

A detailed Northern Renaissance painting by Marinus van Reymerswale, 1539. It depicts a money changer and his wife in a cluttered workshop. The man, on the left, wears a green robe and a large, ornate feathered hat. He is focused on counting coins on a green table. The woman, on the right, wears a red robe and a white headscarf with a red and blue band. She is looking down at an open book. The table is covered with various coins, a wooden abacus, and a small bag. In the background, there are shelves filled with papers, a candlestick, and a wooden wall.

Finance

CY Cergy-Paris University
Sébastien Laffitte

Presentations

- Me ...
 - Assistant Professor at CY Cergy University.
 - Research on corporate taxation and corporate tax avoidance.
 - Expect me to ask you questions.
 - Course website with slides, problem sets and past exams:
https://sebastien-laffitte.eu/teaching_intro.html
- You ...

What is this course about?

- Introduction to Finance
 - Introduction to the **technical** details of finance.
 - Finance is traditionally divided between the study of **Corporate Finance** and the study of **financial markets**.
 - Corporate Finance studies the financial decisions of firms.
 - Most of finance consists of valuing assets: that's what we will learn here.
 - Importantly, finance is also part of economic life: we'll keep an eye on real-world problems.

What is this course about?

- Introduction
- Objective of the Company and Net Present Value
- Analysis of Financial Statements
- Time value of money
- Investment strategies and investment selection
- Portfolio Theory
- Valuation

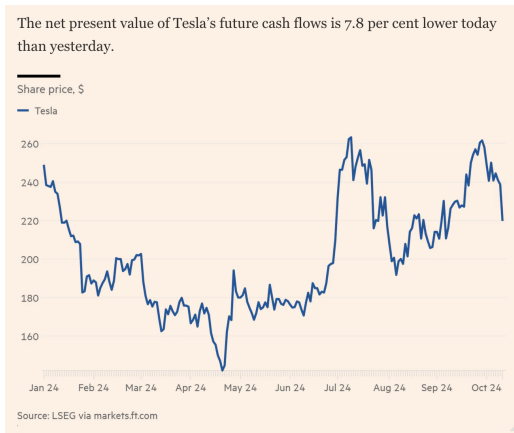
What is this course about?

- Anthropic is valuation might be around \$2tn
- What does it mean?
- How should the price be determined?



What is this course about?

- Tesla “net present value” falls by 7.8% in one day.
- What does it mean?
- Where does this variation comes from?



→ How to determine the value of an (financial) asset?

Course organization

- 8 classes of 3 hours.
- Grading.
 - Mid-term exam (October, 19th) (1/3)
 - Final Exam during last session (November, 23rd) (2/3)
 - Exercises in class (from -2 to +2 to the mid-term grade)
 - Homework consists of exercises.
 - You need to prepare them and participate in the in-class correction.
 - Additional exercises in class.

Any questions?

What is Finance?

- “The process of raising funds for any kind of expenditure.” (*Encyclopedia Britannica*)
- More importantly, it is a *system* that is part of the economy.
- The system brings together economic agents with excess funds (*e.g.* savings) and economic agents that need funds (*e.g.* to buy a house or launch a corporation).
- Generally households supply money and want to minimize risk and keep liquidity
- Firms and the state demand money for medium- to long-term investments.
- The problem of the financial system is to create institutions to deal with these different time horizons that intrinsically generate instability.
- The notion of **time** is central in finance.

