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# EE 431: Economics of Financial Markets and Institutions

# Money and the Financial System

- We use money in our daily life.
- Money helps improve the welfare of the society.

- ***Financial system*** transfers funds from people who have an excess of funds to people who have a shortage.
- This promotes economic efficiency as well.

# Financial Markets

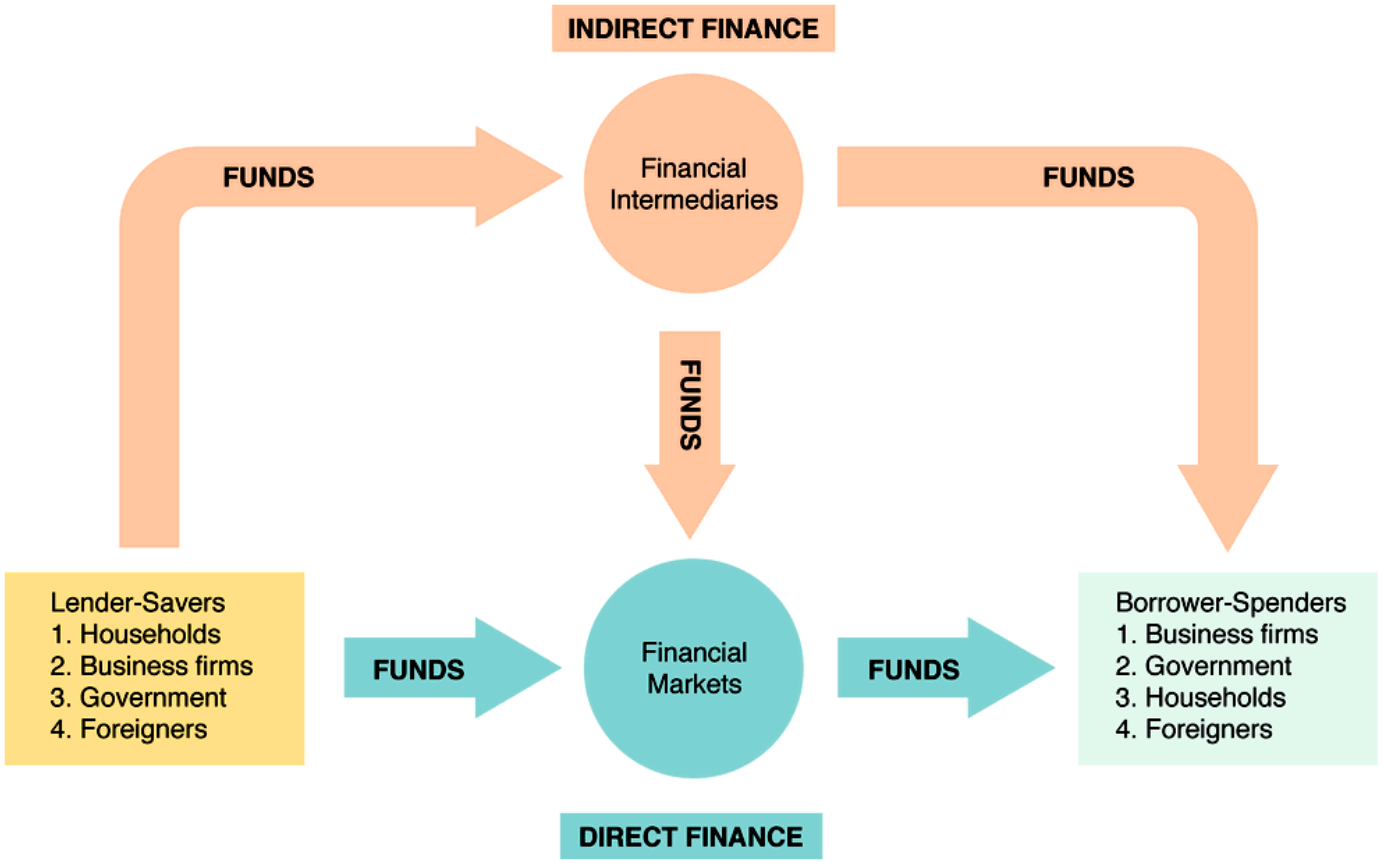
- This is a main component of the financial system

**Bond market**

- A *security* is a claim on the issuer's future income or assets
- A *bond* is a debt security that promises to make payments periodically for a specified period of time
- An *interest rate* is the cost of borrowing for the rental of funds.

