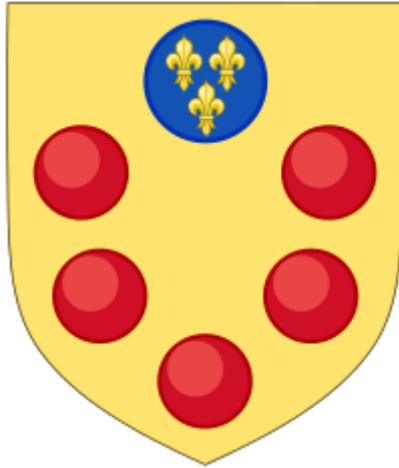


Figure: The Medici Dynasty power and influence beyond comparison through local in Italy - bank created by Giovanni de Medici in the 15th century.

Shakespeare's Merchant of Venice



Figure: Ernst von Posart as Shylock in Shakespeare's play "The Merchant of Venice" (ca. 1600). – image [wikimedia.org](https://commons.wikimedia.org/wiki/File:Ernst_von_Posart.jpg)

History of Banking: a subjective selection

Modern Times

Modern Times

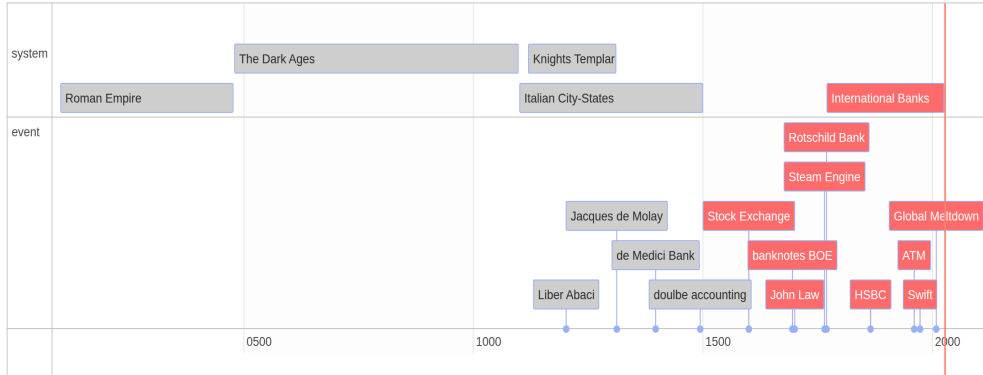


Figure: Rapid developments of banking during modern times.

Shares and stock exchange

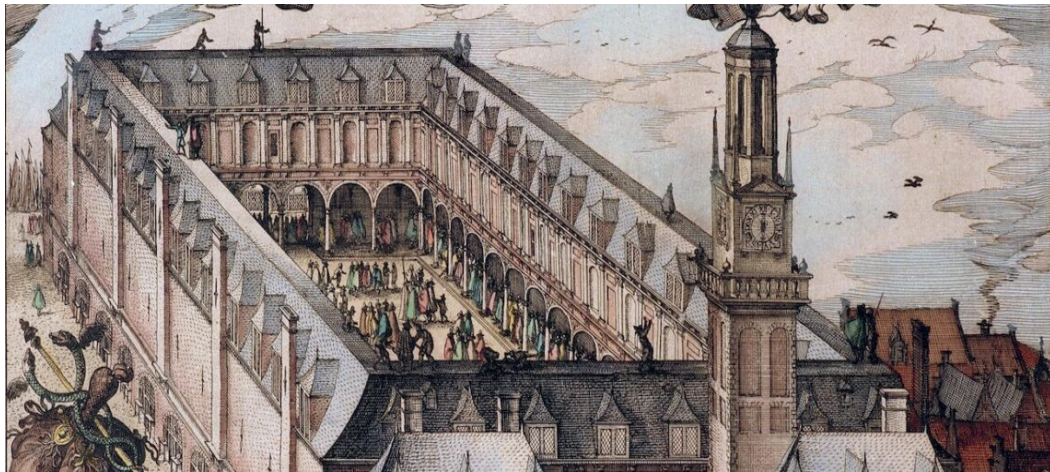


Figure: The Amsterdam Stock Exchange: 1602.

Mayer Amschel Rothschild



Figure: Mayer Amschel Rothschild re-invents international banking – The Internationalisation of the bank ca. 1770.