The Fundamental Function of Finance

The Fundamental Function of Finance

Functions of financial markets

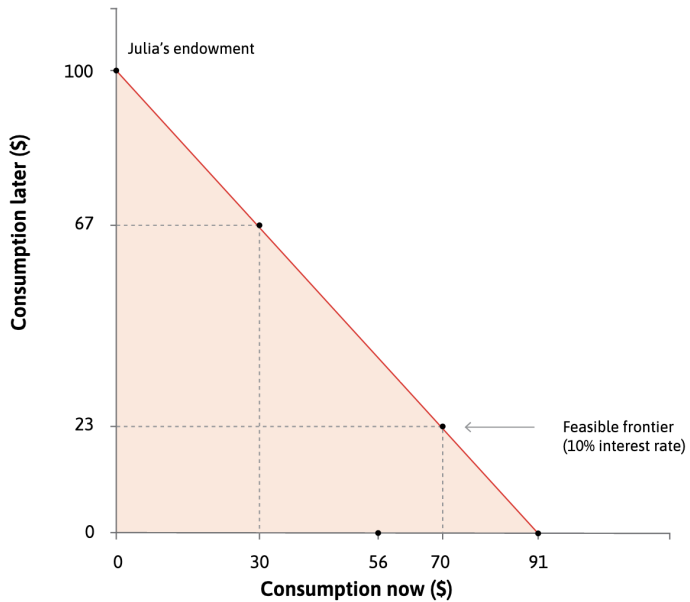
- (Efficient?) Allocation of scarce capital to projects.
- (Efficient?) Pricing and sharing of risks in the economy.
- **Consumption smoothing via saving and borrowing.**

The Fundamental Function of Finance

- What's the fundamental function of finance?
- Transforming today's euros into tomorrow's euros and vice versa.
- Don't forget that even if we study finance in isolation, finance is part of **a system**.
- The State defines, by its regulation, the rules of the game: how and under which conditions finance can operate.

The Fundamental Function of Finance

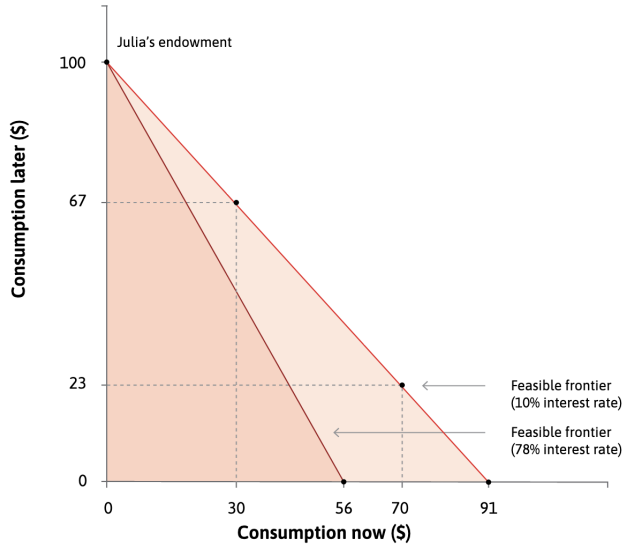
- Let's look at Julia's endowments.
- There are two periods: *now* ($t = 0$) and *later* ($t = 1$).
- She knows for sure that she will have wage income of 100 in period 1.
- The interest rate is 10%.
- What is the maximum she is able to borrow today?
- $x_{t+1} = x_t \times (1 + r) \iff x_t = \frac{x_{t+1}}{1+r}$
- $x_t = \frac{1}{1+r} 100 \approx 91$



The Fundamental Function of Finance

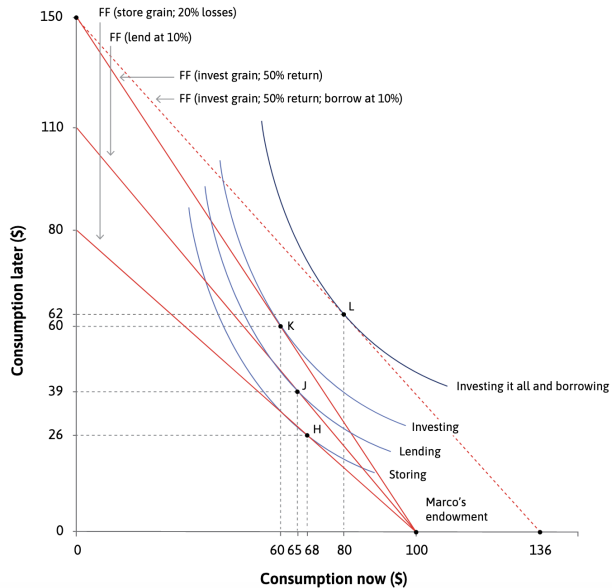
- How do you draw the feasible frontier?
- It works like in micro when a consumer allocates consumption between two goods.
- The maximum Julia can consume is 100 later or 91 now.
- Think about period 1. She has to allocate 100 between today's consumption and tomorrow's consumption.
- $R = x_{t+1} + (1 + r)x_t$.
- $x_{t+1} = R - (1 + r)x_t$
- $(1 + r)$ can be seen as the marginal rate of transformation of future consumption to present consumption.
 - I have to give up $(1+r)$ in consumption in the future to consume 1 now.