**Stock market**

- A *common stock* represents a share of ownership in a corporation. It is a security that claims on the earnings and assets of a corporation.


INDIRECT FINANCE
FUNDS
Financial Intermediaries
FUNDS
FUNDS
Lender-Savers
1. Households
2. Business firms
3. Government
4. Foreigners
FUNDS
Financial Markets
FUNDS
Borrower-Spenders
1. Business firms
2. Government
3. Households
4. Foreigners
DIRECT FINANCE

# Financial Institutions

- This is another main component of the financial system

**Banks**

- *Banks* are financial institutions that accept deposits and make loans.
- They are the financial intermediaries that the average person interacts with most frequently.

**Other financial institutions**

- These include, for example, insurance, finance companies, mutual funds, government financial intermediation, and investment banks.

# Eight Basic Facts (1)

STOCKS ARE NOT THE MOST IMPORTANT SOURCES OF EXTERNAL FINANCING FOR BUSINESSES

ISSUING MARKETABLE DEBT AND EQUITY SECURITIES IS NOT THE PRIMARY WAY IN WHICH BUSINESSES FINANCE THEIR OPERATIONS

INDIRECT FINANCE IS MANY TIMES MORE IMPORTANT THAN DIRECT FINANCE

FINANCIAL INTERMEDIARIES, PARTICULARLY BANKS, ARE THE MOST IMPORTANT SOURCE OF EXTERNAL FUNDS USED TO FINANCE BUSINESSES.

# Eight Basic Facts (2)

The financial system is among the most heavily regulated sectors of the economy

Only large, well-established corporations have easy access to securities markets to finance their activities

Collateral is a prevalent feature of debt contracts for both households and businesses.

Debt contracts are extremely complicated legal documents that place substantial restrictive covenants on borrowers

| Asymmetric Information Problem | Tools to Solve It | Explains Fact Number |
|---|---|---|
| Adverse selection | Private production and sale of information | 1, 2 |
| | Government regulation to increase information | 5 |
| | Financial intermediation | 3, 4, 6 |
| | Collateral and net worth | 7 |
| Moral hazard in equity contracts (principal–agent problem) | Production of information: monitoring | 1 |
| | Government regulation to increase information | 5 |
| | Financial intermediation | 3 |
| | Debt contracts | 1 |
| Moral hazard in debt contracts | Collateral and net worth | 6, 7 |
| | Monitoring and enforcement of restrictive covenants | 8 |
| | Financial intermediation | 3, 4 |

*Note:* List of facts:
1. Stocks are not the most important source of external financing.
2. Marketable securities are not the primary source of finance.
3. Indirect finance is more important than direct finance.
4. Banks are the most important source of external funds.
5. The financial system is heavily regulated.
6. Only large, well-established firms have access to securities markets.
7. Collateral is prevalent in debt contracts.
8. Debt contracts have numerous restrictive covenants.

# Bank Operation

- Banks make profits by selling liabilities (e.g. deposits) with one set of characteristics and using the proceeds to buy assets (e.g. loans) with a different set of characteristics ➔ ***Asset transformation***
- Normally, banks borrows from short-dated deposits and lends through long-term loans ➔ ***Maturity Mismatch***
- Bank management
  - Liquidity Management
  - Asset Management
  - Liability Management
  - Capital Adequacy Management

## Table 1 Balance Sheet of All Commercial Banks (items as a percentage of the total, January 2003)

| Assets (Uses of Funds)* | | Liabilities (Sources of Funds) | |
|---|---|---|---|
| Reserves and cash items | 5 | Checkable deposits | 9 |
| Securities | | Nontransaction deposits | |
| U.S. government and agency | 15 | Small-denomination time deposits (< $100,000) + savings deposits | 42 |
| State and local government and other securities | 10 | Large-denomination time deposits | 14 |
| Loans | | Borrowings | 28 |
| Commercial and industrial | 14 | Bank capital | 7 |
| Real estate | 29 | | |
| Consumer | 9 | | |
| Interbank | 4 | | |
| Other | 8 | | |
| Other assets (for example, physical capital) | 6 | | |
| Total | 100 | Total | 100 |

*In order of decreasing liquidity.

