

# Global Financial Systems

## Chapter 4

### Liquidity

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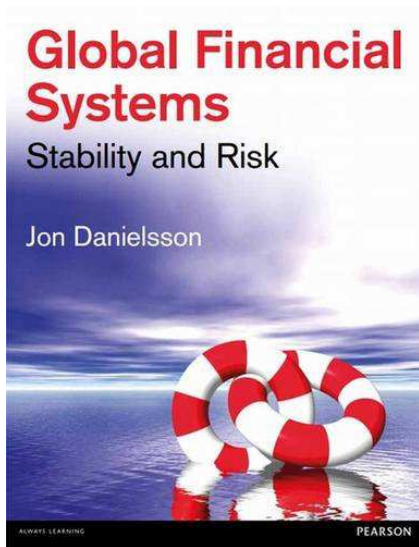
To accompany

*Global Financial Systems: Stability and Risk*

<http://www.globalfinancialsystems.org/>

Published by Pearson 2013

# Book and slides



- The tables and graphs are the same as in the book
- See the book for references to original data sources
- Updated versions of the slides can be downloaded from the book web page [www.globalfinancialsystems.org](http://www.globalfinancialsystems.org)

# Introduction to Liquidity

# Liquidity

- Everybody knows liquidity is important, but nobody knows quite what it is
- Nevertheless we have lots of ways of measuring liquidity, or at least different aspects of it
- The concept of liquidity ties into just about every other concept in the course, and we will focus on different features of liquidity in different contexts

# Liquidity and asset-pricing

- When liquidity is scarce, asset prices are more affected by it
- When there is no liquidity in the market, no one can trade and there is no price
- When there is uncertainty about the true value of a security, liquidity does sometimes evaporate
- Liquidity *is priced*

# The virtues of liquid markets

- More liquid markets have lower transactions costs
  - securities are more attractive to investors
  - firms and banks can more easily withstand mismatches between their assets and liabilities
  - central bankers can conduct open-market operations and thereby efficiently implement monetary policy
- Liquidity begets liquidity

# Liquidity is idiosyncratic ...

... but only in good times

- Certain securities are ordinarily more liquid than others
- The most liquid are securities with broadest appeal, characterized by
  - familiarity
  - well-understood risks
  - formal trading mechanisms
- Innovative, sophisticated, bespoke, and highly risky securities are inherently illiquid
- Liquidity is systemic

# Liquidity crises

just some examples

- 1998
- 1997
- 1987
- 1914
- 1864
- 1763
- Almost all financial crises have liquidity as a central element



# If liquidity crises are so frequent and well understood, why can't they be prevented?

- Safeguards react to previous crisis
- For example, after 1998, we protected the system from hedge funds
- The problem is, those wanting to take risk actively seek it where the safeguards are weakest

# Market Liquidity

# What is liquidity?

many contradictory definitions. This one from the BCBS is common

- *Funding liquidity* refers to the ability of firms to obtain the cash they need to continue to operate smoothly
- *Market liquidity* refers to the ease of buying and selling securities at a fair price
- More generally, liquidity has to do with switching between cash and assets and between cash now and cash later

# Illiquidity and insolvency

- A firm that is insolvent is bankrupt
- Illiquidity is where assets minus liabilities is positive, but the bank does not have enough liquid assets on hand to pay off creditors
- Illiquidity means that banks cannot raise cash by selling assets, because they cannot get acceptable prices in the short run
- In practice, it can be difficult to distinguish between illiquidity and insolvency

# Aspects of market liquidity — Kyle (1985)

1. *Tightness* is the cost of turning around a trading position in a short period of time. Tighter markets mean lower trading costs
  2. *Depth* refers to the size and continuity of the market, in terms of participants and volume of trading. Large orders can be absorbed by deep markets without affecting the price much
  3. *Resiliency* refers to the speed with which the market price recovers after being driven away from intrinsic value by uninformative shocks
- *Immediacy*, the time it takes to find a counterparty, initiate, clear, and settle a trade, is also important (Black, 1971)

