Deciphering the liquidity and credit crunch 2007-2008

Brunnermeier (2009)

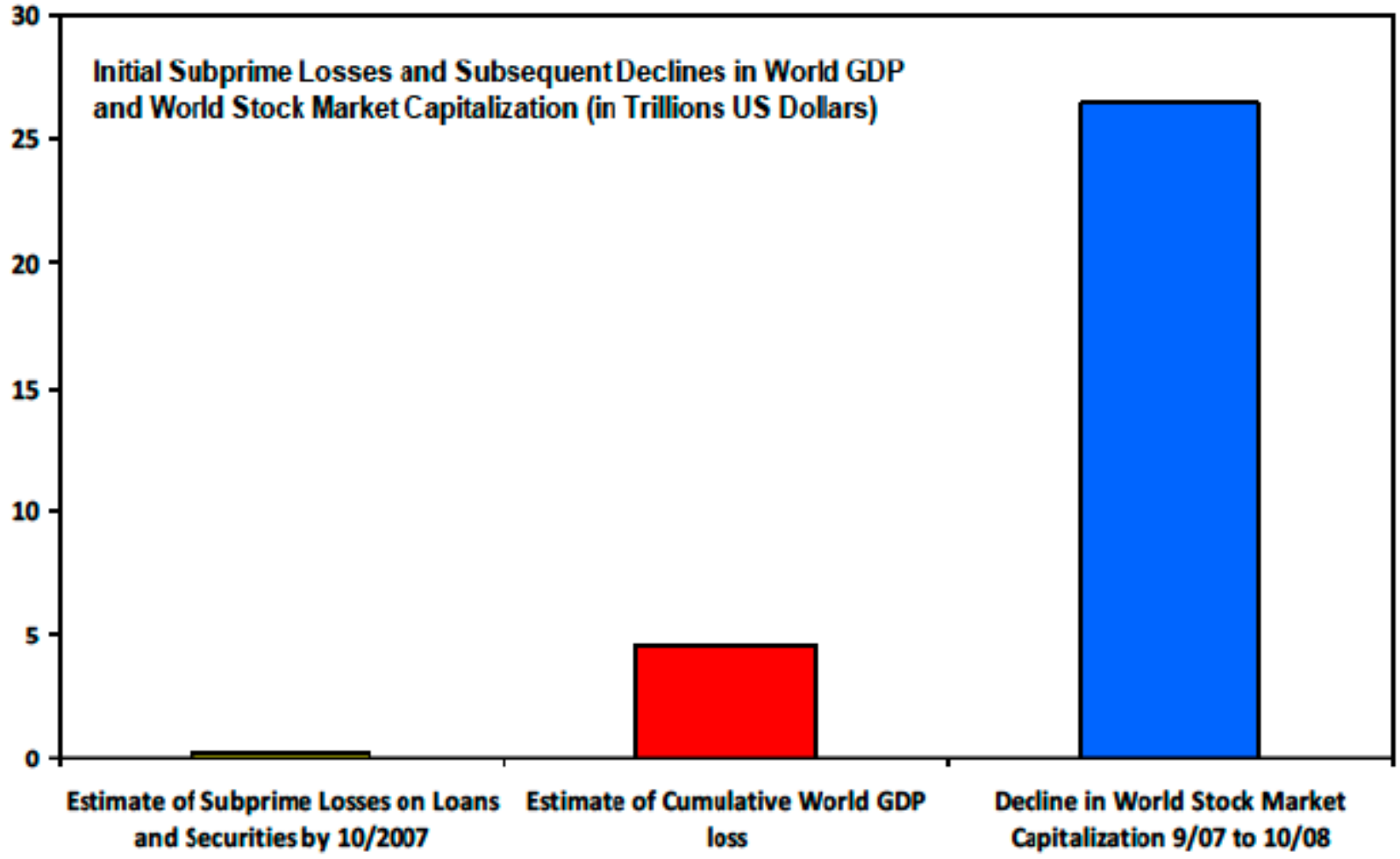
Brunnermeier et al. (2009) Ch. 2

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

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.