*Source:* www.federalreserve.gov/releases/h8/current/.

# 8 Basic Aspects of Banking Regulation

With asymmetric information problem, government must regulate banks:

- Government safety net
- Restrictions on bank asset holdings
- Capital requirements
- Chartering and bank examination
- Assessment of risk management
- Disclosure requirements
- Consumer protection
- Restrictions on competition
- (+) Prompt corrective actions

# Deposit Insurance

- Asymmetric information on banks
  - Depositors cannot observe the quality of private loans
- Direct rationale: protect depositors
- Indirect rationale: reduce problems in banking system caused by asymmetric information
- However, deposit insurance may lead to moral hazard problem:
- Banks' moral hazard:
  - Encourage risk-taking behaviors
  - Too big to fail: Regulators are reluctant to allow a big bank to fail. Increases moral hazard for big banks
- Depositor side:
  - No incentive to assess banks' credit risks
- A good design of deposit insurance is needed!

# Capital Requirement

- Reduces moral hazard: banks have more to lose when have higher capital
- More capital can also cushion bad shocks
- Can be regulated in 2 ways:
  - Based on leverage ratio (equity capital/assets): the ratio must exceed 5%
  - Basel Accord: Risk-based capital requirement
- Basel Accord: banks are required to hold as capital at least 8% of their risk-weighted assets
  - Assets and off-balance-sheet activities are allocated into 4 categories, each with different weight
- Basel 2:
- Based on 3 pillars
- Pillar 1 links capital requirements to market risk, credit risk, and operational risk
- Pillar 2 focuses on strengthening the supervisory process in banking institutions
- Pillar 3 focuses on improving market discipline through increased disclosure of information
- Criticism: complexity and procyclicality