The Fundamental Function of Finance



The Fundamental Function of Finance

- Borrowing and lending allow someone to rearrange their capacity to buy goods now versus in the future.
- Consuming more now will constrain my consumption in the future.
- How to choose the optimal bundle?
- Look at preferences! Assume that:
 - Agents prefer to smooth consumption $\longrightarrow$ diminishing marginal returns to consumption.
 - Agents are impatient (they trade-off consumption today against more consumption tomorrow).



The Fundamental Function of Finance

- This conceptual exercise shows how finance can support investment and consumption smoothing by reallocating resources over time.
- The allocation of resources is much more complicated in practice.
- **Risk and uncertainty**, which are absent from this example, generate financial instability.

Four Principles of Finance

Four Principles of Finance

1. Investors prefer more to less.
2. Investors are risk-averse.
3. Investors prefer money today to money tomorrow.
4. Arbitrage opportunities do not persist.

Four Principles of Finance

Investors prefer more to less.

- Self-evident.
- Would you prefer to receive
 - 100 €
 - 200 €
 - Indifferent

Four Principles of Finance

Investors are risk-averse.

- Would you prefer to receive
 - 100 €
 - 200 € with 50% chance, 0 otherwise
 - Indifferent

Four Principles of Finance

Investors prefer money today to money tomorrow.

- Would you prefer to receive
 - 100 € today
 - 100 € in a year
 - Indifferent

→ The choice depends on individual preferences, expected inflation, and uncertainty about the future.

Four Principles of Finance

Arbitrage opportunities do not persist.

- Riskless profit opportunities attract trading and should not persist in competitive markets.

Stock	Rain	Shine
Parasol Co.	-10%	20%
Umbrella Co.	20%	-10%

- Each share costs 100, you have no cash, but you can borrow and lend at a 4% rate.
- Is it possible to make a profit for sure?
 - Borrow 200 and buy one share of each.
- Will this situation last?
 - Demand for credit will increase until the rate stabilizes at 5%

The Financial System

What is Finance?

The Financial Industry

- Nowadays finance is mostly indirect *i.e.* it goes through intermediaries that transform the maturity of money against a commission.
- Actors of the financial industry: **banks** (they create money), **institutional investors** (insurance companies, pension funds, asset management), **central banks**, **regulators**, *etc.*
- Institutional investors: Pool money to invest following defined objectives in terms of yield, risk, etc.

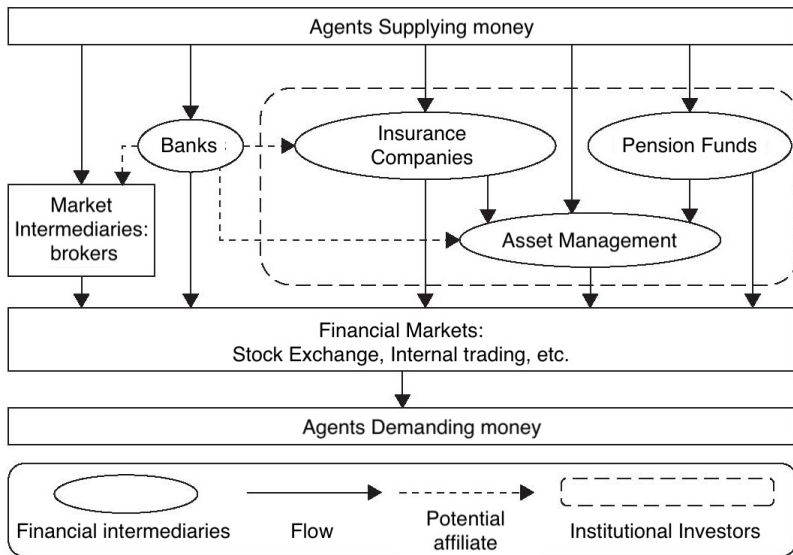
What is Finance?