Solvency, Liquidity and Maturity Mismatch

- A financial institution is ***insolvent*** when its going concern value does not exceed the expected value of its liabilities
- In normal times, when financial markets are strong, it is fairly easy to identify insolvent financial firms
- However, at times of crisis, it is difficult since solvency becomes so co-mingled with liquidity issues

Solvency, Liquidity and Maturity Mismatch

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/.

Solvency, Liquidity and Maturity Mismatch

- 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)
- Remember that A leveraged institution that suffers mark-to-market losses of $x has to reduce its position by $x times its leverage ratio

Amplifying Mechanisms and Recurring Themes

- ***Funding Liquidity***
  - Describes the ease that expert investors can obtain funding from (possibly less informed) financiers
- Funding liquidity is high, when it is easy to raise fund
- Typically, when a leveraged trader purchases an asset, he uses the purchased asset as collateral and borrows against it
- However, he cannot borrow the entire price
- The difference between the security's price and its value as collateral – the ***margin*** or ***haircut*** – must be financed by the trader's own equity capital
- The *higher* the margin, the *lower* the funding liquidity

Amplifying Mechanisms and Recurring Themes

- Financial institutions that rely substantially on short-term (commercial) paper or repo contracts have to roll over their debt
- An inability to roll over this debt is equivalent to margins/haircuts increasing to 100 percent, because the firm becomes unable to use its assets as a basis for raising funds
- ***Funding liquidity risk*** is due to maturity mismatches and can thus take three forms:
  - margin/haircut funding risk, or the risk that margins and haircuts will change
  - rollover risk, or the risk that it will be more costly or impossible to roll over short-term borrowing
  - redemption risk, or the risk that demand depositors of banks or even equity holders seek to withdraw funds

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***
  - When financial institutions mark their balance sheets to market, changes in prices lead to losses that may be sufficient to transmit the shocks to other institutions even when they do not hold claims against each other
  - 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