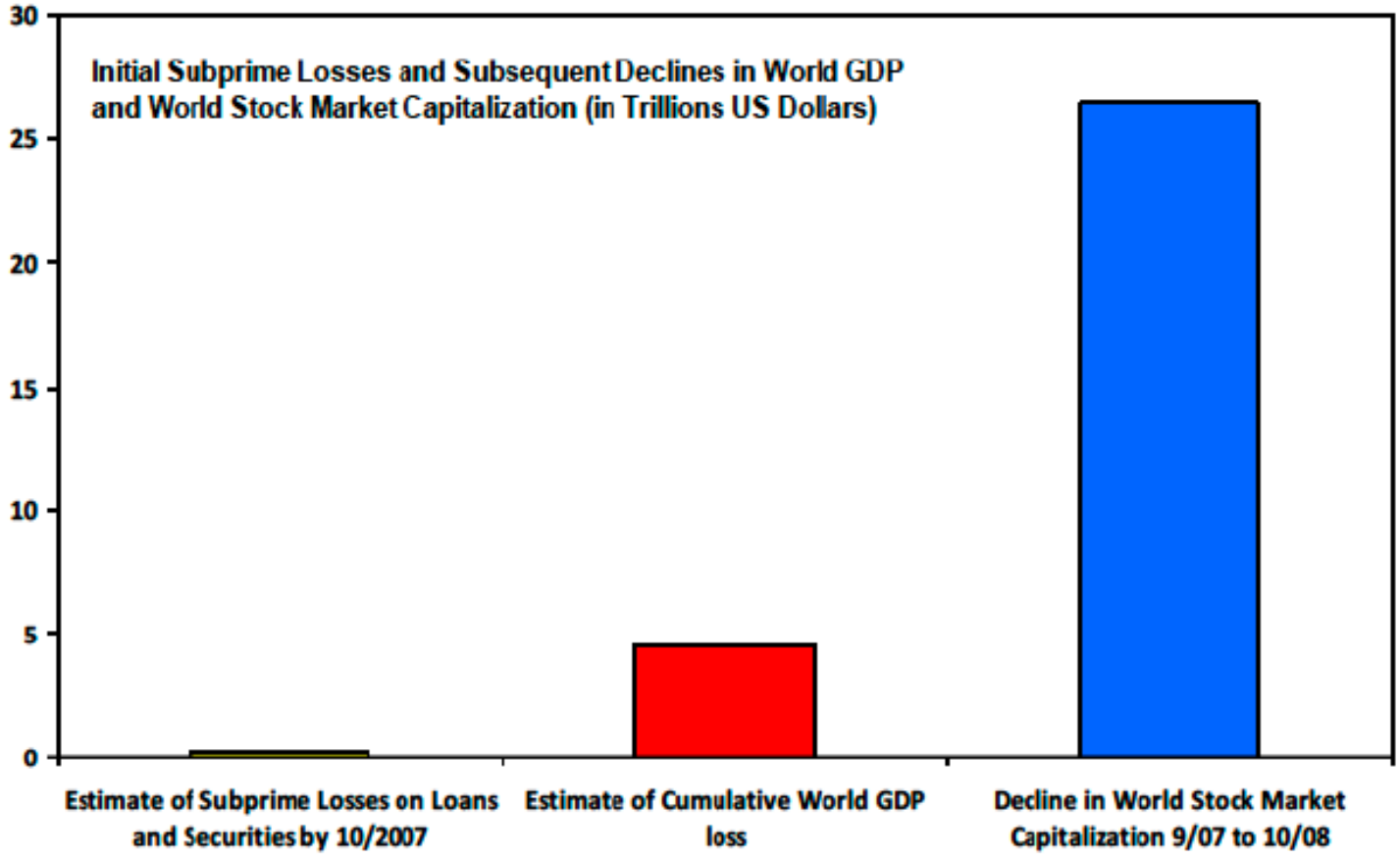
# Disclosure requirements

- Individual depositors and creditors do not have enough incentive to produce private information about the quality of a financial institution's assets
- Regulators require banks to adhere to certain standard accounting principles and disclose a wide range of information
- More public information can better enable stockholders, creditors, and depositors to monitor financial institutions
- **Mark-to-market accounting** (assets are valued in the balance sheet at what they could sell for in the market) is implemented
- The rationale is that market prices provide the best basis for estimating the true value of assets, and hence capital, in the firm
- However, mark-to-market accounting is procyclical

# The Subprime Financial Crisis of 2007 - 2008

- We can say that mismanagement of financial innovation in the subprime mortgage market and a bursting of a bubble in housing price were the underlying forces behind the financial crisis of 2007 – 2008
- Financial innovations in the Mortgage Markets
  - **Subprime mortgages** are mortgages for borrowers with less-than-stellar credit records
  - **Alt-A mortgages** are mortgages or borrowers with higher expected default rates than prime, but with better credit records than subprime borrowers
  - High-risk mortgages are bundled and risk-quantified in a standardized debt security called **mortgage-backed securities**
  - **Structured credit products** (e.g. CDOs, CDO2s, CDO3s) are derived from cash flows of underlying assets and can be tailored to have a particular risk characteristics
  - **Structured investment vehicles** pay off cash flows from pool of assets such as mortgages (like CDOs), but they issued asset-backed commercial papers (which is short-term)
- Banks use an ***originate-and-distribute*** model
- Unfortunately, the originate-and-distribute model is subject to the principal-agent problem, because financial institutions have weak incentives to make sure that the mortgage is of good credit risk