The last piece of the puzzle



Figure: The last piece of the puzzle: energy rich food with the potato. From the end the 16th century (via Spain around 1570, and via the British Isles between 1588 and 1593) – widely used since the 1700s.

The Motor: the Scientific Method

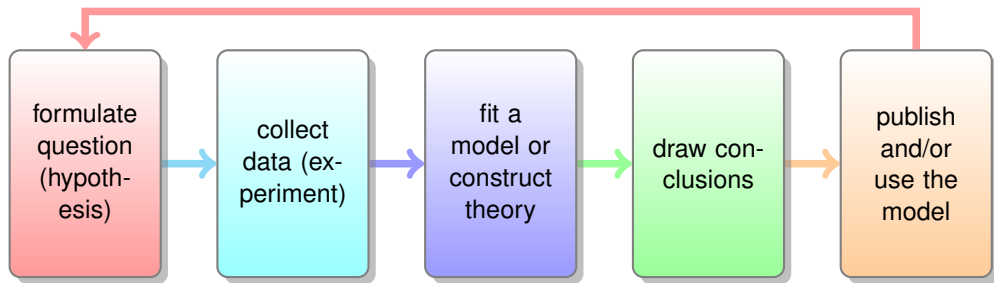


Figure: The steps in the scientific method for the data scientist as commonly in use from the 19th century, long after the work of Ibn al-Haytham (aka Alhazen — 965–1039, Iraq).

Cycles of Capitalism

Cycles of Capitalism

The Steam Engine

The steam engine provides power for factories and fuelled unprecedented economic growth

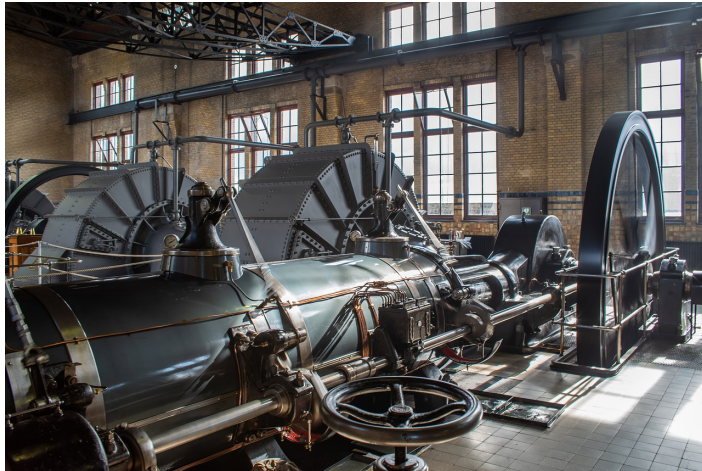


Figure: Steam Engine in factory — image by Kobus van Leer from pixabay.com

The Steam Engine

Key dates

Prelude

- ♦ 1551 & 1629: Taqi al-Din and Giovanni Branca first ideas
- ♦ 1698: Thomas Savery invents the steam pump
- ♦ 1712: Thomas Newcomen builds a practical atmospheric engine

Spark

1765: James Watt innovates with the separate condenser

Growth

Explosive industrial and economic growth since the early 1800s, re-shaping global labor markets

Exhaust

“The Panic of 1857”, 1866, and “The Panic of 1873” which initiated the “Long Depression” – (Karl Marx writes “Das Kapital” in 1867)

Cycles of Capitalism

The Train

The Train



Figure: The Train provided reliable mass transport — image Image by Erich Westendarp from pixabay.com

The Train

Key Dates

Prelude

- 1804: Richard Trevithick builds the first steam locomotive, pulling 25 tonnes of material and 70 people over 10 miles
- 1829: Stephenson's "The Rocket" wins the Rainhill Trials, reaching an unprecedented speed of nearly 48 km/h

Spark

1830s–1840s: The era of "Railway Mania" drives rapid, explosive expansion of rail networks across Europe and North America. Speeds reach up to 96 km/h

Growth

Further global railroad expansion stabilizes logistics; approximately 40% of the world's cargo still moves by train today due to its high efficiency.

Exhaust

Over-speculation leads to market crashes like "The Panic of 1901" and financial exhaustion leading up to WWI.

