

# Deciphering the liquidity and credit crunch 2007-2008

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# Conditions before the crisis

- Credit boom
- Securitization: the “originate and distribute” banks
- Maturity mismatch (Sometimes through “shadow” banking system)
- U.S. housing bubble
- The changes in the banking system (points 2 – 3) also contribute to the housing bubble (point 4): Cheap credits, lending standards fell

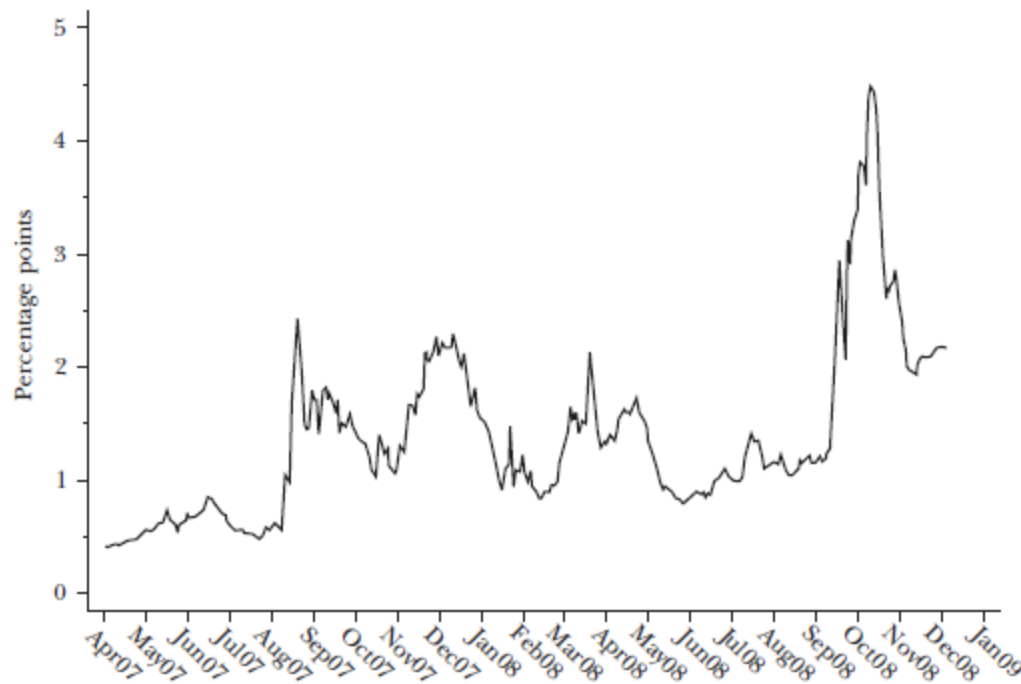
# The Unfolding of the Crisis

- The Subprime Mortgage Crisis
  - The trigger was an increase in subprime mortgage defaults, which was first noted in February 2007
  - Subprime tranches were downgraded
- Asset-Backed Commercial Paper
  - July 2007
  - How to value structured products
  - A reduction in confidence in the reliability of ratings
  - The market for short-term asset-backed commercial paper began to dry up

# The Unfolding of the Crisis (cont.)

- The LIBOR, Repo, and Fed Funds Markets

*Figure 3*  
The TED Spread



Source: Bloomberg.

Note: The line reflects the TED spread, the interest rate difference between the LIBOR and the Treasury bill rate.

# The Unfolding of the Crisis (cont.)

- Central Banks Step Forward
  - The first “illiquidity wave” on the interbank market started on August 9
  - The European Central Bank injected EUR95 billion
  - The U.S. Federal Reserve injected USD24 billion
  - The U.S. Fed Res also reduced the discount rate, broadened the type of collateral, and lengthened the lending horizon
  - However, banks are reluctant to borrow

# The Unfolding of the Crisis (cont.)

- ▣ Continuing Write-down of Mortgage-related Securities
  - October 2007 was characterized by a series of write-downs (booked losses to their balance sheets)
  - However, the estimate of the total loss seemed to be too small
- ▣ The Monoline Insurers
  - Monoline insurers focused completely on one product
  - Amid ongoing bank write-downs, the worry by January and early February 2008 was the potential downgrading of the monoline insurers

