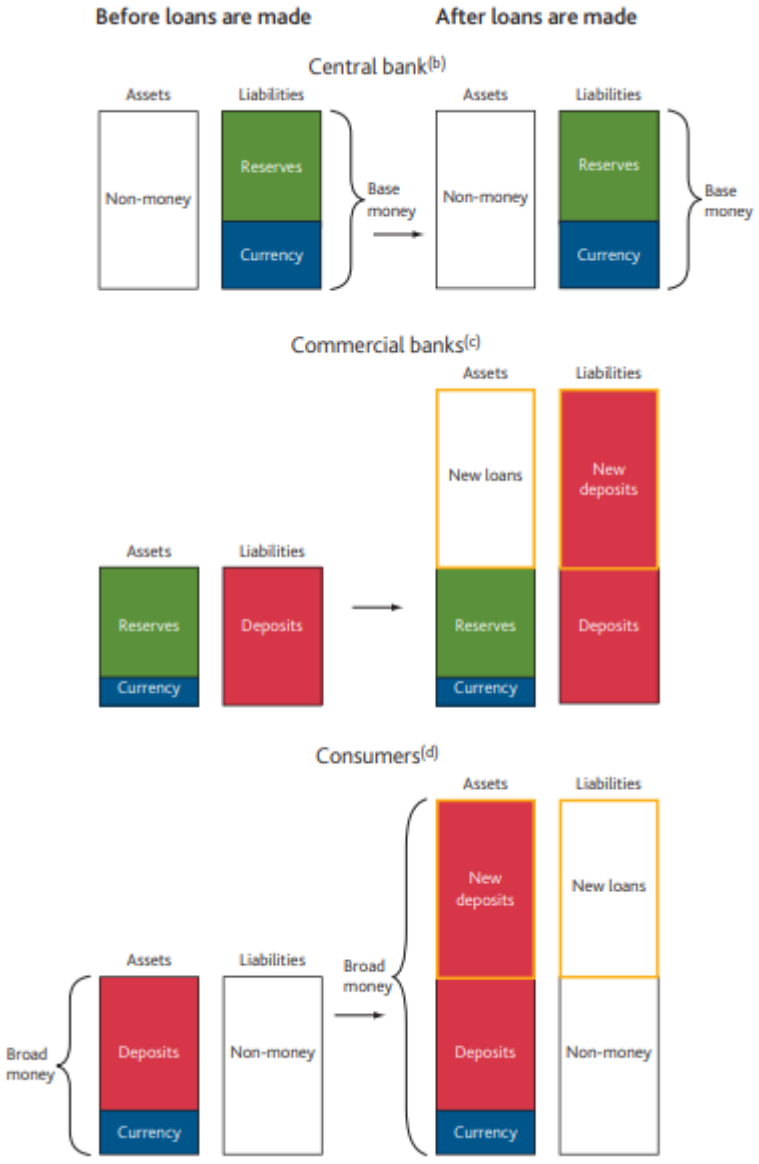
Where does money come from in an economy?

- Majority of money is created by commercial banks making loans
  - When a loan is made, it creates a matching deposit in the borrower's bank account and thus creating new money



- Note that reserves are supplied "on demand" by the central bank to commercial banks in exchange for other assets on their balance sheets
  - The aggregate quantity of reserves does not directly constrain the amount of bank lending or deposit creation
- In addition, reserves can only be lent between banks
- Note that, the bank deposits are how much bank owe its customers, so they are liability instead of asset.

- On the other hand, the money creation is limited
  - Banks are limited in how much they can lend
    - If they are to remain profitable in a competitive banking system
      - If the cost charged for loans, no one wants to borrow
      - If the bank wants to make an additional loan, they may need to lower the rate which in turn lower their profitability
    - Banks also need to take steps to mitigate the risks associated with making additional loans
      - If lots of loans are made, banks may not have enough money to pay the depositors – liquidity risk
      - Borrowers may default – credit risk
    - Regulations act as constraint on banks' activities
  - Counterparties who received the new money may take actions to "destroy" the money by repaying the debt for instance
    - When they repay, banks write off the debt by taking from their personal deposits, which destroy the newly created money
  - Monetary policy is the ultimate limit on money creation
    - It implements monetary policy by setting the interest rate on central bank reserves. This influences a range of interest rates in the economy, including those on bank loans
    - If interest rates are low, money creation and spending in the economy is too low for the monetary policy objective, central bank can use "quantitative easing" (QE) through purchasing assets, mainly from non-bank financial companies
      - It increases amount of bank deposits those companies hold
      - Those companies wish to rebalance their portfolios of assets by buying higher-yielding assets
      - It raises price of those assets and stimulate spending in the economy
      - Central bank creates new reserves which cannot be multiplied into more loans and deposits