Cycles of Capitalism

The Internal Combustion Engine, Electricity and Magnetism

The Internal Combustion Engine, Electricity and Magnetism

Fuelled exponential economic growth and provided individual transport

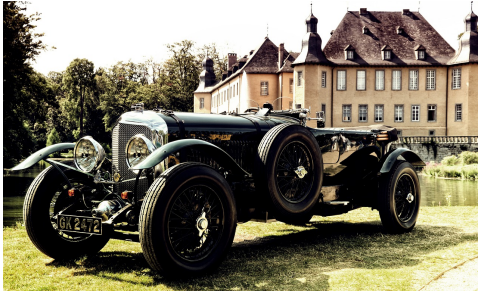


Figure: The internal combustion engine gave rise to reliable individual transport — image by S. Hermann & F. Richter from pixabay.com. Electricity and Magnetism provided lightbulbs, radio, and all kinds of powered appliances — image by PublicDomainPictures from pixabay.com

The Internal Combustion Engine, Electricity & Magnetism

Key Dates

Prelude

- ♦ 1805: Humphry Davy invents the “carbon arc” lamp
- ♦ 1832: William Sturgeon the first DC electric motor
- ♦ 1885: Karl Benz the first practical gasoline-powered automobile

Spark

1908: Henry Ford introduces the Model T, initiating the age of affordable mass motorization and assembly-line manufacturing.

Growth

Widespread electrification and mastery of electromagnetism drive rapid automation, transforming operations both at home and in the factory.

Exhaust

The “Wall Street Crash of 1929” triggers the global “Great Depression,” setting off socioeconomic instability that ultimately culminates in WWII.

Cycles of Capitalism

Automobiles and the Petro-Chemical Industry

Automobiles and the Petro-Chemical Industry

Fuelled exponential economic growth



Figure: The petro-chemical industry — image by Frauke Feind from pixabay.com

Automobiles and the Petro-Chemical Industry

Key Dates

Prelude

- ♦ 1600 BCE: Mesoamericans use natural rubber for artifacts
- ♦ 1850s: First modern oil wells and refineries (Łukasiewicz)
- ♦ 1856 & 1872: Inventions of man-made plastic and PVC

Spark

- ♦ 1933: Polyethylene discovered by ICI (Gibson and Fawcett)
- ♦ 1930s: Industrial manufacturing of Polystyrene and PVC

Growth

1940s–1950s: Post-war boom driven by PET (1941), Polypropylene, and Dow Chemical's polystyrene

Exhaust

The 1973–1974 Oil Shocks (OPEC oil crisis, brings an end to the era of cheap, unchecked petrochemical expansion)

Cycles of Capitalism

The Electronic Computer and the Internet

The Electronic Computer

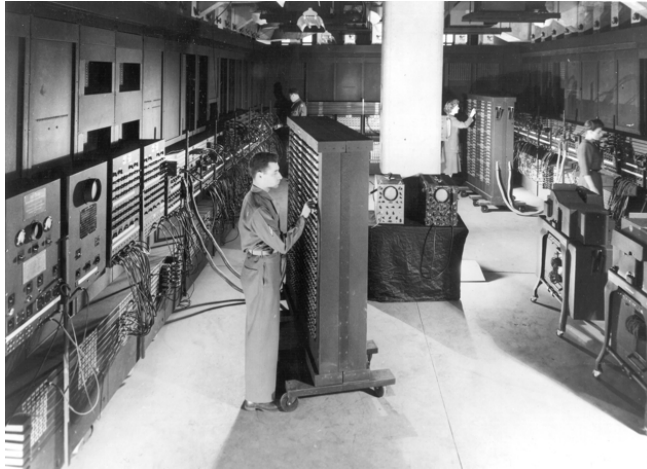


Figure: The ENIAC (Electronic Numerical Integrator and Computer) — image by Unidentified U.S. Army photographer - Public Domain

The Computer

Key Dates

Prelude

- ◆ 1843: Ada Lovelace writes the first machine algorithm for Babbage's Analytical Engine
- ◆ 1942–1946: digital computers such as ENIAC
- ◆ 1952–1953: IBM's commercial mainframes; first hard disk

Spark

- ◆ 1959: Atalla and Kahng invent the MOSFET transistor
- ◆ 1968–1977: ARPANET nodes open at UCLA

Growth

- ◆ 1973–1980: C language; Microsoft develops DOS
- ◆ 1989–1993: WWW at CERN; first smartphone (IBM)

Exhaust

Dot-Com Bubble of 2000, Global Meltdown of 2008.

