# Banking Regulation in Theory and Practice (1)

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# Outline

# Disclaimer

*(If they care about what I say,) the views expressed in this manuscript are those of the author's and should not be attributed to Norges Bank.*

# Prelude

*"Now it is true that banks are very unpopular at the moment, but this (banking regulation) seems very much like a case of robbing Peter to pay Paul." (The Economist, 20th July, 2011)*

# Why regulation?

Banking, as other industries, needs regulation on issues where free market cannot discipline itself, to

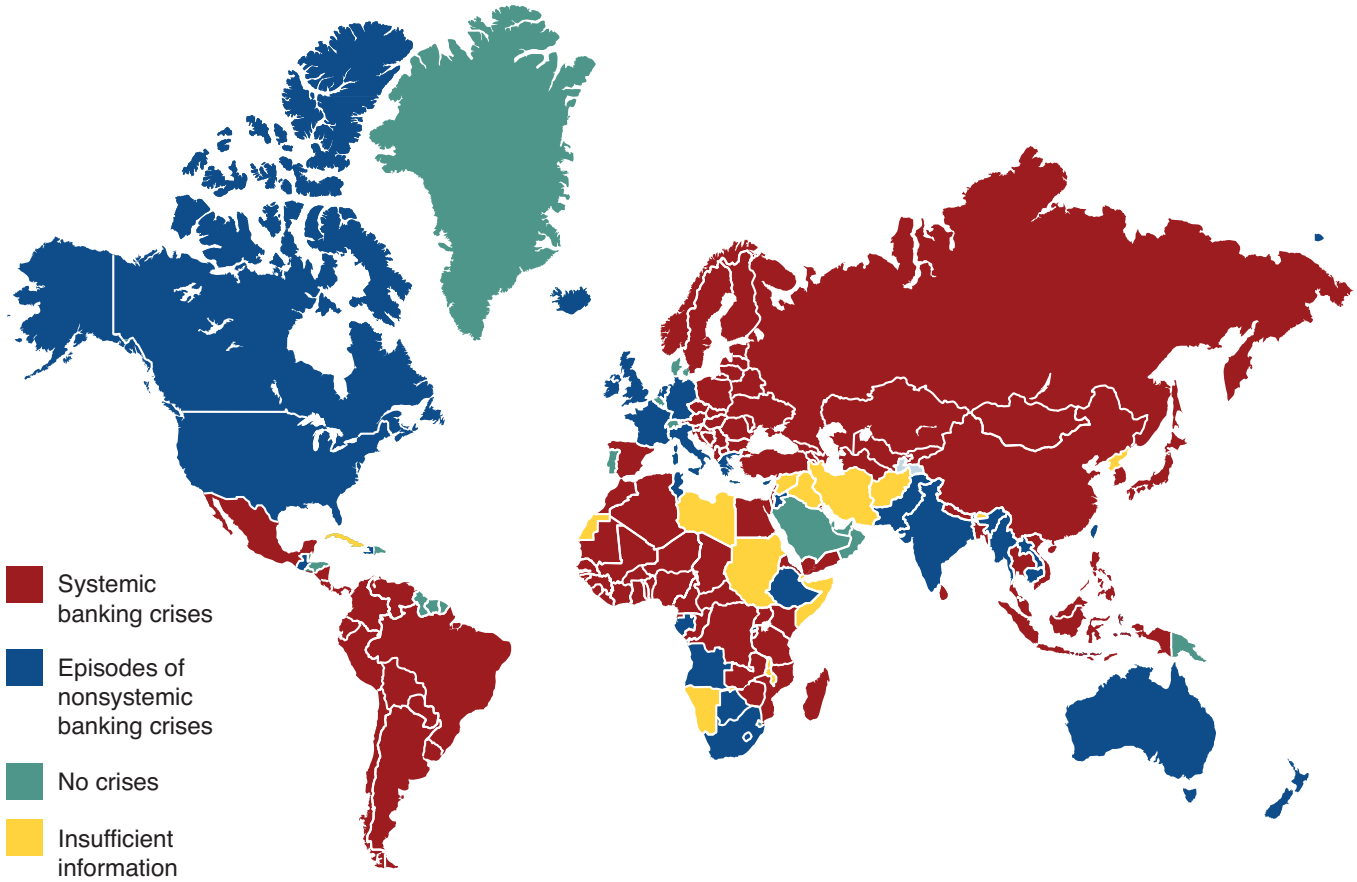
- Create and enforce *rules of the game*;
- Restrict *market power* and keep market competitive;
- Correct *externalities* or other *market failures* due to moral hazard and adverse selection;
- Protect the interests of *taxpayers*.