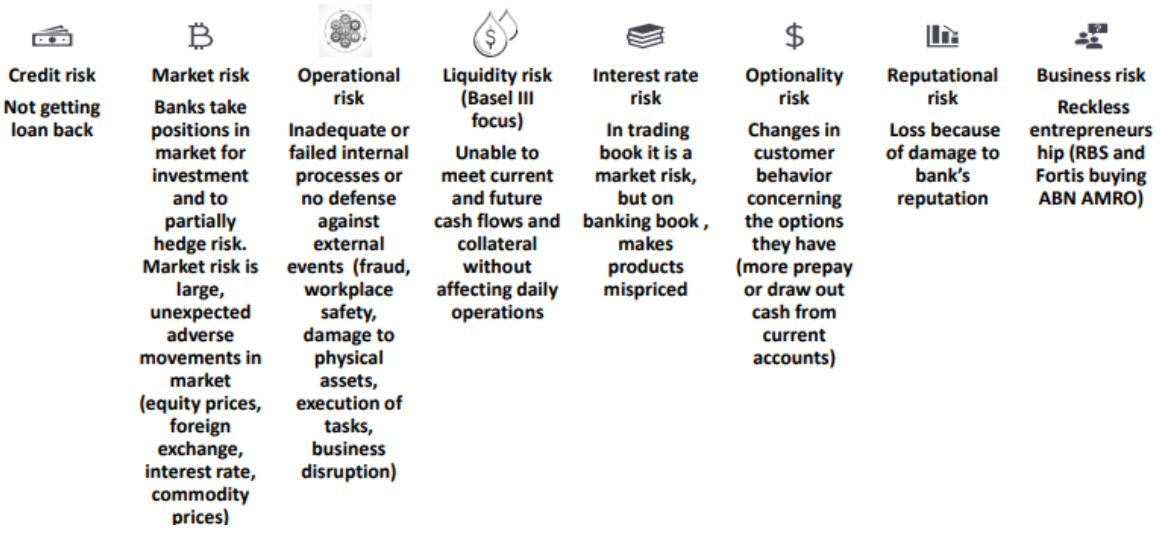
Banking regulation

- The need for banking regulation
  - Banks behave with cycle
    - When economy is growing, demand for money is high → inflation
    - Then a downturn → deflation → demand for money is low → small amount of money to recover crisis
    - If banks behave with cycle, there would be hyperinflation
  - Banking regulation can control, manage, and give ceiling to the amount that banks could create
    - Banks will try to behave countercyclical
    - Inject more money during crisis

- Trade-off for capital requirement
  - Plus-side: reduce risk taking behavior by 5.3% per extra point of capital

- Down-side: reduce availability of loans by 4.3% per extra point of regulatory capital

Types of banking risks



- Banks need to save money to cover the expected value of
  - Credit risk
  - Market risk
  - Operational risk
  - Liquidity risk
  - Interest rate risk
- Banks need to have the stocks or increase their capital to be able to respond to the sudden flows

Credit Risk

- If a bank goes bankrupt, if there is some government guarantee program, depositors could cover some of their losses. But the rest of their deposit, if any, is gone
  - So there is the fact that they are too big to fail
- Global economy is heavily exposed to the risk of financial institutions which should raise concern
  - 30,000 obligators have $16.5 trillion in liabilities (20% of the global monetary amount)
    - From money creation and destruction

Economic Capital

- Capital is what you own that could be used to cover unexpected serious events
  - E.g. company, buildings

- Economic capital
  - It is the amount of money that are available or have in the total value to deal with the unexpected realistic risk, so that business can stay solvent
  - E.g. have investments that can be sold in the event of a crisis

- Example of looking at the 10% extreme loss as a criteria to determine whether to invest or not