The Financial Industry

- Everything is interconnected and banks have many of these activities.
 - The financial sector is concentrated, with many conglomerates.
 - Conglomerates might be *too big to fail*.
 - Knowing that they will be backed by central banks in case of trouble increases risk-taking by these actors (**moral hazard**).
 - Need for regulation: Basel Agreements.
- The financial system is intrinsically connected to the economic system.
 - Transmission of financial crises to the real economy.
 - Financial capitalism creates systemic actors.

What is Finance?

The Financial Industry



What is Finance?

The Financial Industry

	Total	Public Financial Institutions	Central Banks	Banks	Non-Bank Financial Corporations									
	10 ¹² \$	%	%	%	%									
					Total	Insurance Companies	Pension Funds	Investment Funds	Money market funds	Hedge funds	Real Estate Funds	Special Purpose Vehicles	Broker-dealers	Financial Auxiliaries
2002	116,2	10,0	4,3	47,9	37,8	13,2	11,4	4,9	2,8	0,0	0,2	2,1	2,9	0,4
2009	215,1	6,3	5,9	48,8	38,9	9,8	10,0	8,9	2,4	0,3	0,3	3,7	3,3	0,3
2019	362,4	5,0	8,4	42,9	43,7	10,0	10,9	14,0	1,9	1,5	0,7	1,5	2,8	0,4

What is Finance?

Finance and the State

- The development of finance is historically associated with public finance.
 - *e.g.* Paris Stock Exchange was created in 1724 to fund royal debt.
- In Europe, competition between relatively small countries and cities created a symbiosis between politicians' interests (demand for money) and merchants' interests (supply of money).
- This can be seen as the origin of European capitalism at the end of the 12th century.
- This is when banks developed, from Genoa to Venice and Florence.
- Private titles develop on European places from the 19th century.
- Nowadays Treasury Bonds are used by financial institutions for risk management as they provide (almost) risk-less investments.

What is Finance?

Financial Assets

- **Real assets**: used to produce goods and services.
 - Examples: land, natural resources, machinery, tools, human capital, software, etc.
- **Financial assets**: claims to the returns generated by real assets.
- **Derivatives**: claims on other financial assets (options, futures, interest rate swap, credit default swap, etc.).
 - “An option is a contract that gives the holder the right to buy or sell an underlying asset or financial instrument at a specified strike price on or before a specified date, depending on the form of the option.” (*source*: Wikipedia).
 - It allows investors to bet on a decrease in a stock price: buy an option to sell (*put*).
 - *e.g.* Exercise price = 100, premium = 10. When the price falls below 90, the owner of the option buys the stock at the current price (90) and sells it at the exercise price (100).

What is Finance?

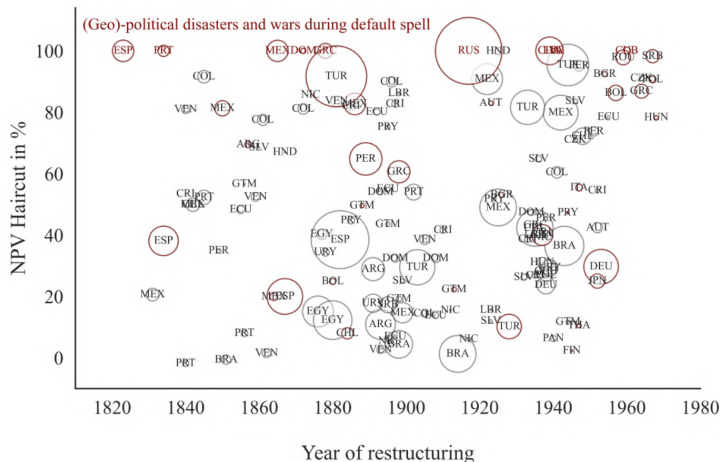
Types of Financial Assets

- Fixed Income Securities (*obligations*); treasury bonds, corporate bonds, mortgage-backed securities, Sovereign bonds, etc.
- Short-term Treasury securities are commonly used as a proxy for a nominal risk-free asset.
 - Default risk is generally treated as negligible for U.S. Treasuries.
 - Long-term Treasury bonds remain exposed to interest-rate and inflation risk.
 - Sovereign defaults and ‘haircuts’ also exist, *e.g.* the Stop of the Exchequer (UK, 1672), Russia in 1917, etc.
- Equity (*actions*): control rights over the firm.
 - Equity is a residual claim (paid after bondholders).
 - Dividends are uncertain and can happen far away (maturity is indefinite).