# The Unfolding of the Crisis (cont.)

- Bear Stearns
  - In March 2008, events put pressure on the investment bank Bear Stearns
  - New type of bank run
  - However, it was considered “too interconnected” to be allowed to fail suddenly
  - JPMorgan Chase, with some help from Fed Bank of New York, acquired Bear Stearns for \$2 per share (Compared to the price around \$150 less than a year before)

# The Unfolding of the Crisis (cont.)

- Fannie Mae and Freddie Mac
  - Fannie Mae and Freddie Mac at that time were two publicly traded but government-chartered institutions that securitized a large fraction of U.S. mortgages
  - They involved in a large volume of “credit default swaps”.
  - The government put them in federal conservatorship on September 7, 2008

# The Unfolding of the Crisis (cont.)

- Lehman Brothers
  - Lehman Brothers had survived the fallout in March 2008, but only narrowly
  - It made heavy use of the Fed's new credit facility, but did not issue new equity to strengthen its balance sheet
  - It felt that issuing the new shares was a bad signal
  - Other institutions refused to take over Lehman Brothers, the government refused to guarantee
  - Consequently, Lehman had to declare bankruptcy in the mid September 2008

# The Unfolding of the Crisis (cont.)

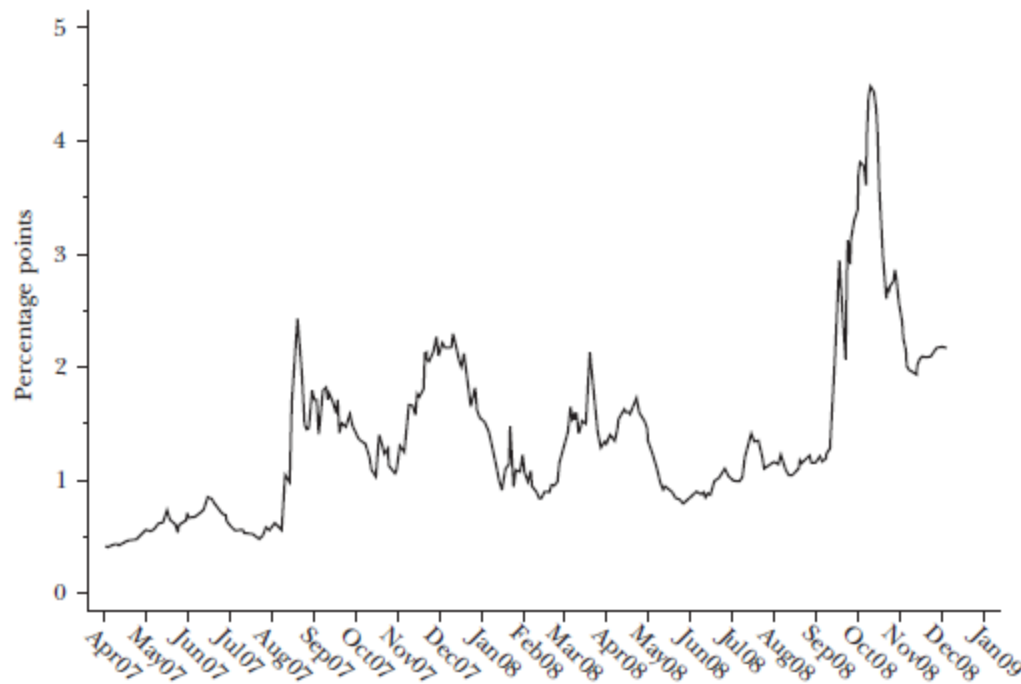
## ▣ Merrill Lynch and AIG

- During the collapse of Lehman, Merrill Lynch had already announced that it had sold itself to Bank of America
- AIG also disclosed that it faced a serious liquidity shortage
- AIG had been increasingly active in the credit derivatives business, including CDSs
- Owing to AIG's interconnectedness in the credit derivatives business, the Federal Reserve bought an 80 percent of its equity stake
- The AIG bailout was extended further in October and November 2008