## Figure 1. Initial Subprime Losses and Declines in World GDP and World Stock Market Capitalization



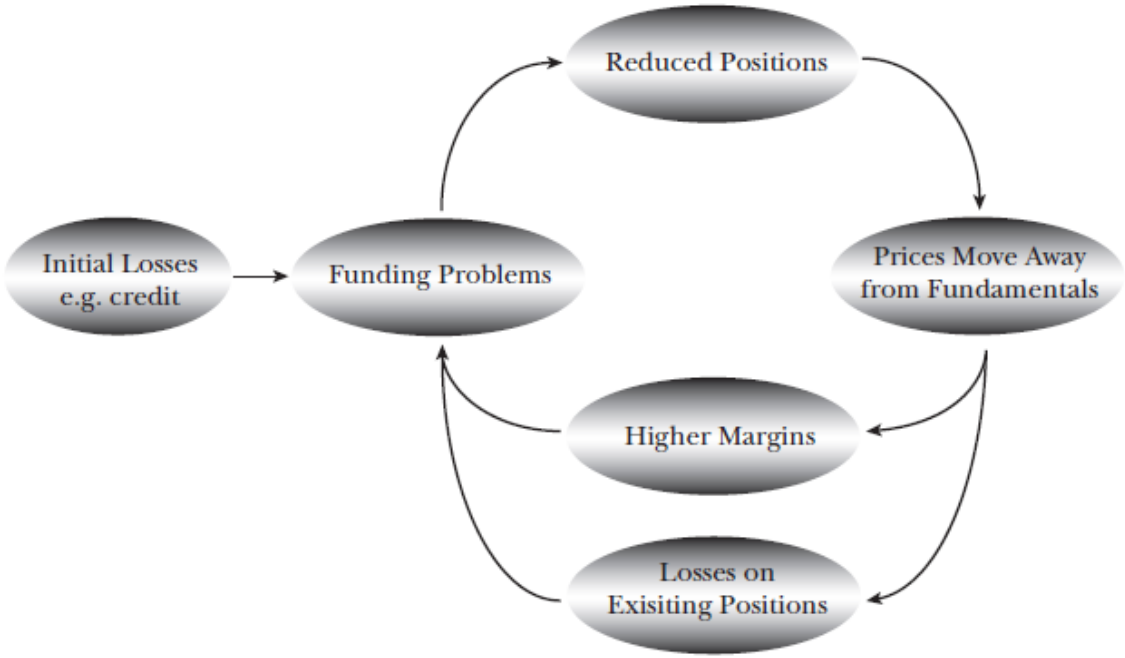

Source: IMF Global Financial Stability Report; World Economic Outlook November update and estimates; World Federation of Exchanges.

# Amplifying Mechanisms

- At times of crisis, it is difficult to identify insolvent financial institutions since solvency becomes so co-mingled with liquidity issues
- Financial institutions typically have an asset-liability maturity mismatch and hence are exposed to funding liquidity risk
- A funding shortage arises when it is prohibitively expensive both to
  - borrow more funds (low funding liquidity) and
  - sell off its assets (low market liquidity)
- In the middle of crisis, liquidity problem may cause bankruptcy of even prudential financial institutions
- Banking regulation plays important part in these amplifying mechanisms

*Figure 4*

**The Two Liquidity Spirals: Loss Spiral and Margin Spiral**




*Source:* Brunnermeier and Pedersen (forthcoming).
*Note:* Funding problems force leveraged investors to unwind their positions causing 1) more losses and 2) higher margins and haircuts, which in turn exacerbate the funding problems and so on.

# New Regulation

- There is a widespread view that the Credit Crunch of 2007-8 was, in part, a result of insufficient reach of regulation and that a solution is to take existing regulation and spread it more comprehensively across more institutions and jurisdictions
- That would be an incorrect diagnosis
- The crisis has involved a regulatory failure as much as anything else
- The current regulatory approach assumes that we can make the system safe by simple trying to make sure that individual banks are safe
- In practice, it represents a fallacy of composition
- ***Micro-prudential regulation*** concerns itself with the stability of each individual institution
- ***Macro-prudential regulation*** concerns itself with the stability of the financial system as a whole
- The current micro-prudential regulation should be supplemented by macro-prudential regulation
- But we do not want to over-regulate financial institutions either