What is Finance?

Types of Financial Assets

Figure 13: 200 years of Sovereign haircuts (all restructurings with foreign private creditors)



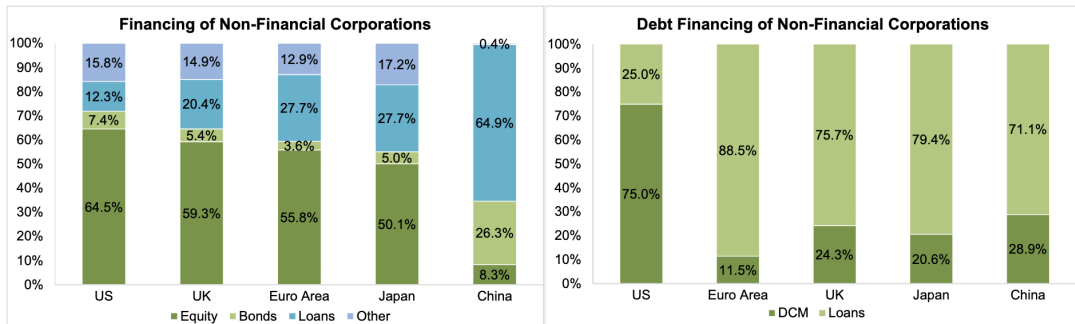
What is Finance?

The Financial Industry

- Different types of markets.
 - **Money markets:** where debt securities with maturity < 1 year are issued and traded. High liquidity, low return and low risk.
 - **Capital markets:** where debt instruments or securities with maturities > 1 year and corporate stocks or equity securities are issued and traded.
 - The initial offering of debt and equity securities takes place on the primary market. The issuer (a firm for instance) receives directly the proceeds from the sale.
 - Secondary markets are where debt and equity securities are traded between investors. The original issuer does not receive anything here.

What is Finance?

Types of Financial Assets: Financing of corporations

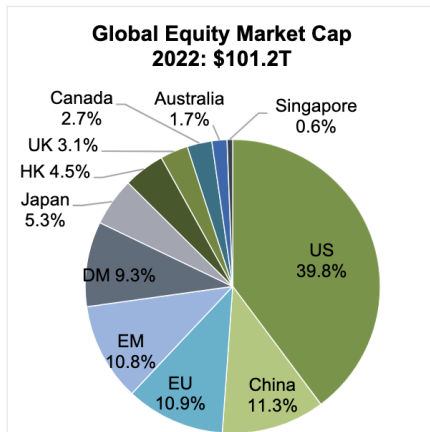


Source: OECD, Federal Reserve, ECB, Bank of Japan, National Bureau of Statistics of China, SIFMA estimates

Note: As of 2022, China 2020; Economic activity defined as financing of non-financial corporations. Euro Area = 19 EU-member states using the Euro. Other financing, ex-China = insurance reserves, trade credits and trade advances; other financing, China = bankers' acceptances, FDI, other foreign A/D, misc. and errors; DCM = debt capital markets, corporate bonds only

What is Finance?

Size of the equity market ($\approx$ World GDP)

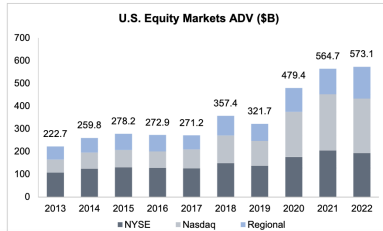
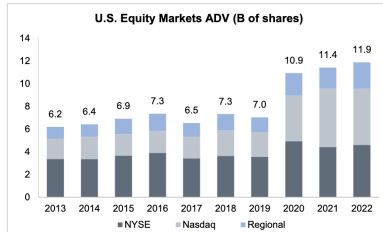


Source: World Federation of Exchanges, SIFMA estimates

What is Finance?