# What make banking regulation special?

Banking regulation is special, compared with others like telecommunications

- Focuses more on "*safety*" and less on "*price*";
- *Taxpayer* protection, rather than consumer protection, is more important motivation and benchmark in regulatory design;
- The outcome is a crucial *public good*: *financial stability*;
- It prevents the spillover to the real economy through *macro-finance linkages*, such as "*financial accelerator*".

# Banking crises since 1970



# Cost of bank bailout since 1980

| Country | Date | Cost as Percentage of GDP |
|---|---|---|
| | **1980–2007** | |
| Indonesia | 1997–2001 | 57 |
| Argentina | 1980–1982 | 55 |
| Thailand | 1997–2000 | 44 |
| Chile | 1981–1985 | 43 |
| Turkey | 2000–2001 | 32 |
| South Korea | 1997–1998 | 31 |
| Israel | 1977 | 30 |
| Ecuador | 1998–2002 | 22 |
| Mexico | 1994–1996 | 19 |
| China | 1998 | 18 |
| Malaysia | 1997–1999 | 16 |
| Philippines | 1997–2001 | 13 |
| Brazil | 1994–1998 | 13 |
| Finland | 1991–1995 | 13 |
| Argentina | 2001–2003 | 10 |
| Jordan | 1989–1991 | 10 |
| Hungary | 1991–1995 | 10 |
| Czech Republic | 1996–2000 | 7 |
| Sweden | 1991–1995 | 4 |
| United States | 1988 | 4 |
| Norway | 1991–1993 | 3 |
| | **2007–2009** | |
| Iceland | 2007–2009 | 13 |
| Ireland | 2007–2009 | 8 |
| Luxembourg | 2007–2009 | 8 |
| Netherlands | 2007–2009 | 7 |
| Belgium | 2007–2009 | 5 |
| United Kingdom | 2007–2009 | 5 |
| United States | 2007–2009 | 4 |
| Germany | 2007–2009 | 1 |

# Banking regulation: basic principles

- Banking regulation should be based on sound foundations
  - To address *well articulated problems*;
  - Using instruments working through well understood *mechanisms*;
- Banking regulation should target on *excessive* risk-taking while maintaining optimal *risk-sharing*;
- Regulatory policies should be *efficient*, or *incentive compatible*;
- Regulatory policies should be waterproof for *regulatory arbitrage*.

# Financial crises and evolution of banking regulation

- Financial crisis is the most important driving force of banking regulation. The first greatest output was to create central banks worldwide;
- The second greatest output is to create global standards for banking regulation, namely, **Basel Accord** since 1988
  - **Basel I** (1988): on *credit risks* and *risk-weight* of assets;
  - **Basel II** (2004): more refinements, but failed miserably in the crisis
    - **I**nternal **R**ating-**B**ased (IRB) approach – opportunities to *arbitrage*;
    - Generates more volatilities through *procyclical* rules;
  - **Basel III** (2011) and **Basel IV** (?)