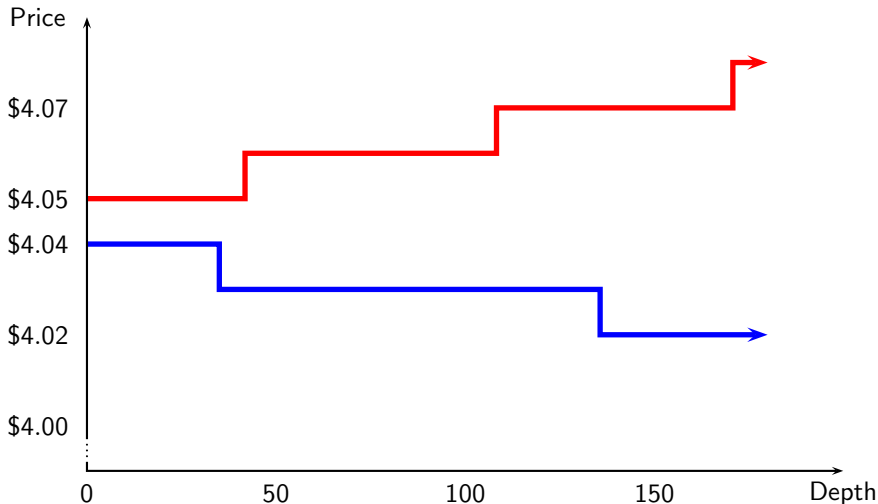
# Depth, tightness, and price impact

- In electronic markets with limit-order books, market depth is partly determined by outstanding limit orders
- Liquidity begets liquidity as more traders are attracted to liquid, low-cost markets
- Transaction costs, especially the *bid-ask spread*, is the most important factor affecting liquidity in *ordinary* trading
- But not during crisis events