Types of Financial Assets

US Equity Markets Average Daily Trading Volume (ADV) – Charts



Source: Cboe Global Markets

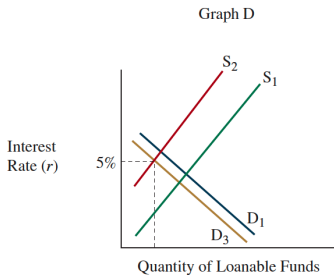
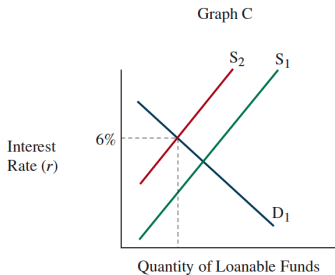
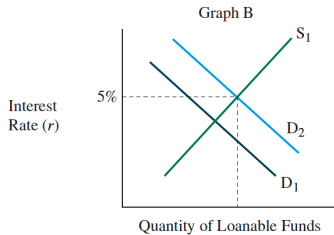
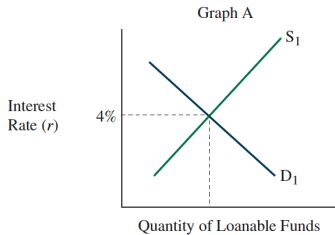
What is Finance?

Types of Financial Assets

- Interest rates are central in financial markets.
- They are the price of loanable funds in financial markets.
- How are they determined?
- At the price that equalizes supply and demand.

What is Finance?

Types of Financial Assets



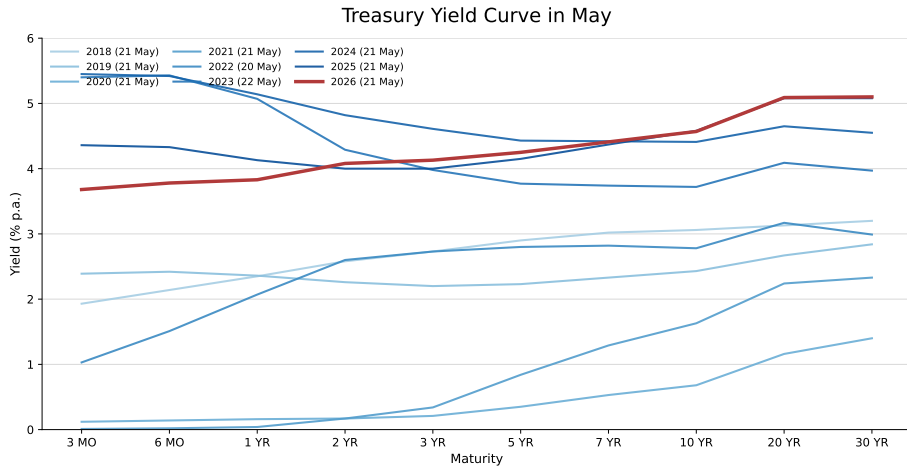
What is Finance?

Types of Financial Assets

- Interest rates are also affected by factors other than exogenous movements in supply and demand.
- They depend on inflation (if I expect inflation in the future, I'll ask for a higher rate), default risk (if the borrower is riskier, I'll ask for a higher rate to compensate for potential losses), *etc.*

What is Finance?

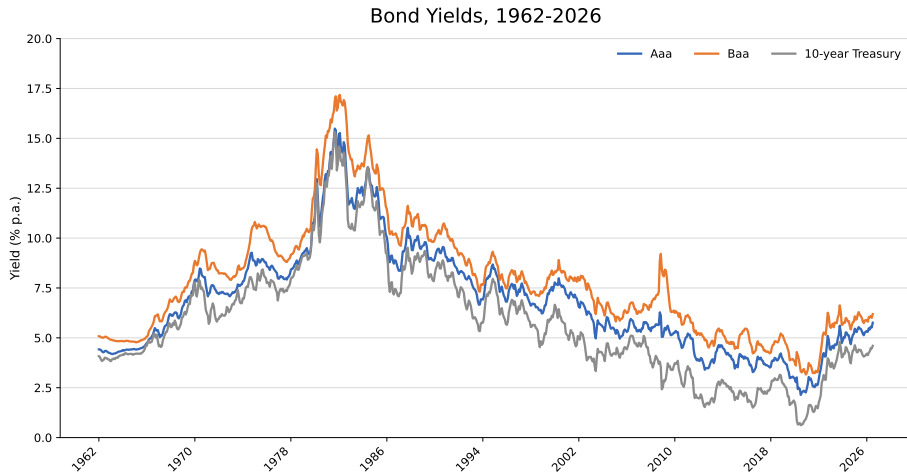
Types of Financial Assets



Source: Federal Reserve Board, H.15 Selected Interest Rates, via FRED. Closest complete observation to 21 May; percent per annum.