# Reconstructing banking regulation

- Banking regulation needs to address **systemic risk**,
  - The risk or probability of breakdowns in an *entire* system, as opposed to breakdowns in individual parts;
  - Evidenced by *comovements* (*correlation*) among most or all the parts;
- Banking regulation needs to be **macroprudential** instead of microprudential, mitigating *systemic* risks instead of idiosyncratic risks;
- Banking regulation needs to be **countercyclical** instead of procyclical
  - Building up buffers and cushions in the boom in order to
  - Absorb shocks and losses in the bust.

# Systemic risks: the root of evils

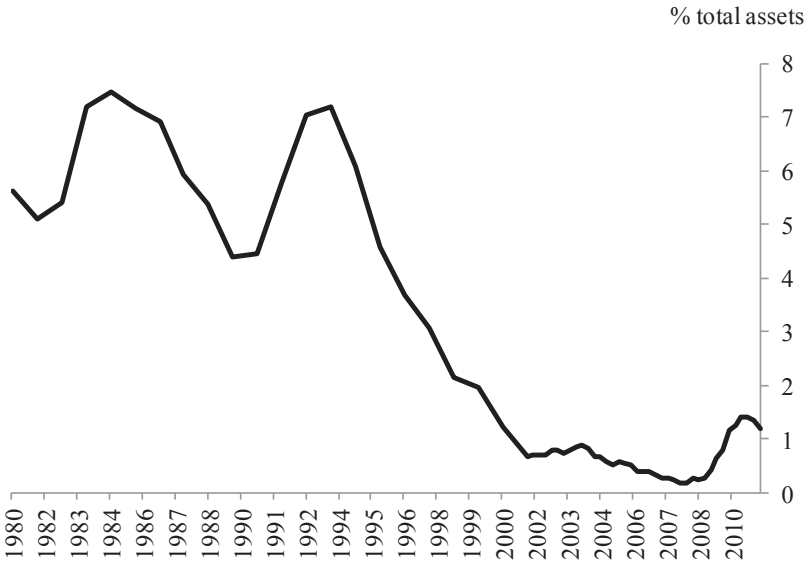
- *Principal-agent problems* and *limited liability* that encourage banks to take excessive risks, e.g., biased incentives from OPM (**O**ther **P**eople's **M**oney) instead of MOM (**M**y **O**wn **M**oney);
- *Externalities* that lead to inferior allocation of resources and risks
  - **Positive** externalities – taking the full cost while generating benefit to others – reduce necessary buffers in banking system, e.g., liquid assets holdings;
  - **Negative** externalities – taking the full benefit while cost partially borned by others – lead to excess risk-taking, e.g., interbank borrowing.

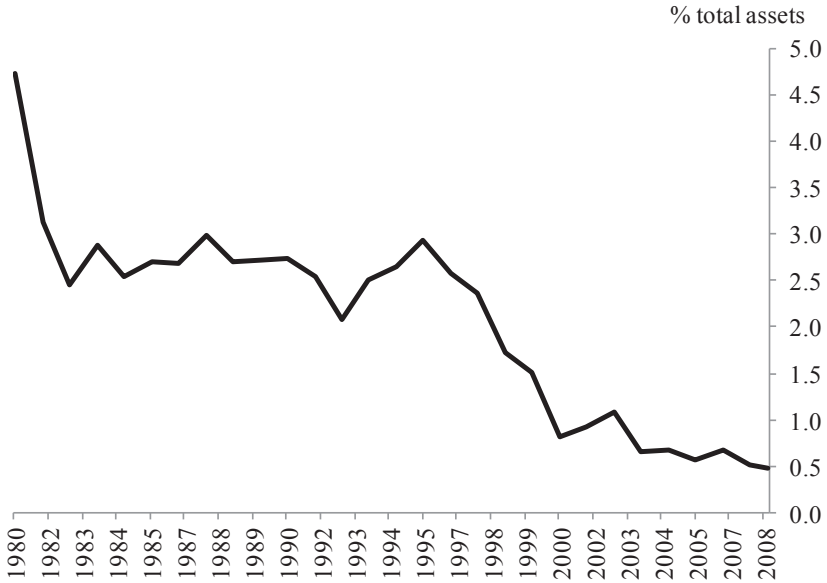
# Example: systemic liquidity shortages

- Banks need to hold some *liquid assets* – assets that can be easily converted to cash – in order to cushion demand shocks from depositors
  - There's *opportunity cost* in holding liquid assets, while
  - It benefits stressed banks through interbank lending;
- *Positive externality* $\rightarrow$ *systemic liquidity shortage* among banks.