Invest £10 in A: sure profit of £3

Invest £10 in B: 0.5 chance make £20; 0.5 chance lose £10

Expected profit calculation: E(A)= 3; e(B)=0.5(20)+0.5(-10)= 5: Choose B

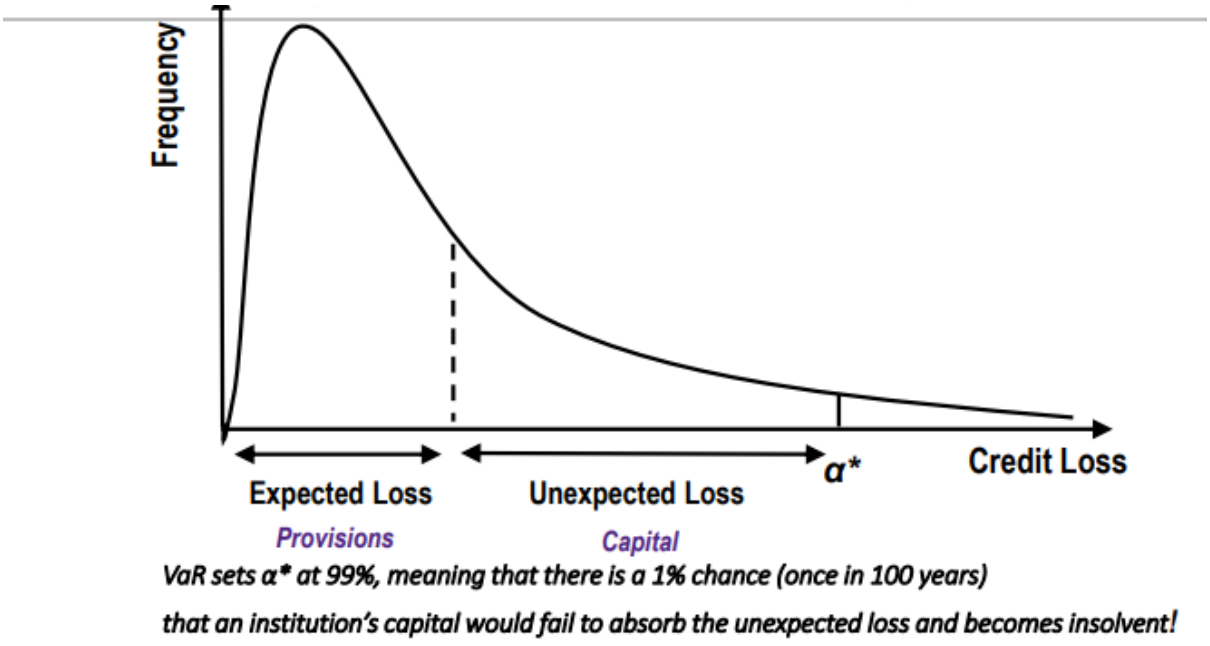
With economic capital added and 10 such investments

Invest in A: sure profit of 10x£3+ no uncertainty= £30

Invest in B: cover extreme loss of 10x(-10)=100: Expected profit 10x(£5)=£50. So return is £50-100=-50 (too pessimistic)

Invest in B: economic capital at 99%. So 9 or 10 investments bad ((1+9)(0.50)10 approx. 0.1. Economic capital (9(-10)+(20)=-70

So Return is £50-£70= -£20 (So choose A)



