2014 年 4 月 3 日：17 時 40 分～19 時
MPT フォーラム例会：東洋経済新報社 9 階経済倶楽部ホール

金融システムの（不）安定性
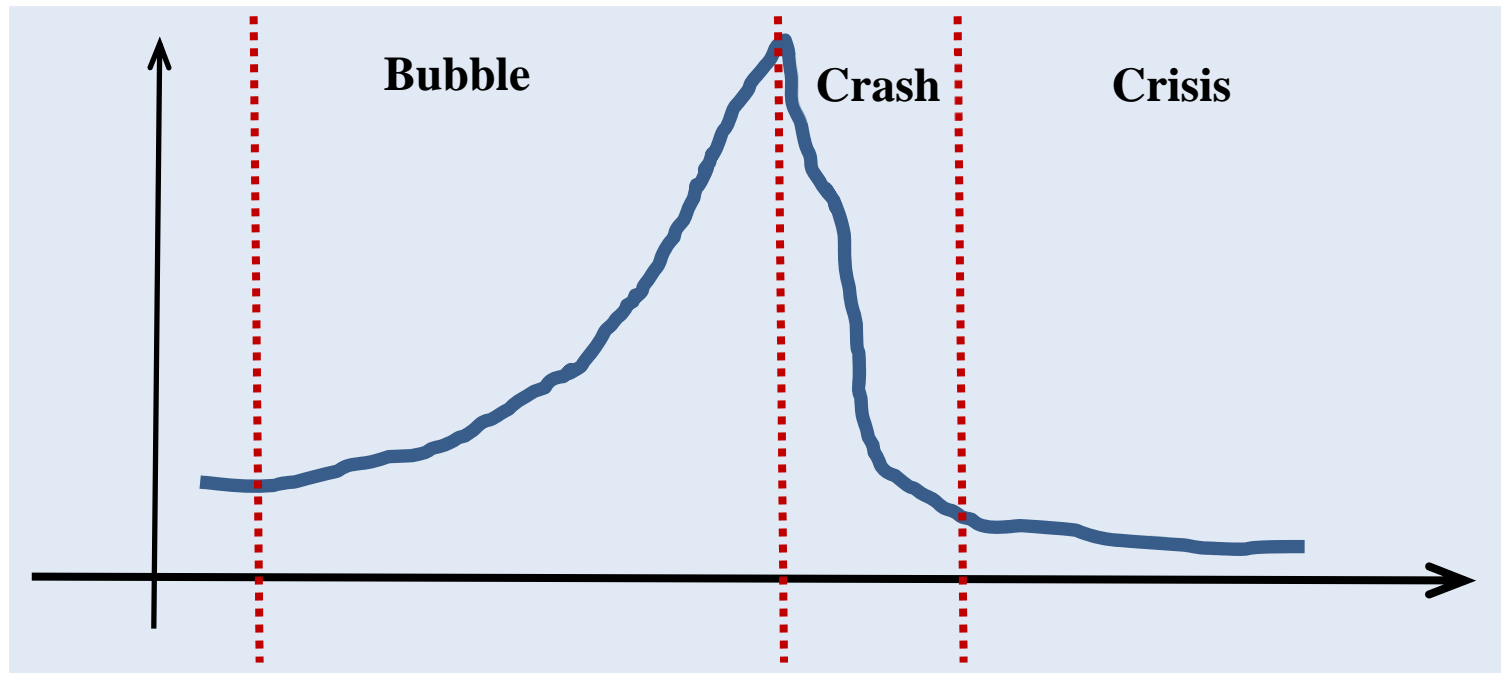
1. Historical Evidences

BC	メソポタミア	農民の債務帳消
BC	ギリシャ	ソロンの改革（債務帳消）
1434~38	オランダ	チューリップマニア
1719~20	フランス	ミシシッピ計画：ジョン・ロー
1720	イギリス	サウスシーバブル
1763	イギリス	North European Financial Crisis
1837, 1857, 1873, 1884, 1893, 1907, 1914		
	USA	Banking Crisis, FRB 設立（1913）
1929	USA	Great Stock Market Crash, Great Depression
		Real Estate Boom followed by Crash, Bank Run
		Glass-Steagall Act 1933: Deposit Insurance
1979	USA	Saving and Loan Crisis
1970s~80s	South American	Currency Crisis, Banking Crisis, Brady Plan (1989, 債務帳消)
1990s	Scandinavians	Real Estate Bubble followed by Banking Crisis
1990s	Japan	Real Estate Asset Bubble followed by Long recession
1990s~2000s	Mexico, East Asia, Russia	Currency Crisis, Default of LTCM (Russia)
1997~2000	USA	Dotcom bubbles
2001	Argentina	Public Sector Debt Crisis
2007~	USA	Housing Bubble followed by Global Financial Crisis
		Financial Innovation, Mortgage Securitization
		Default of Bear Sterns, Lehman Brothers, AIG
2008~	EU	Sovereign Debt Crisis (Greece, Ireland, Italy, Portugal, Spain)
2013~	Japan	Bitcoin