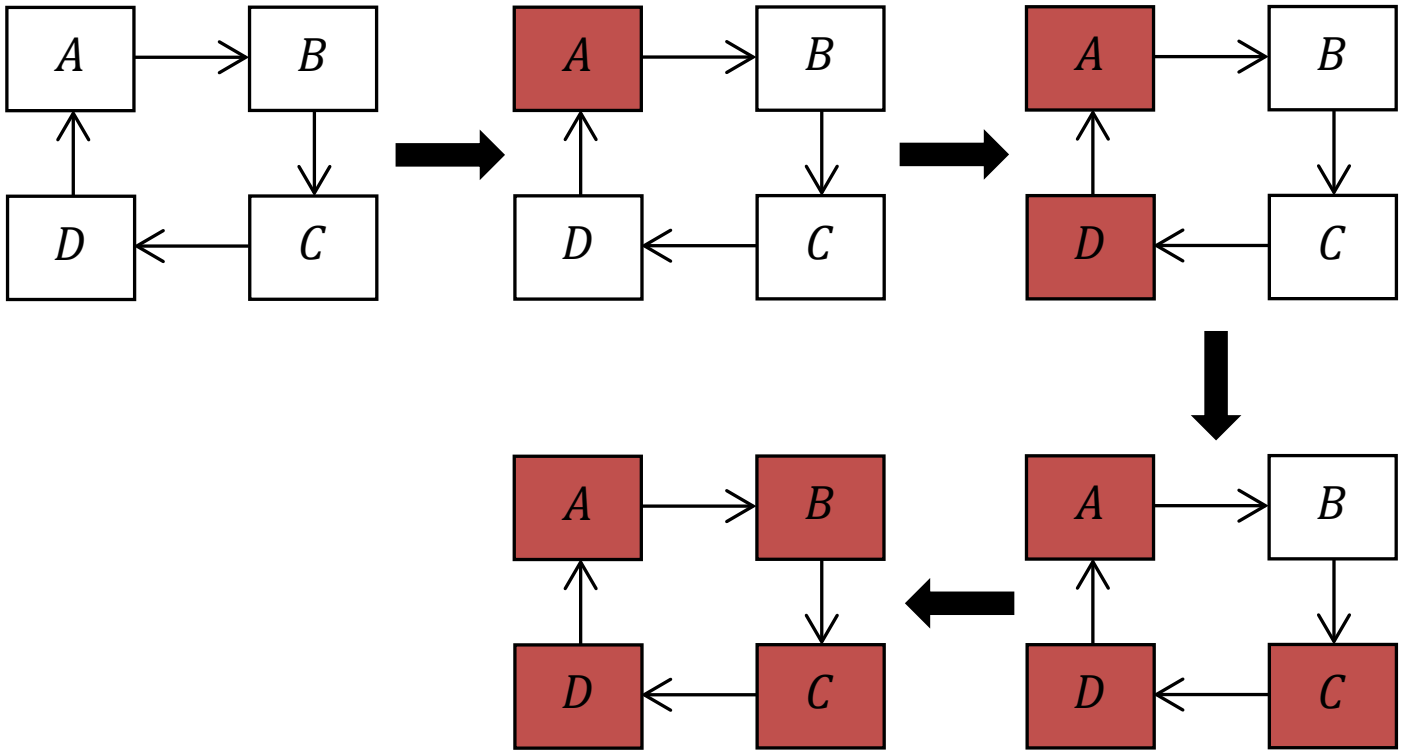
# Example: systemic liquidity shortages (cont'd)