*Price impact* is the effect an order has on price: lower in more liquid markets

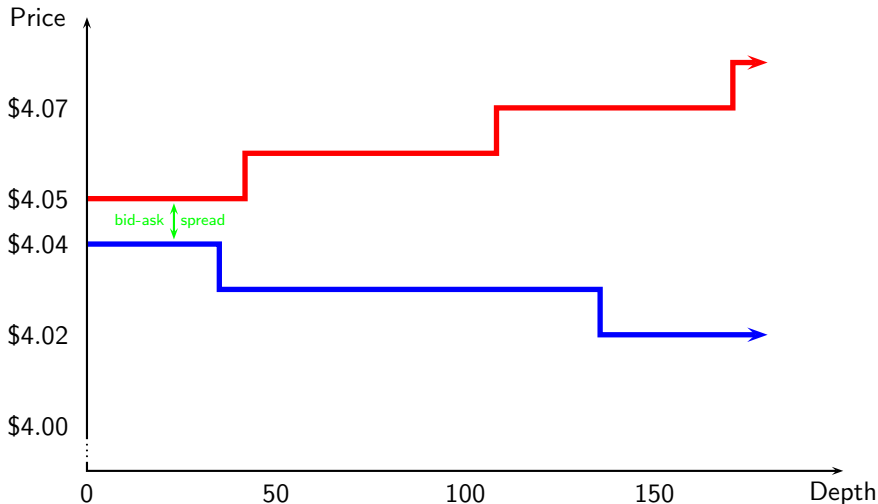
# Market depth in a limit order book

shares of Citigroup on the BATS Exchange, 08:10 EDT, 21 July 2010



# Market depth in a limit order book

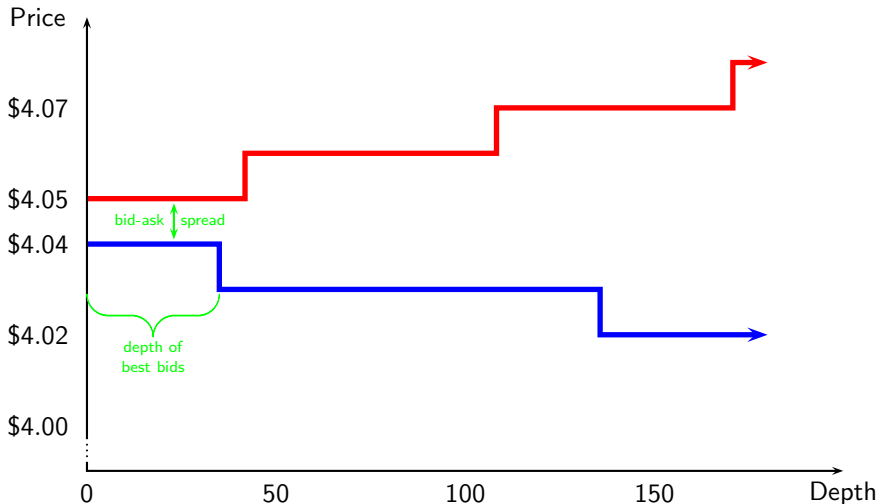
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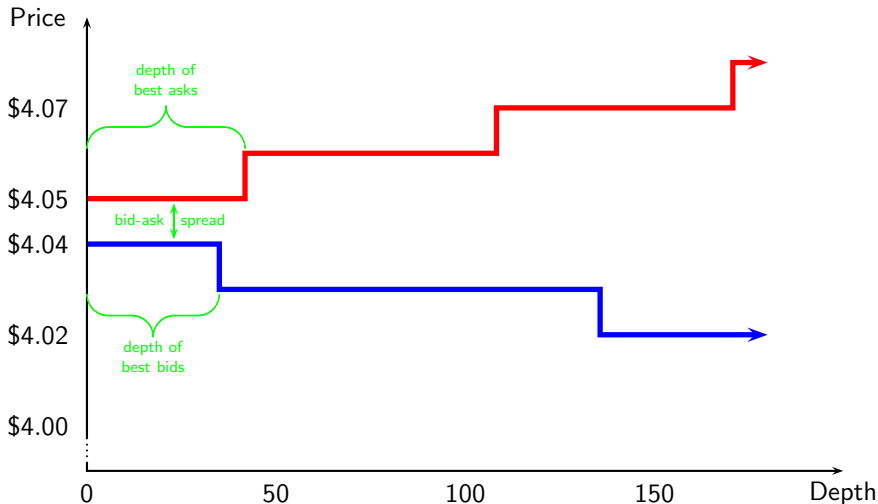
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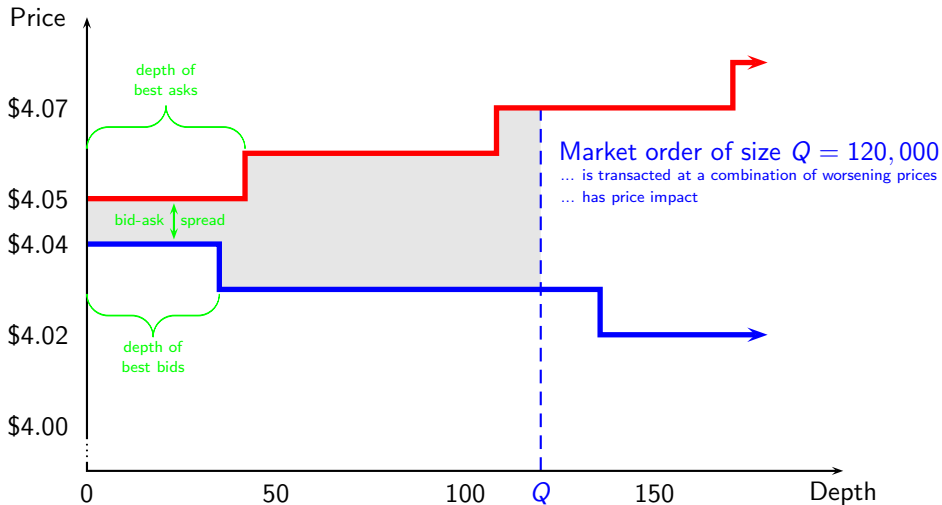
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# Interaction Between Market Liquidity and Funding Liquidity