2. Hyman Minsky's 5 Steps

Step 1:   **Displacement**   **New technology and/or financial Innovation**
$\Rightarrow$ **High expectation on future profit**

Step 2:   **Boom**   **Asset price > fundamental value**
Low volatility
Reinforcement

Step 3:   **Euphoria**   **High volume**
High volatility
Investors gradually recognize Bubble.

Step 4:   **Profit Taking**   **Sophisticated investors gradually sell up.**

Step 5:   **Panic**   **Minsky moment**

3. 金融システム研究は難しい

実証データ判別困難、統一理論なし

Various Models for Bubbles

|	
OLG:	**Samuelson (1958), Tirole (1985), Martin and Ventura (2013)**
Limited arbitrage:	**Shleifer (2000) Abreu and Brunnermeier (2003), Matsushima (2013, 2014)**
Heterogeneous belief:	**Miller (1973) Harrison and Kreps (1978), Simsek (2013) Maekawa (2013)**

リーマンショック以降、金融システム研究が活発化

4. US Housing Bubbles (2005, 2006)

Inflation-adjusted U.S. home prices, Population, Building costs, and Bond yields (1890–2005)

Source: *Irrational Exuberance*, 2d ed. (Fig. 2.1)
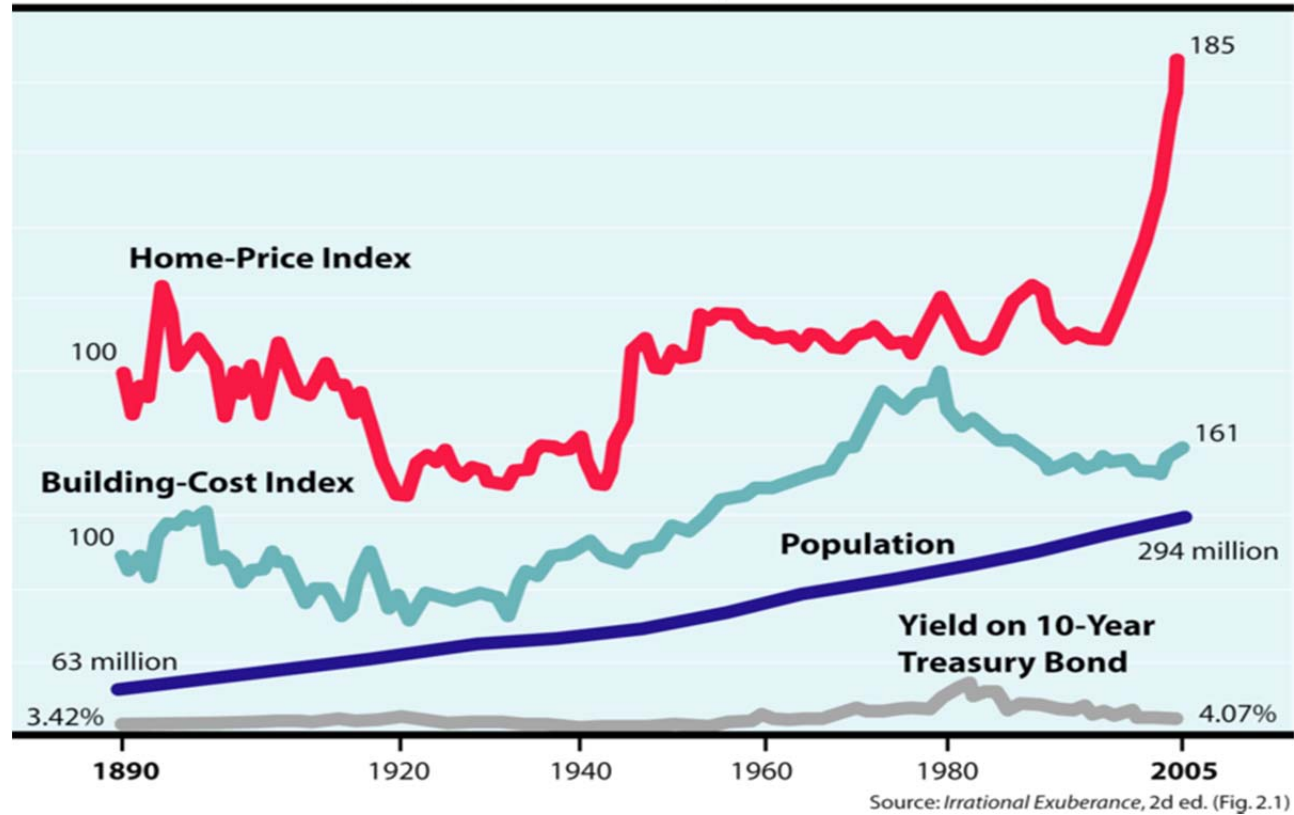
5. Global Financial Crisis (2007, 2008)
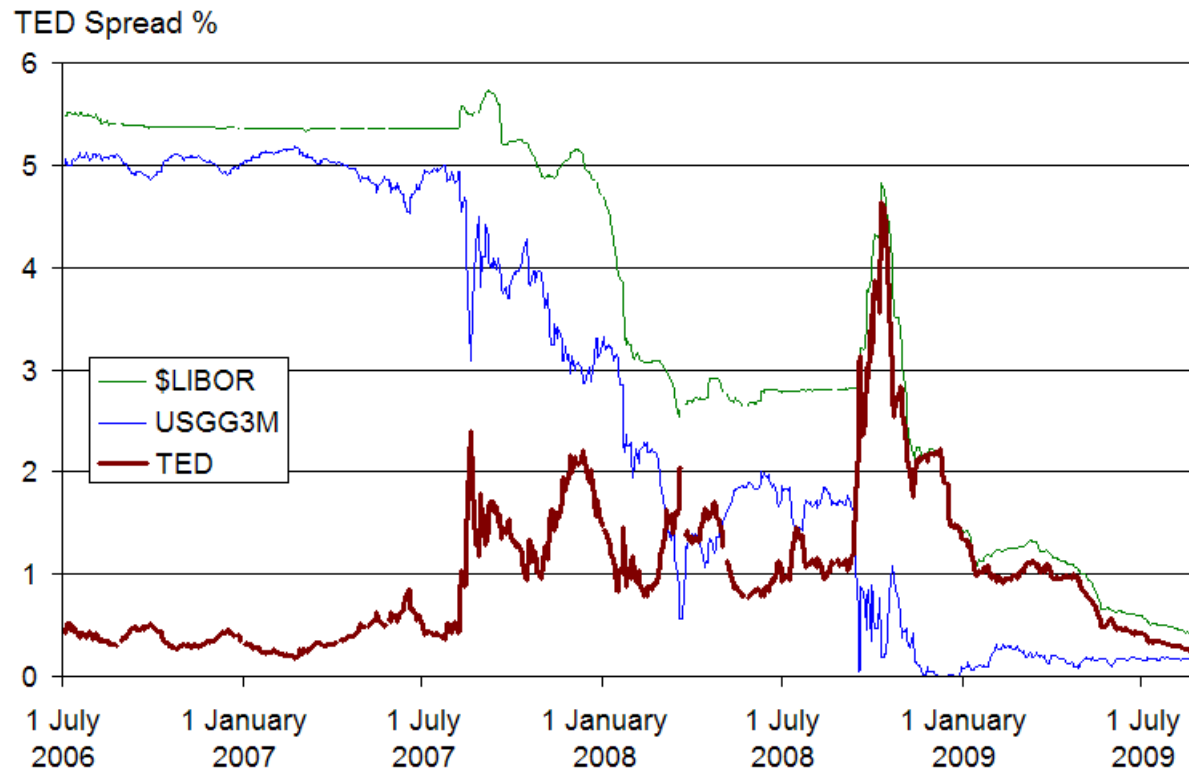
6. Subprime Market Collapse (2007)

Amplification
Local (Small) Event ⇒ Global Crisis

ＵＳサブプライムローンは住宅ローン全体の４％程度
にもかかわらず、経済全体に悪影響

7. 金融システムのミクロ的基礎

ゲーム理論、情報の経済学
Brunnermeier (Princeton), Shin (Princeton), et al

松島研究室

松島斉：**Limited Arbitrages**

Behavioral Aspects of Arbitrageurs in Timing Games of Bubbles and Crashes, *Journal of Economic Theory* **148, 858-870, 2013.**

The Role of Bubble-Contingent Claims in Timing Games, 2014, mimeo

Bubble company	**Raises wasteful funds for private use by issuing shares**
Noise Traders	**Plenty of money**
	Unaware of crash risk, unaware of no speculative benefit
	Unconscious reinforcement
Sophisticated arbitrageurs	**Purchases bubbles by leverage**
	Purchases bubble-contingent claims (BCC, naked CDS)

High leverage associated with BCC deters bubbles.