- Liquid assets as share of banks' balance sheets: US & UK



# Example: network externality



# Example: network externality (cont'd)

- Interbank lending makes the banks a "*web of claims*", or *banking network*;
- One bank's failure leads to losses of connecting banks'; bank failure may further spread over the network – *contagion* or "*domino effect*";
- In good time banks make profit with borrowed money from other banks, while in bad time the connecting banks suffer from losses, too – *negative externality*;
- Too much reliance on interbank lending – "*too-interconnected-to-fail*".

# Systemic risk indicators: the devil in the details

- Financial history suggests the following *lead indicators* for systemic events:
  - "Capital Flow Bonanzas";
  - Waves of financial innovation;
  - Housing boom;
  - Financial liberalization;
  - After all, *credit growth* seems single best indicator for financial instability;
- Regulators need watch the indicators, while design rules to target sources of systemic risks.

# What's new in macroprudential regulation?

**The macro- and microprudential perspectives compared**

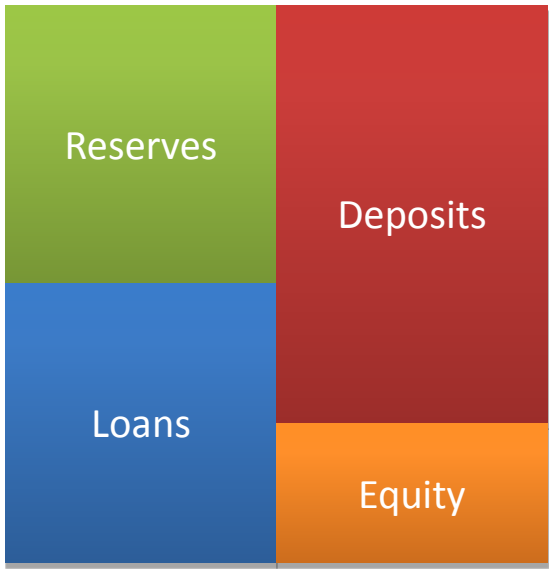
| | **Macroprudential** | **Microprudential** |
|---|---|---|
| Proximate objective | limit financial system-wide distress | limit distress of individual institutions |
| Ultimate objective | avoid output (GDP) costs | consumer (investor/depositor) protection |
| Model of risk | (in part) endogenous | exogenous |
| Correlations and common exposures across institutions | important | irrelevant |
| Calibration of prudential controls | in terms of system-wide distress; top-down | in terms of risks of individual institutions; bottom-up |

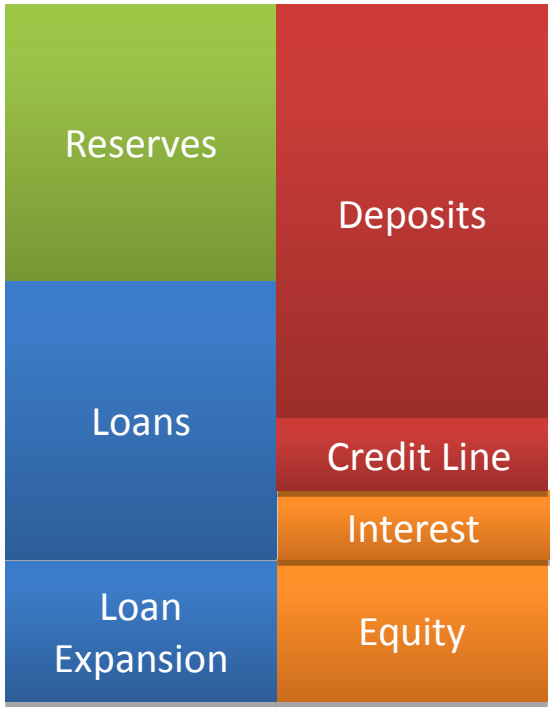
# Role of banks in money creation: theory