# Who should be regulated?

- Since any effective regulation forces firms to deviate from their preferred option, they always have an incentive to move their business outside the boundary of regulation
- The classification of financial institutions should be based on objective risk measures that capture the risk-spillovers from one institution to the next
- CoVaR seems to be a suitable measure for the classification of financial institutions under regulation
- CoVaR is a technique for capturing a financial institution's contribution to systemic risk based on market data and the value-at-risk (VaR) methodology
- Bank X's CoVaR is the conditional Value-at-Risk (VaR) of bank X's counterparty or the whole financial sector after conditioning that bank X is in difficulty
- $\Delta$CoVaR gives an estimate of institution i's contribution to systemic risk (how much the system's large loss increases because of firm i's stress)

# Who should be regulated?

Financial institutions can be grouped as:

- Individually systemic
  - Cause risk spillovers
  - So large and so interconnected (to fail)
  - Macro + Micro prudential regulations
- Systemic as part of a herd (e.g. highly levered hedge funds)
  - Small, and insignificant, for their individual condition
  - But move together as part of a larger group
  - Some macro-prudential regulation, but limited micro-prudential regulation
- Non-systemic large (e.g. insurance companies and pension funds)
  - Not highly levered
  - Full micro prudential regulation, but no macro-prudential regulation
- Tinies, especially if they are unlevered
  - Small and not interconnected
  - Minimal regulation

# Countercyclical Regulation

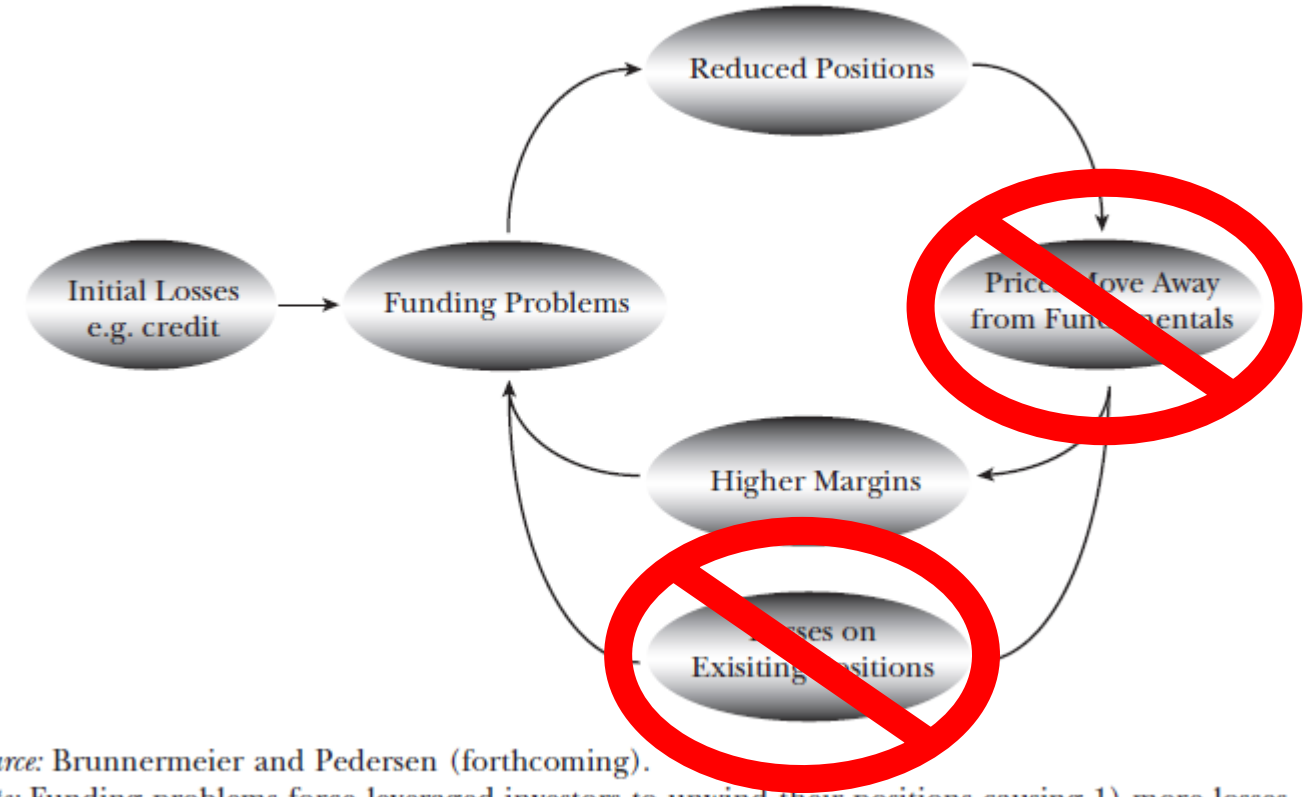
- The current regulation is pro-cyclical:
  - Basel II
  - Mark-to-market accounting
- Three main principles
  - The main objective of counter-cyclical regulation should be to reduce the systemic risk from one institution on the rest
  - Tough during a credit boom, relaxed during a crisis
  - Should be independent of political pressures
- Capital requirements should be changed
  - The new regulation should combine the risk-weighted assets approach (Basel II) with measures of maturity mismatch, market and funding liquidity, and other variables that predict future systemic risk exposure
  - Specifically, multiplying the basic capital adequacy ratio under Basel II by factor(s) relating to systemic risk
  - When there is increasing systemic risk, with increasing leverage, maturity mismatch, credit expansion, and asset price increases, the multiplication factor should be greater than one, while it is less than one during periods of deleveraging