前川淳（助教）：**Heterogeneous Beliefs**

Securitization and heterogeneous-belief bubbles with collateral constraints, 博士提出論文, **2013**

Optimists	**Purchases bubbles by borrowing from pessimists**
Pessimists	**Securitizes and sells loans to future optimists**

Securitization facilitates bubbles.

早川仁（助教）：**Financial Networks**

Complexity of Payment Network, PhD Thesis, 2013

Domino Spirals

8. Global Financial Crisis

Key concept: Liquidity (Maturity) Mismatch

Lender: High Liquidity, Short-term lending
Borrower: Low Liquidity, Long-term borrowing

Two models

Bank Run (Depositor Run, Counterparty Run):   伝統的な銀行モデル

Margin Run (Collateral Run, Leverage Run):   Modern Financial Institutions

9. Margin Run

Modern financial institutions: Finance through wholesale funding market as well as deposit

Short-term collateralized debt contracts

    ex. REPO   **Margin (Haircut) 10%, Leverage ratio 10**
                    Borrow 90 for Asset 100 as collateral with agreement to repurchase it by 90 tomorrow

Asset	Liability
100	借入 90
	自己資本 10

$$自己資本\ 10 \Rightarrow 借入\ 10 \times 0.9 \Rightarrow Asset\ 10 \times 0.9$$

$$\Rightarrow\quad 借入\, 10 \times (0.9)^2 \Rightarrow Asset\ 10 \times (0.9)^2$$

$$\Rightarrow\quad 借入\, 10 \times (0.9)^3 \Rightarrow Asset\, 10 \times (0.9)^3$$

$$\Rightarrow\quad 借入\ 10 \times (0.9)^4 \Rightarrow Asset\ 10 \times (0.9)^4\ \ldots\ldots\ldots$$

$$\therefore\quad 総資産\ 10 \times (1 + 0.9 + (0.9)^2 + (0.9)^3 + (0.9)^4 + \cdots = 100$$

Two aspects of Margin Run：
Loss Spiral and Margin Spiral

Loss Spiral

Start with Leverage ratio 10 (Value-at-Risk, Default Risk)

Asset	Liability
100	借入 90
	自己資本 10

Asset price decreases by 5%：Leverage ratio changes from 10 to $\dfrac{95}{95-90} = 19$

Asset	Liability
95	借入 90
	自己資本 5

Sell 45 of assets ⇒ Restore leverage ratio 10

Asset	Liability
50	借入 45
	自己資本 5

Selling pressure further decreases asset prices:

Fire-Sale Price Externality (Large Price Impact, Indirect spillover) ⇒ Loss Spiral!

Margin Spiral

Asset price drop increases informational asymmetry between borrowers and lenders
⇒ Margin requirement increase from 10% to 15%.
⇒Sell 16.7 of assets ⇒ Restore Leverage ratio 15

Asset	Liability
33.3	借入 28.3
	自己資本 5

Selling pressure further decreases asset prices:
Fire-Sale Price Externality (Large Price Impact, Indirect spillover)
⇒ Margin Spiral!

Contagion through Loss Spiral and Margin Spiral

Other Asset price declines: Flight to quality, Flight to safety
We need regulation on leverage ratio (not only default risk but also systemic risk)

10. Bank Run
Diamond and Dybvig (1983)
銀行システムの不安定性を説明する伝統的なモデル

Two Nash Equilibria:
    No Bank Run: **Depositor withdraws only when he demands**
    Bank Run: **Depositors compete with one another to withdraw**

Coordination Game: Two Depositors

	Withdraw		No	
Withdraw	**0.5**	**0.5**	**1**	**0**
No	**0**	**1**	**2**	**2**

Glass-Steagall Act 1933: Deposit Insurance

BIS 規制

Domino Effects (Direct spillover): Morris and Shin (2008)

11. Sovereign Risk Crisis

Sovereign Debts（国債）

    We expect very safe and liquid
    Financial institutions utilizes sovereign debts as collaterals
    Financial sectors have large exposure to sovereign risk.

What happens if sovereign debts become risky?

Sovereign debt becomes risky.
- ⇒   **"Margin run" caused by large exposure.**
- ⇒   **Sovereign need to bail out financial sectors.**
- ⇒   **Fiscal position become worse.**
- ⇒   **Sovereign debt becomes more risky.**
- ⇒   **Banking sectors reduce lending to real business.**
- ⇒   **Sovereigns' tax revenue declines.**
- ⇒   **Sovereign debt becomes more risky.**
- ⇒   **'Diabolic loop' (Brunnermeier)**