- Traditional (obsolete) view of banks' role in money creation mostly focuses on the *liability side*
  - Total liabilities determine banks' *loanable funds* on asset side. Fractional reserves are required for withdrawal demand — *money multiplier*;
  - When central bank tightens monetary policy, total reserves in banking sector decline, so that
  - Banks are forced to reduce *reservable* deposits to meet reserve requirement
  - By raising interest rates on term deposits and other alternatives, leading a rise on long-term rates and decline in aggregate demand.
- An important feaeture before current crisis was expansion of *excessive* reserves in banking system: reserve requirement was mostly not a binding constraint.

# Role of banks in money creation: practice

- In reality, instead of obtaining loanable funds in the first place, banks simply "create" money to issue loans (Bigio, 2015)

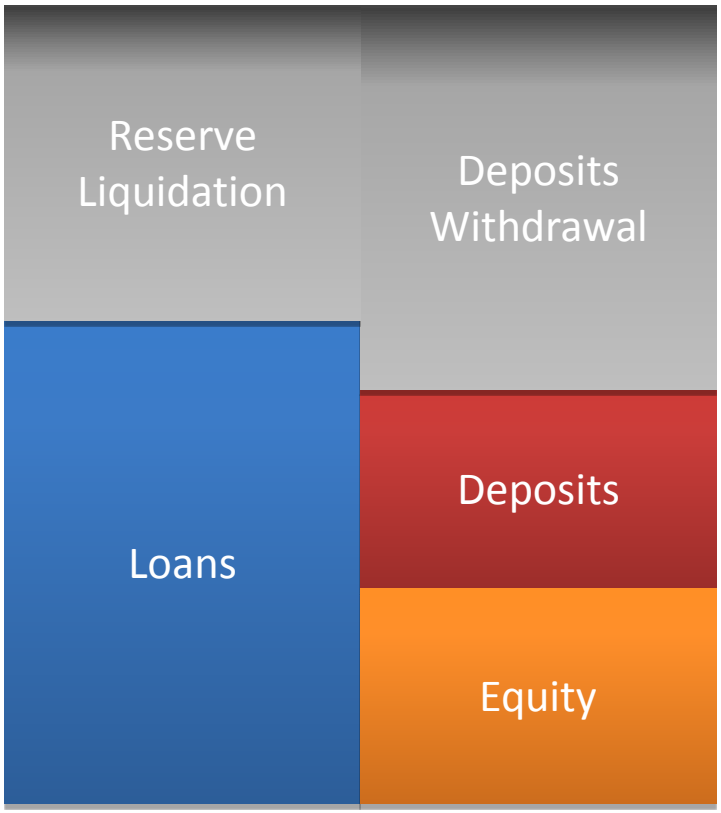


# Banks' "money creation" through liquidity management

- When a bank expands balance sheets by issuing new loans, it creates money with a stroke of pen
  - New loans are added on the asset side, and borrowers get "**credit line**" — deposit accounts — on the liability side;
    - "Loan expansion" is larger than "credit line", difference being interest;
    - When loans are paid down, interest income raises bank's equity.
  - However, deposits can be withdrawn immediately after loans are issued ...