What is Finance?

Types of Financial Assets



Sources: Moody's (seasoned Aaa and Baa corporate bonds) and Federal Reserve Board H.15 (10-year Treasury), via FRED. Monthly, percent per annum; through July 2026.

The Financial System

Silicon Valley Bank

Silicon Valley Bank fails in largest bank collapse since 2008 crisis

US regulators seize SVB's assets after a run on the bank, as global institutions monitor situation closely

● [Why did Silicon Valley Bank fail?](#)

Kalyeena Makortoff
Banking correspondent,
Kari Paul *in Oakland, and*
agencies

Sat 11 Mar 2023 00:27 CET



The Financial System

Silicon Valley Bank

- 94% of deposits were uninsured at the end of 2022.
- Securities represented 55% of assets, compared with 25% for large-bank peers.
- 78% of securities were classified as held to maturity.
- The average duration of the held-to-maturity portfolio was 6.2 years.

Safe assets, fragile funding?

The Financial System

Silicon Valley Bank

- Interest rates increase → bond values fall.
 - When interest rate increase, it means that new bonds offer higher yields, old low-yield bonds must become cheaper, otherwise nobody would buy them.
- March 8, 2023: SVB announces a \$1.8 billion after-tax loss on a \$21 billion securities sale and plans an equity offering.
- March 9: Bank run → more than \$40 billion of deposits leave the bank.
- March 10: regulators close the bank.

Finance and financial crises

Anatomy of a crisis

- Key idea of Minsky: changes in the supply of credit are pro-cyclical.
 - Increases when the economy booms and conversely.
 - (check "Manias, Panics and Crashes: A History of Financial Crises", by Kindleberger for deeper insights)
- When the economy booms, investors become more optimistic, revise upward their estimates of profitability, and become more eager to borrow.
- At the same time lenders' risk assessment and risk awareness decline, making them more willing to make loans, loans they wouldn't have made in the past.
- Investors that increase their indebtedness to buy real estate, stocks or commodities to make short-term profits (assuming that their financial gains will exceed the interests) become distressed when the economy slows and are willing to massively sell.

Anatomy of a crisis

Financing positions

- **Hedge finance:** expected cash flows cover interest and principal.
- **Speculative finance:** expected cash flows cover interest, but the principal must be refinanced.
- **Ponzi finance:** expected cash flows do not cover all interest and principal; payments require further borrowing or asset sales.
 - Here, *Ponzi* describes a fragile financing position, not necessarily fraud.
- During a boom, financing positions can progressively move from hedge toward speculative and Ponzi finance.

Anatomy of a crisis

- It begins with a positive exogenous shock that generates optimism.
 - U.S.A, 20': Boom of the automobile industry, massive electrification of the country, and the equipment of households in phones.
 - Japan, 80': Financial liberalization and the excess of money coming back to Japan.
 - U.S.A. 90': Revolution in information technology and the great decrease in communication costs.
 - Early 00': Financial innovation of securitization (packaging of mortgages with similar attributes into bundles that provided the basis for issuing collateralized debt obligations.
 - Nowadays (?): AI boom

Anatomy of a crisis

Amplification

One possible amplification mechanism:



- Financial distress affects investment, consumption, housing, employment, public finances, and the distribution of losses.
- Finance is not separate from the economy or from society.