Cycles of Capitalism

Artificial Intelligence

Artificial Intelligence



Figure: Artificial Intelligence is the next industrial wave.

Artificial Intelligence

Key Milestones

Prelude

- ◆ 1920: Karel Čapek introduces the word “robot”
- ◆ 1950: Alan Turing proposes the “Turing Test”
- ◆ 1956: The Dartmouth Workshop establishes AI as a research field
- ◆ 1966: first reasoning robot; ELIZA delivers early NLP
- ◆ 1997: IBM's Deep Blue defeats Garry Kasparov

Spark

- ◆ 2012: AlexNet wins ImageNet
- ◆ 2017: Google invents the Transformer architecture
- ◆ 2022: ChatGPT launches as the first mass-adopted LLM

Growth

- ◆ **TODAY:** exponential adoption
- ◆ **TOMORROW:** AGI, ASI, and the singularity

Exhaust

?

Modern Banks

Modern Banks

How banks operate

How banks operate



Figure: The role of banks

How banks operate

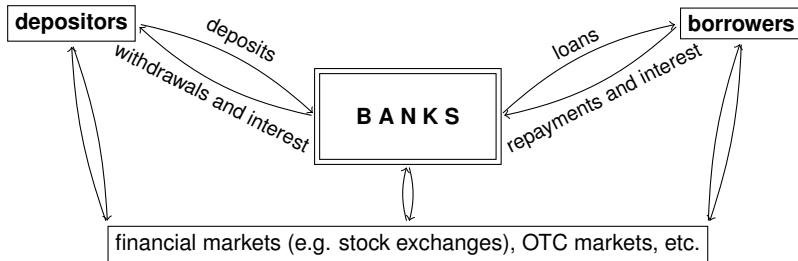


Figure: The role of banks

Modern Banks

Overview of Banking Institutions

Global Universal Banks

◆ What they do:

- Offer a full range of services worldwide: retail, commercial, and investment banking.

◆ Unique characteristics:

- Massive scale and global reach.
- Integrated financial service models.
- Significant systemic importance.

◆ Role in system:

- Facilitate international trade and capital flows.
- Serve multinational corporations and global clients.

Examples:

- ◆ HSBC (Global)
- ◆ BNP Paribas (France/Global)
- ◆ Deutsche Bank (Germany/Global)
- ◆ Santander (Spain/Global)

Commercial Banks

◆ What they do:

- Serve businesses and corporations.
- Business loans, treasury services.

◆ Unique characteristics:

- Focus on business cash flow and needs.
- Larger transaction sizes.

◆ Role: Fund business operations and growth.

Examples:

- ◆ Bank Pekao (Poland)
- ◆ ING Bank Śląski (Poland/Netherlands)
- ◆ Commerzbank (Germany)

Retail Banks

♦ What they do:

- Serve individual consumers.
- Basic accounts, savings, personal loans, mortgages.

♦ Unique characteristics:

- Extensive branch/ATM networks.
- High-volume, low-value transactions.

♦ Role: Main banking access for the public.

Examples:

- ♦ PKO BP (Poland)
- ♦ mBank (Poland)
- ♦ Barclays (UK)
- ♦ Société Générale (France)

Investment Banks

◆ What they do:

- Capital raising (IPOs, bonds).
- Mergers & Acquisitions (M&A) advice.
- Securities trading.

◆ Unique characteristics:

- Fee-based revenue model.
- Serve corporations, governments, institutions.

◆ Role: Facilitate complex financial transactions.

Examples:

- ◆ Goldman Sachs (USA/Global)
- ◆ Rothschild & Co (France/Global)
- ◆ Dom Maklerski PKO BP (Poland)

Central Banks

◆ What they do:

- Set monetary policy (interest rates).
- Supervise the banking system.
- Ensure financial stability.

◆ Unique characteristics:

- Sole authority to issue currency.
- Lender of last resort.
- Non-profit, public institution.

◆ Role: Macroeconomic management.

Examples:

- ◆ European Central Bank (Eurozone)
- ◆ Narodowy Bank Polski (Poland)
- ◆ Bundesbank (Germany)

Cooperative Banks

◆ What they do:

- Provide banking services to members.
- Often community or profession-focused.

◆ Unique characteristics:

- Customer-owned (member-owned).
- "One member, one vote" governance.