# Banks' "money creation" (cont'd)



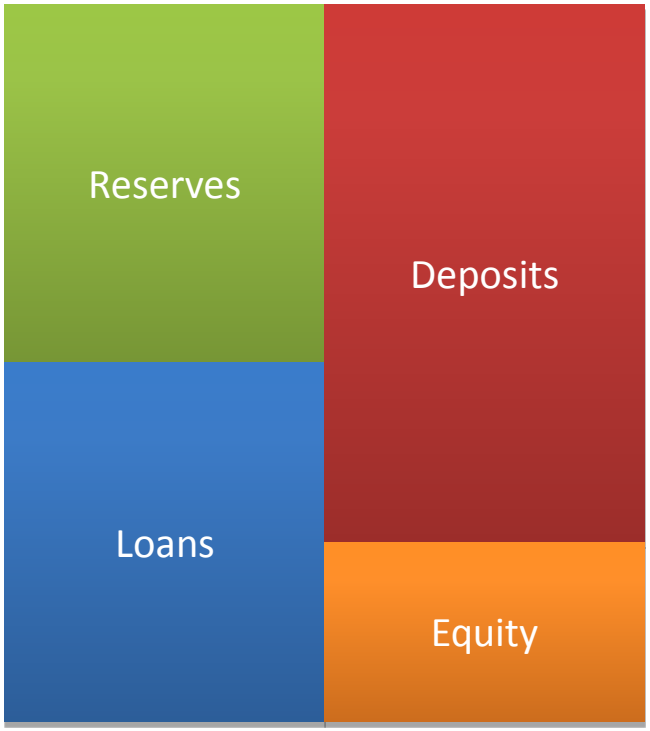

Withdrawal in excess of existing

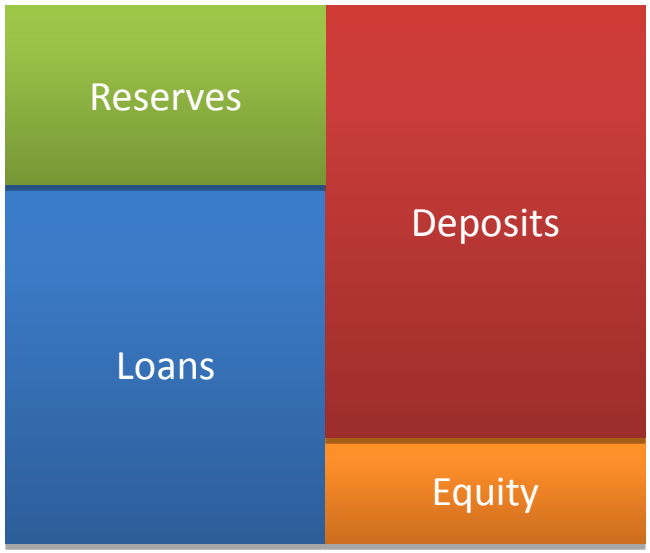
# Banks' "money creation" (cont'd)

- When deposits are withdrawn, bank reserves are depleted so that it needs to raise reserves via
  - Borrow from other banks in interbank market; and / or
    - Borrow from central bank liquidity facilities; and / or
    - Converting some of its assets to cash, ...
  - However, each option incurs a cost, reducing the bank's equity.

# Banks' "money creation" (cont'd)

- Initial balance sheet vs balance sheet after withdrawal and reserves restoration



# Banks' "money creation" (cont'd)

- Therefore, when a bank creates new money and issues new loans, it also increases exposure to risks
  - **Credit risks**: loans may not perform;
  - **Liquidity risks**, coming from two sources
    - **Market liquidity**: on the *assets* side, whether assets can be converted to cash without much discount ("*haircut*") when necessary;
    - **Funding liquidity**: on the *liabilities* side, whether a bank can raise funding without too high cost when it needs to roll over its debt;
  - Bank's risk management is to balance benefits and costs on the margin: *limit to money creation*. Implementation of monetary policy: central bank's involvement in banks' liquidit management.

# Market liquidity and market liquidity risks

- **Market liquidity** refers to the ease of converting assets to cash when needed without incurring a large discount on such assets.
- The market liquidity of assets affects the extent to which banks can raise funding through
  - Asset sales,
  - Liquidation, or
  - Interbank borrowing using assets as collateral. etc.
- Highly liquid assets can be sold quickly without any discount, whereas illiquid assets may take a long time to sell and / or have to be sold at a discount. Likewise, illiquid assets incurs higher haircuts from their market value when they are used for collateral.