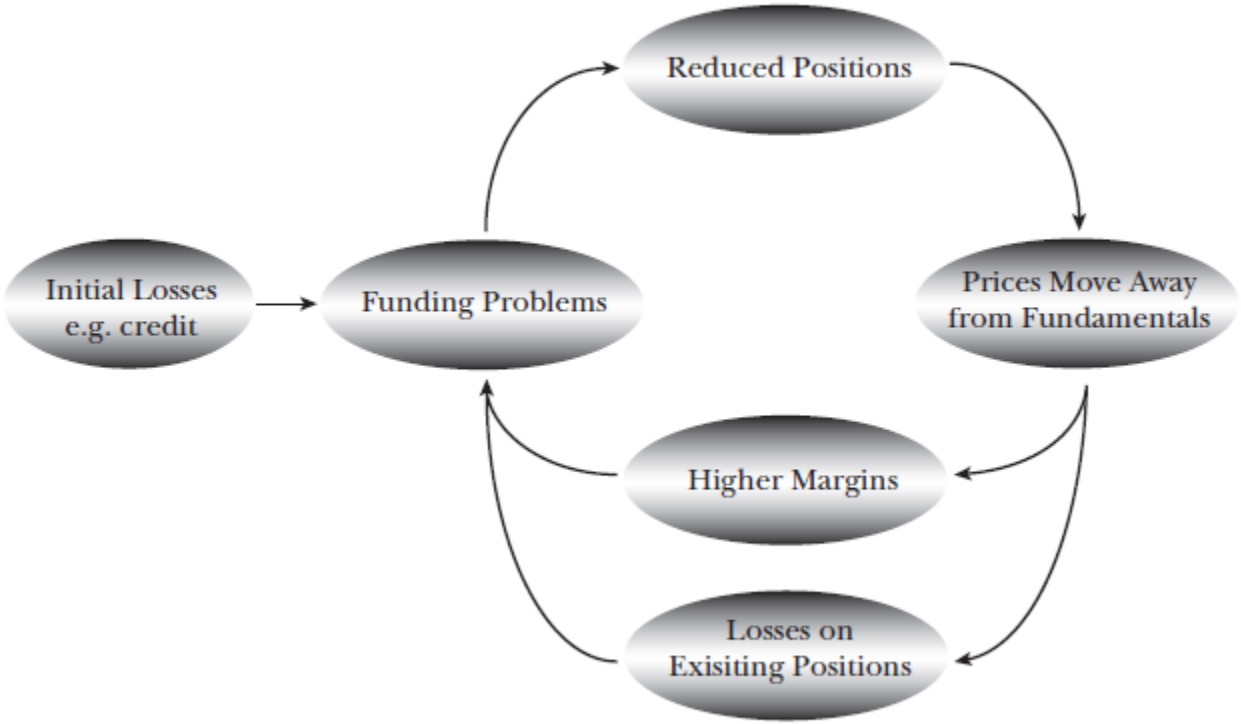
1. Borrower's Balance Sheet Effects

- ***Margin/Haircut Spiral***
  - Margins and haircuts spike in times of large price drops, leading to a general tightening of lending
  - There are at least 3 reasons to explain the increase in margins and haircuts during a large price drop
    - Unexpected price shocks signal higher future volatility, which leads to margins and haircuts increase
    - Financiers become more careful about whether to accept a pool of assets as collateral during bad time
    - If lenders naïvely estimate risk measures using past data, a sharp temporary price drop leads to a sharp increase in the estimates of these risk measures and higher margins

1. Borrower's Balance Sheet Effects

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.

1. Borrower's Balance Sheet Effects

- Loss spiral and margin/haircut spiral reflect what we call "fire-sale externality"
- The ***fire-sale externality*** arises since each individual financial institution does not take into account the price impact its own fire-sales will have on asset prices in a possible future liquidity crunch
- Hence, fire-sales by some institutions spillover, and adversely affect the balance sheet of others, causing a negative externality

1. Borrower's Balance Sheet Effects

- During downturns both spirals force leveraged investors to unwind their positions causing a) more losses and b) higher margins/haircuts and tighter lending standards, which in turn exacerbate the funding problems, and so on
- Both spirals lead to procyclicality

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 occurs on other financial institutions
- The problem may also extends 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

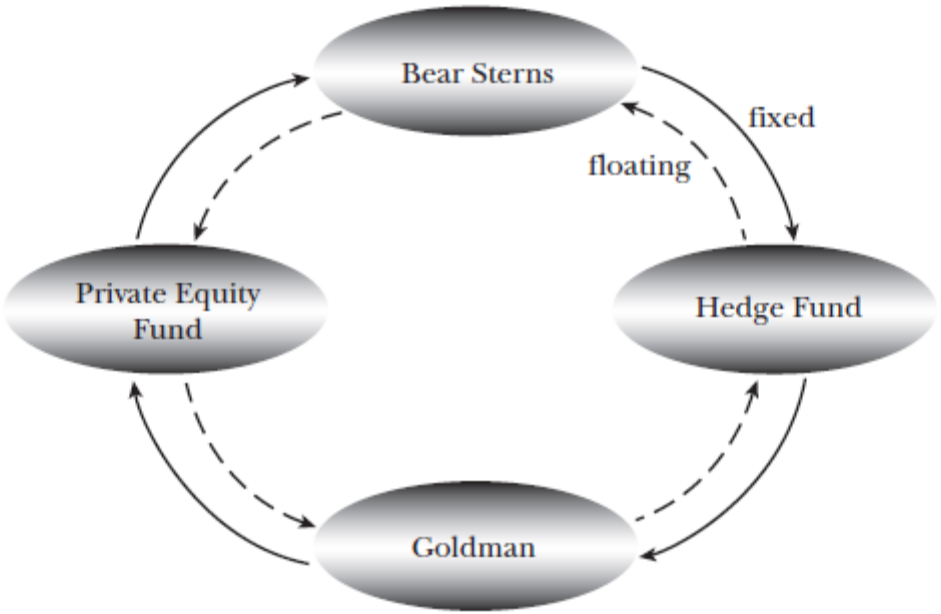
4. Network Effects

- 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
- Because all interconnected parties are aware of their own contractual agreements, they may not know the full situation and therefore become concerned about counterparty credit 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

Conclusion

- There is a widespread view that the Credit Crunch of 2007-2009 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
- When a regulatory mechanism has failed to mitigate boom/bust cycles, simply reinforcing its basic structure is not likely to be a successful strategy
- All mentioned amplifying mechanisms form a starting point to start about a new financial architecture
- We need counter-cyclical regulations!