# Mark-to-Funding

- Objective
  - To reduce the procyclicality that mark-to-market induces in asset booms and bust, due to the loss spiral
- Principle
  - Assets should be valued and managed, not according to the intention of the holder, but to the funding capacity of the holder
- Example
  - If a bank has funded its 20-year assets with 1-month borrowings, they should value the asset according to mark-to-market accounting
  - However, if the asset is funded with the issuance of a 10-year bond, the asset can be valued by a third party valuer on the basis of the present value
- The adoption of mark-to-funding may also encourage financial institutions with long-term funding to be buyers of distressed assets, which will also support market liquidity

*Figure 4*

**The Two Liquidity Spirals: Loss Spiral and Margin Spiral**




*Source:* Brunnermeier and Pedersen (forthcoming).

*Note:* Funding problems force leveraged investors to unwind their positions causing 1) more losses and 2) higher margins and haircuts, which in turn exacerbate the funding problems and so on.

# Capital Charges Against Illiquidity

- Objective
  - Encourage banks to find long-term funding, and discourage them from greater leverage
- Principle
  - If two banks hold the same asset, the one funding with term deposits would be set aside a lower amount of capital than the one funding with overnight borrowing
- In practical, adjustments to capital to reflect the maturity mismatch between assets and liabilities could be done as simple multiples to the current requirement
- The multiple should be a function of the months of effective mismatch between the asset maturity and the funding maturity

# Bank of Thailand digital currency scheduled for 2019



22 Aug 2018 at 08:00 1 comments

NEWSPAPER SECTION: BUSINESS | WRITER: SOMRUEDI BANCHONGDUANG



The first phase of the Bank of Thailand's wholesale Central Bank Digital Currency (CBDC), which will be used for interbank fund transfers, is expected to be completely developed by the first quarter of next year, says the central bank.

The Bank of Thailand and eight commercial banks under Project Inthanon Phase 1 will design, develop and test a proof-of-concept prototype for domestic wholesale funds transfers by using wholesale CBDC, the central bank said in a release.

# Evaluation

- Financial games 30%
- Mid-term examination 30%
- Final examination 40%

# Final Exam

- There are 2 parts in this examination paper:
  - Part 1: 10 short questions (4 points each)
  - Part 2: 2 long question (6 points each)
- Answer all questions.
- No calculators are allowed in the examination room.
- No other materials are allowed in the examination room.