Financing the transition

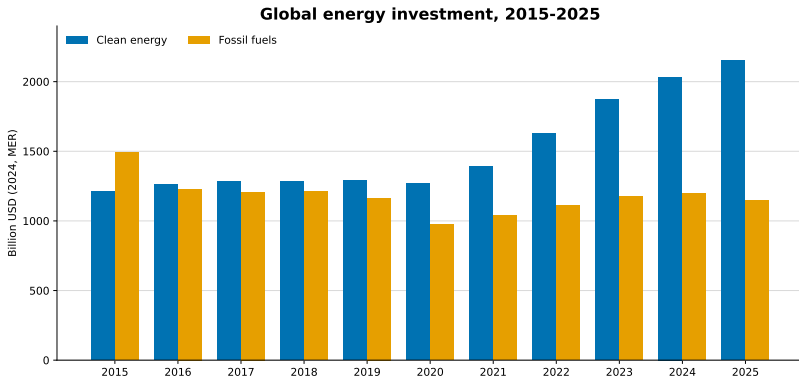
Financing the transition

Finance and social goals

- Collective goals include climate mitigation, adaptation, energy security, and a just transition.
- These goals are defined through social and political choices, not by financial markets alone.
- Finance influences which projects receive funding, when they are built, and who bears their risks and costs.
- Green and transition finance can support public policy; they cannot replace it.
- Climate change also creates physical risks (climate damages) and transition risks (policy, technology, and market changes).

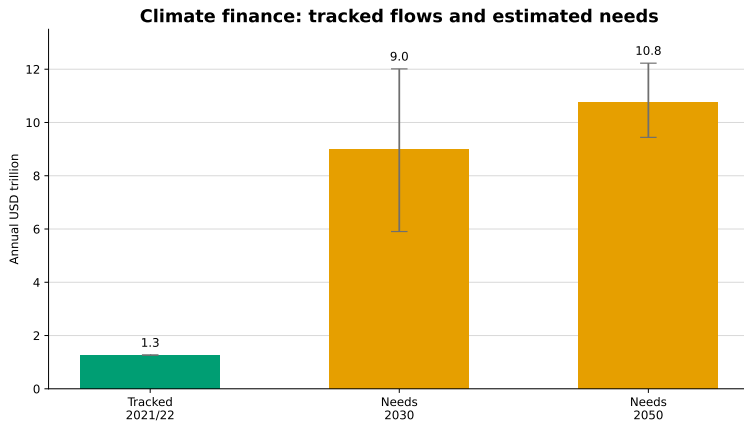
The future of finance

Investment



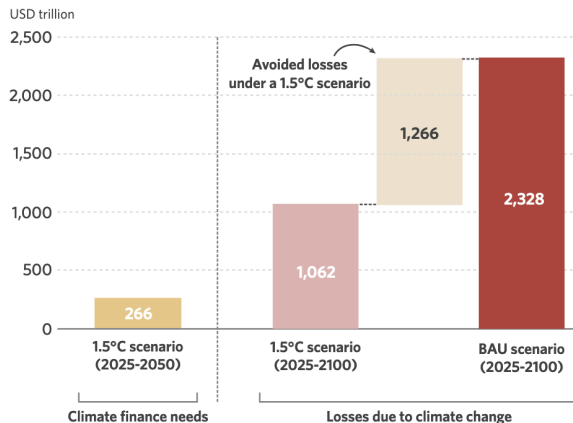
Does this pattern of energy investment imply that the transition is on track?

The future of Finance



The future of Finance

Figure ES4: Cumulative climate finance needs vs. losses under 1.5°C and BAU scenarios



Source: CPI analysis and NGFS (2022).

The future of Finance

- Investment generally flows where the return are higher (for a given level of risk is better).
- McKinsey (2020): almost half of the necessary investment will not meet standard investment criteria.
- Introducing carbon pricing can make green investment profitable.
- Public investment planning can also be part of the solution.

The future of finance

Private and social returns

Private value	Social value
Benefits to the investor – Costs to the investor	Private value + External benefits – External costs

Private value	–5
External climate benefit	+12
Social value	+7

- A socially valuable project is not necessarily privately profitable.
- Policy can change private costs, revenues, and risks.

The future of finance

Green finance

- Carbon pricing and regulation can change relative expected returns.
- Public investment and guarantees can share risks between private investors and the public sector.
- Classification systems (taxonomies), disclosure, green bonds, and transition finance can help direct capital.
- Limits remain: greenwashing, uncertainty, assets that lose value during the transition, and conflicts over who bears the costs.

How can finance serve collective objectives without pretending that markets choose them?

Next sessions

- Time value of money.
- Corporate finance.
 - What is the objective of companies?
 - How to choose and finance investments?
- Portfolio theory: the trade-off between risk and return.