# Market liquidity and market liquidity risks (cont'd)

- Market liquidity varies mostly because of *informational frictions* in the financial market
  - *Moral hazard*: project managers cannot be perfectly monitored, they may act in a manner that promotes their private benefit instead the investors' best interests. Hence investors may only be willing to buy the assets at a discount on their face value;
  - *Adverse selection*: buyers have less knowledge than sellers about asset quality, buyers cannot tell whether they are being sold bad assets. The fear of buying lemons, resulting from adverse selection, can lead to discounts in asset prices;
  - *Inalienable human resources*: buyers cannot achieve the same value of assets that managed by expertise;
  - *Limits of arbitrage*: lack of buyers in a market stress;
  - *Complexity* in financial product design, etc.

# Funding liquidity and funding liquidity risks

- Banks can also raise funding on the liability side. **Funding liquidity** refers to the ease with which banks can raise funds by taking more debt. Funding liquidity reflects more institution-specific factors
  - The *availability of liquidity suppliers* in the market, which may change over the business cycles. In normal times there are many active participants in interbank markets so that one bank can easily borrow from others for a short term at fairly low costs; in contrast, when markets are under stress there may be few lenders in the market and borrowing costs become very high;
  - *Corporate governance*, i.e., investors are more willing to lend to better managed banks;
  - Raising new debt implies that claims of existing creditors are diluted, which may impede banks' funding capability. Such *debt overhang* reduces banks' funding liquidity.

# Liquidity risks and liquidity spirals

- Market liquidity and funding liquidity are interconnected. Given that assets are often used as collateral when banks borrow, market liquidity and funding liquidity can reinforce each other, destabilizing banking systems under market stress
  - Banks, by participating capital markets, provide market liquidity to the banking system, and banks' capability to do so depends on their ability to obtain funding;
  - If there is stress in markets for liquidity, banks cannot get enough funding via borrowing and they'll need to sell illiquid assets instead;

# Liquidity risks and liquidity spirals (cont'd)

- With many banks attempting to sell illiquid assets, a situation can arise where there are far fewer buyers relative to sellers of such assets. This generates downward pressure on asset prices, worsens market liquidity in the system, and increases haircut levels;
- This situation further reduces bank asset value as collateral, aggravates banks' funding liquidity, forcing banks to liquidate more assets which makes asset prices plummet even further... the entire banking system falls into a *downward spiral*.

# Central bank as the lender of last resort

- The classical doctrine (Thornton, 1802 and Bagehot, 1873): during market stress
  - Lend only against good collateral to solvent banks;
  - Lend at a penalty rate (to banks that are illiquid);
  - Credible policy: willing to lend without limits;
- However, it is generally hard to follow
  - Impossible to distinguish illiquidity and insolvency;
  - Creates moral hazard problem, e.g., too-big-to-fail;
  - Subject to political pressure and regulatory capture;
- Liquidity regulation is needed.

# Liquidity requirement in Basel III: LCR

- Liquidity Coverage Ratio (LCR) in Basel III to address *market liquidity risk*
  - Sufficient liquid assets to withstand a 30-day stressed funding scenario;
  - Unemcumbered, high quality liquid assets that can be converted to cash to meet liquidity demand;
  - $LCR = \frac{Stock-of-high-quality-assets}{Net-cash-outflows-over-30days} \geq 100\%$.

# Liquidity requirement in Basel III: NSFR

- Net Stable Funding Ratio (NSFR) in Basel III to address *funding liquidity risk*
  - NSFR measures the proportion of long-term assets which are funded by long-term, stable funding – such as customer deposits, long-term wholesale, equity, etc.;
  - NSFR is required to be no lower than 100%.

# Liquidity regulation: facts and challenges

- From very limited experience of liquidity regulation in the Netherlands and UK
  - Banks tend to respond to regulation from liability side, reducing short-term funding;
  - Instead of reducing lending to certain sectors;
- However, still many potential problems, most of them not well understood, e.g.
  - Interaction between liquidity regulation and monetary policy?
  - Impact on systemic risk?