◆ Role: Support local communities and members.

Examples:

- ◆ Credit Agricole (France)
- ◆ DZ Bank (Germany)
- ◆ Spółdzielcza Kasa Oszczędnościowo-Kredytowa (SKOK) (Poland)

Credit Unions

◆ What they do:

- Provide retail banking to a member group (e.g., employees, residents).

◆ Unique characteristics:

- Not-for-profit, member-owned.
- Common bond requirement for membership.

◆ Role: Financial cooperation for a specific group.

Examples:

- ◆ Less common in Poland.
- ◆ Popular in North America.

Savings and Loan Associations

◆ What they do:

- Specialize in residential mortgages.
- Accept consumer deposits.

◆ Unique characteristics:

- Historical focus on home financing.
- Mutual ownership structure.

◆ Role: Promote home ownership.

Examples:

- ◆ Less distinct in Europe today.
- ◆ Many evolved into universal banks.
- ◆ (Historically prominent in the USA)

Islamic Banks

♦ What they do:

- Provide Sharia-compliant financial services.
- Use profit-sharing instead of interest.

♦ Unique characteristics:

- Prohibition of interest (riba).
- Asset-backed financing.

♦ Role: Serve Muslim populations ethically.

Examples:

- ♦ Kuveyt Türk (Turkey)
- ♦ Al Rayan Bank (UK)
- ♦ (Niche presence in Europe)

The size of banks is considerable

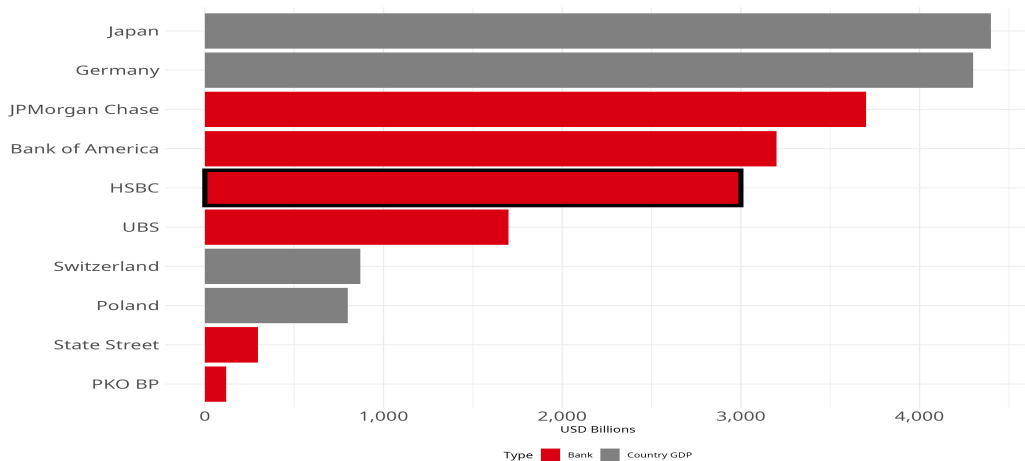


Figure: Balance Sheet of some banks compared to the GDP of some countries.

Conclusions

Conclusions

Key Insights from Historical Evolution to Modern Challenges

Historical Legacy Meets Digital Future

- ◆ Banking evolved from **temple repositories** to **global digital platforms**, yet core principles of trust and intermediation remain the same
- ◆ Banks were one of the enablers of each technological revolution (**steam, electricity, computing**) that gradually transformed banking's scale and scope
- ◆ Today's large banks operate at sizes similar to **national economies** - HSBC's balance sheet exceeds Poland's GDP
- ◆ **Banks are crucial to economies**

Nomenclature I

AGI	Artificial General Intelligence, page 41
AI	Artificial Intelligence, page 40, 41
ASI	Artificial Super Intelligence, page 41
BASF	Badische Anilin und Soda Fabrik, page 35
BCE	before common era, page 35
ENIAC	Electronic Numerical Integrator and Computer, page 37
GPU	graphics processing unit, page 41
LLM	large language model, page 41
MOSFET	metal–oxide–semiconductor field-effect transistor, page 38
NLP	natural language processing, page 41
PS	polystyrene, page 35
PVC	polyvinyl chloride, page 35
WWI	World War I, page 29

Thank you for your attention!



handouts



Philippe's business card