# The Unfolding of the Crisis (cont.)

- The LIBOR, Repo, and Fed Funds Markets

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# Amplifying Mechanisms and Recurring Themes

## ▣ ***Funding Liquidity***

- Describes the ease that expert investors can obtain funding from (possibly less informed) financiers
- ▣ This can be measured through the margin or haircut
- ▣ Normally, traders use assets they buy as collateral
- ▣ However, there is a difference between the price they buy and the value they can use as collateral
- ▣ This difference is called margin or haircut
- ▣ The higher the margin, the lower the funding liquidity

# Amplifying Mechanisms and Recurring Themes

## ▣ ***Market Liquidity***

- Describe the ease of turning assets into money
- ▣ Market liquidity is low when selling the asset significantly decreases the sale price
  
- ▣ The mechanisms that explain why liquidity can suddenly evaporate operate through the interaction of market liquidity and funding liquidity

# 1. Borrower's Balance Sheet Effects

- ***Loss Spiral***

- A decline in the value of assets decreases the investors' net worth quickly, and the amount they can borrow falls
- The leveraged investors may be forced to sell their assets when the price is low
- The sales depress the price further, inducing more selling and so on

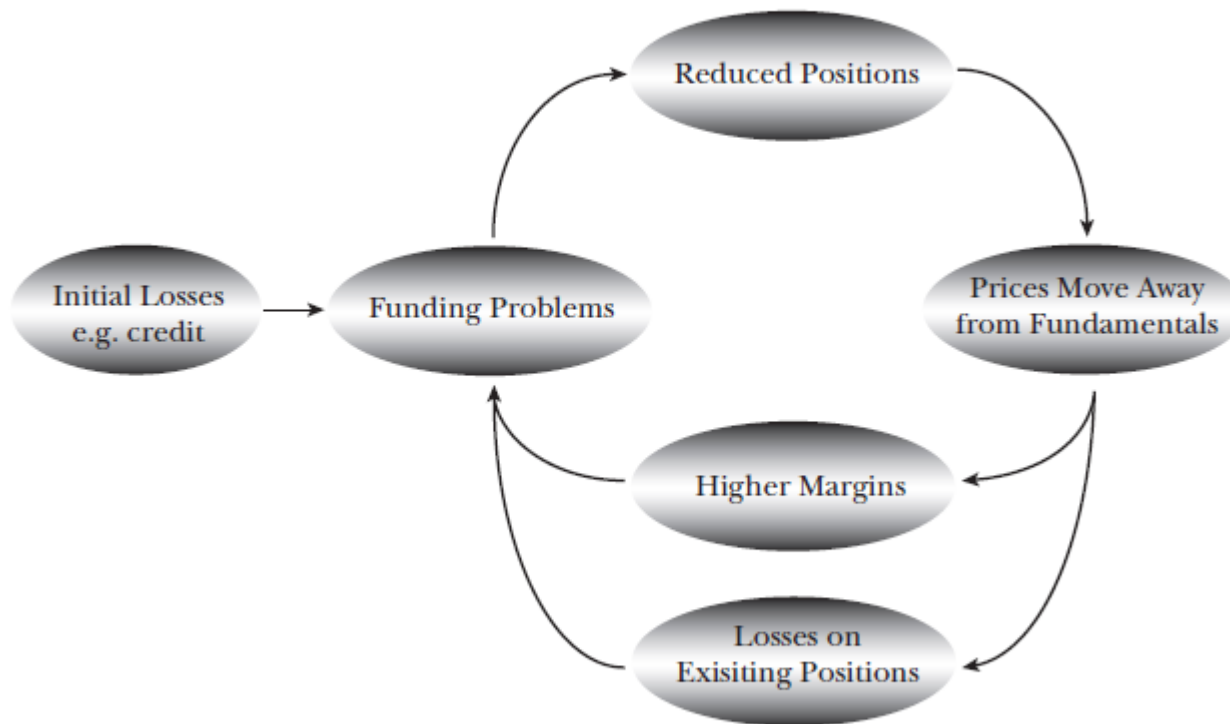
# 1. Borrower's Balance Sheet Effects (cont.)