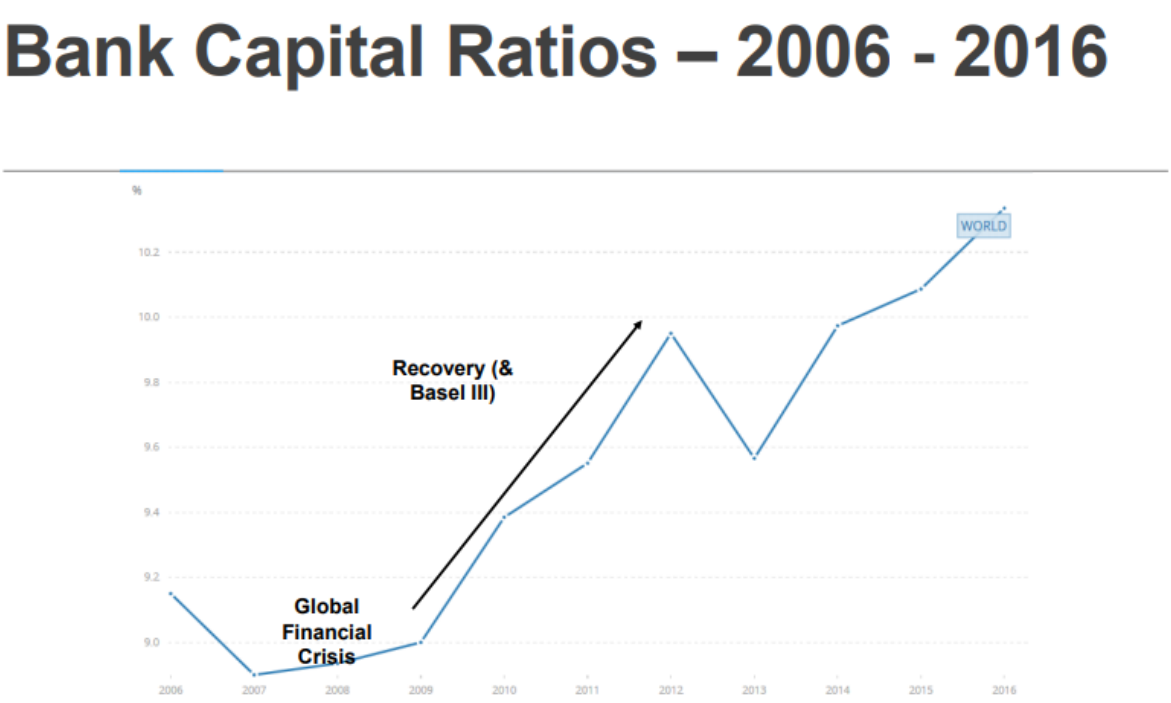
- Note that if the company sees 1 in 100-year event and failed to absorb the loss
  - It goes bankrupt

- Note that the calculation of economic capital depends on the risk tolerance, and the calculation of economic capital determines investments and business directions
  - E.g. HSBC London determined that their business in America is too expensive, and they were below the risk that they were willing to take, so they closed their business in America and some

Europe, opened business in Asia.

- ✧ Now, they think that they have $40 billion extra in the economic capital so that they opened business in Africa and Asia
- ➢ Thus, economic capital is very important to decide where and how to invest your funds. Determines how business grow

- Suppose that we have $100 billion in economic capital and $90 billion in total liability
  - ➢ We could invest $10 billion in bonds
  - ➢ This could affect my credit quality
- Banks often compare economic capital requirements with available capital to gauge whether the degree of leverage is appropriate for the amount of risk undertaken and the institution's desired credit quality
  - ➢ Leverage = debt / assets: high means most of its assets funded by debt not equity
  - ➢ Credit quality: default risk of its bonds in marketplace
  - ➢ Comparison often provided to regulators, rating agencies, and investors



Regulatory Capital

- It is the capital that the government thinks that you should have
- Consider a simple balance sheet

ASSETS (millions of dollars)

Cash	26.9
Short term instruments	
Fed funds sold	4.9
Other interest bearing instruments	0.2
Investment securities	
Treasuries	36.7
Government-sponsored agencies	102.1
Loans	
Commercial loans	86.5
Consumer loans	82.1
Residential mortgages	53.8
Other loans	23.2
General provisions for bad debts	-3.4
Premises and fixed assets	13.5
Other real estate owned	9.7
Goodwill & other intangibles	4.3
All other assets	5.2

LIABILITIES

Demand deposits	61.7
Interest bearing deposits	327.2
Borrowed funds	9.2
Long term subordinated debt	4.6

EQUITY CAPITAL

Common stock	18.6
Preferred stock	8.0
Retained earnings	12.2
Asset revaluation reserve	4.2

- Note that the majority of assets in a bank is the loans they give
  - Residential loans are usually long term
  - Commercial loans are varied, could be long or short term
- Note that "provisions" are negative assets because you expect to lose them

- The things on the right, what should be considered by the government to be used to cover unexpected losses (what should the bank keep?)
  - Liabilities CANNOT be used because it is what the bank owes to other people
  - So only the equity capital can be used
  - Which one is of higher quality? Common stock or preferred stock
    - Preferred stocks are not marketable, so common stock should have higher quality
    - Common stock is where the owners will dilute their property to get capital from other people
      - When more stocks are made, it dilutes the ownership of old stocks; on the bet that the market will value us more than what we are today
      - If the market doesn't, the price will sink, and we lost ownership
      - So we don't want to create common stock
      - But it brings investors and increase oversight, regulators like this
  - Is retained earning count as high quality capital?
    - Yes, because it is the money that I can choose not to pay and cover losses
    - It is liquid capital