- ***Margin/Haircut Spiral***
  - As margins rise, the investor has to sell even more because the investor needs to reduce its leverage ratio
  - Margins and haircuts spike in times of large price drops, leading to a general tightening of lending
- These two spirals reflect what we call “fire-sale externality”

# 1. Borrower's Balance Sheet Effects (cont.)

*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.

## 2. Lending Channel

- ▣ Balance-sheet effects from the lenders' side
  - When lenders also have limited capital, they restrict their lending as their own financial situation worsens
- ▣ Precautionary hoarding arises if lenders are afraid that they might suffer from interim shocks and that they will need funds for their own projects
- ▣ Precautionary hoarding increases when:
  - The probability of interim shocks increases
  - Outside funds are expected to be difficult to obtain

# 3. Runs on Financial Institutions

- Deposit insurance has made bank runs almost obsolete, but runs can occur on other financial institutions
- The problem may also extend to equity holders, such as investors in a hedge fund or mutual funds
  - An early-mover advantage arises to the extent that fund managers sell liquid assets first

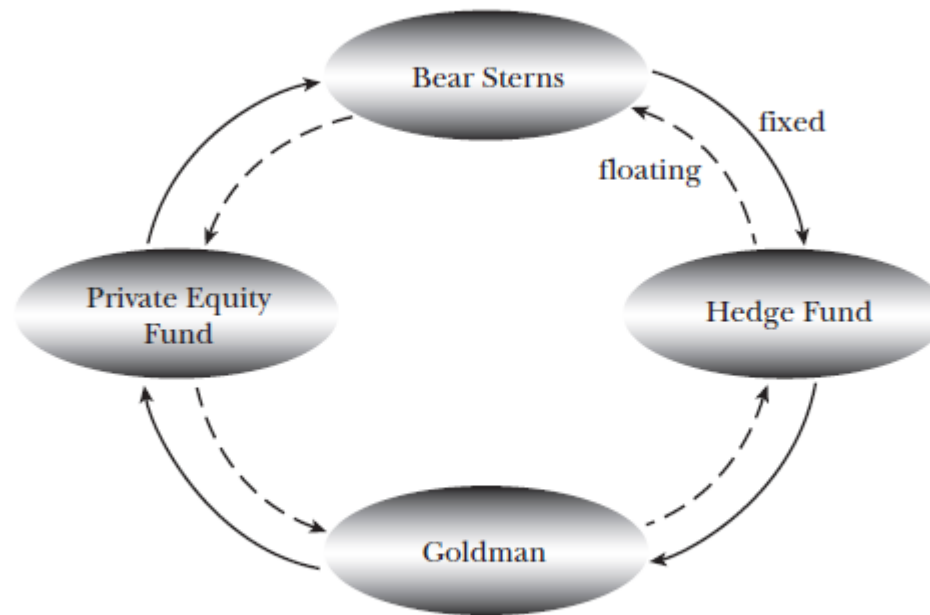
# 4. Network Effects

- In reality, most financial institutions are lenders and borrowers at the same time
- An increase in counterparty credit risk can create additional funding needs and potential systemic risk

# 4. Network Effects

*Figure 5*

**A Network of Interest Rate Swap Arrangements**



*Note:* Figure 5 shows a network of interest rate swap arrangements in which, theoretically, all positions could be fully netted out in a multilateral netting agreement. However, in over-the-counter markets each party only knows its own contractual obligations, and fear of counterparty credit risk might prevent netting.

# 4. Network Effects

- Network and counterparty credit risk problems are more easily overcome if a clearing house or another central authority knows who owes what to whom
- However, the introduction of structured products has made the web of obligations in the financial system more opaque, consequently increasing systemic risk