Capital tiers of regulatory capital

Shareholder equity

Tier 1: core capital

- Permanent shareholders equity
- Disclosed reserves (retained earnings)
- Minority interests in consolidated subsidiaries

Tier 2: Supplementary capital

- Undisclosed reserves
- Asset revaluation reserves
- General provisions/loan loss reserves
- Subordinated long term debt
- Investment in financial subsidiaries

Tier 3: (for market risk) – short term subordinated debt

What percentage of capital has to be of each type

Basel II

- Common equity 25%
- Tier 1 50%

Basel III (of original capital – extra 5/8 is added which is Tier 1)

- Common equity 56%
- Tier 1 75%
- No Tier 3 allowed

- Note that subordinated long term debt are not secured and only need to be paid way in the future
- Note that investment in financial subsidiaries will have a high correlation with what you are, so it is low quality capital

- Note that regulatory capital determination is different from how bank would determine the economic capital
  - A bank will run the economic capital on the left side (assets)
  - Government only considers equity reserves; it is a lot more strict

Example of Regulatory Capital Calculation

First Bank of Solvencia
Regulatory Capital: Tier 1= $26.5 m

Tier 1 does not include Goodwill and other intangibles, which adds value of the equity of the company in the balance sheet, so we need to discount it.

The T1 capital is 18.6 + 12.2 – 4.3 = 26.5m

ASSETS

Cash	26.9
Short term instruments	
Fed funds sold	4.9
Other interest bearing instruments	0.2
Investment securities	
Treasuries	36.7
Government-sponsored agencies	102.1
Loans	
Commercial loans	86.5
Consumer loans	82.1
Residential mortgages	53.8
Other loans	23.2
General provisions for bad debts	-3.4
Premises and fixed assets	13.5
Other real estate owned	9.7
- **Goodwill & other intangibles**	4.3
All other assets	5.2

LIABILITIES

Demand deposits	61.7
Interest bearing deposits	327.2
Borrowed funds	9.2
Long term subordinated debt	4.6

EQUITY CAPITAL

+ Common stock	18.6
Preferred stock	8.0
+ Retained earnings	12.2
Asset revaluation reserve	4.2

TOTAL ASSETS	445.8	TOTAL LIABILITIES & CAPITAL	**445.8**

- Note that common stock includes goodwill but regulatory capital does not.

First Bank of Slovencia
Regulatory Capital: Tier 2 = **$20.2 mil**

ASSETS

Cash	26.9
Short term instruments	
Fed funds sold	4.9
Other interest bearing instruments	0.2
Investment securities	
Treasuries	36.7
Government-sponsored agencies	102.1
Loans	
Commercial loans	86.5
Consumer loans	82.1
Residential mortgages	53.8
Other loans	23.2
+ **General provisions for bad debts**	-3.4
Premises and fixed assets	13.5
Other real estate owned	9.7
- **Goodwill & other intangibles**	4.3
All other assets	5.2

LIABILITIES

Demand deposits	61.7
Interest bearing deposits	327.2
Borrowed funds	9.2
+ **Long term subordinated debt**	4.6

EQUITY CAPITAL

+ Common stock	18.6
+ Preferred stock	8.0
+ Retained earnings	12.2
+ Asset revaluation reserve	4.2

- Banks have very few equity compares to their asset because most of the assets are loans
  - ➢ Government realizes that, and is very restrictive on that

The three types of capitals

- Actual capital is the physical capital which is defined within the balance sheet including equity, long-term debt and hybrids
  - So everything that is yours and you don't need to pay right away

- In general, the economic capital will be the highest amount
  - It puts a value on everything
- Actual capital would normally be smaller than regulatory capital

- For normal people, "capital" would mean the actual capital
- When a banker use "capital", it could mean regulatory or economic capital, or even actual capital

Usage of capital

- The capital can be used for
  - Strategic planning and capital budgeting
  - Measure portfolio risk and the risk-adjusted performance of business lines
    - E.g. compare the expected capital return to actual capital return