# Interplay of funding and market liquidity

- Funding and market illiquidity often go together
  1. Firms encounter unforeseen costs or reduced revenue
  2. They sell assets in the securities markets to obtain operating capital
  3. Securities prices fall
  4. Firms sell more securities than they would have needed to at higher prices
  5. Prices fall farther ...
- This is an example of a *feedback loop* typical of illiquidity

# Effect of margins and haircuts

- Margins and haircuts protect those owed money
- In highly leveraged positions losses happen quickly
- Margins have to be met every day — the trading horizon reduces to one day
- Explains Keynes's comment
- Margins/haircuts depend on the risk of assets
- During market turmoil they increase

# Procyclicality of margins and haircuts

- They are lower in booms than in busts
- Easing credit when things go well
- And contracting credit when things go badly
- They therefore amplify the cycle — *procyclicality*

# Mark to market accounting

- Mark to market accounting exacerbates the problems doing crises
- It makes firms more sensitive to falling prices than they otherwise would be
- Consequently inducing them to react when not reacting might be a better course of action



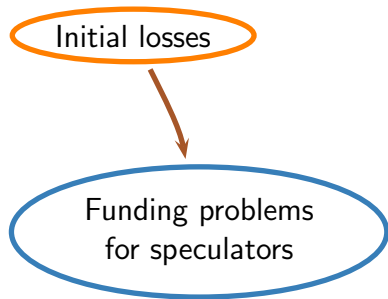
# Market liquidity and funding liquidity

- Deteriorating credit conditions, particularly as manifested in increasing margin requirements, can worsen market liquidity crises
- Small exogenous shocks can be aggravated by endogenous responses of traders, their financiers, and their risk managers, sometimes resulting in dangerous and destructive ‘spirals’ of self-reinforcing action and reaction
- These spirals reinforce each other—*margin spirals* and *liquidity spirals* reinforce broader *loss spirals*

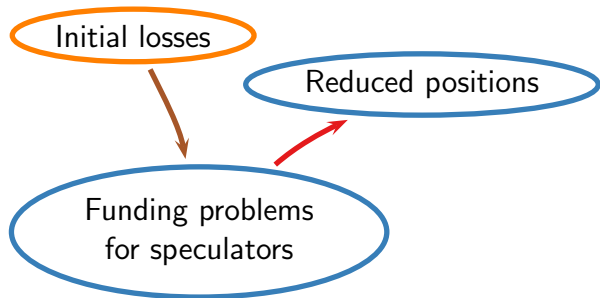
# Vicious liquidity feedback loops

Initial losses

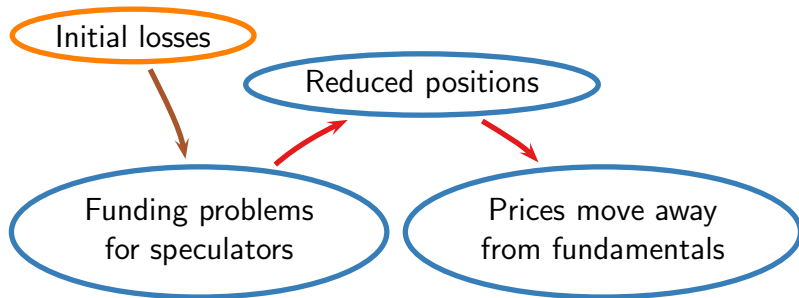
# Vicious liquidity feedback loops



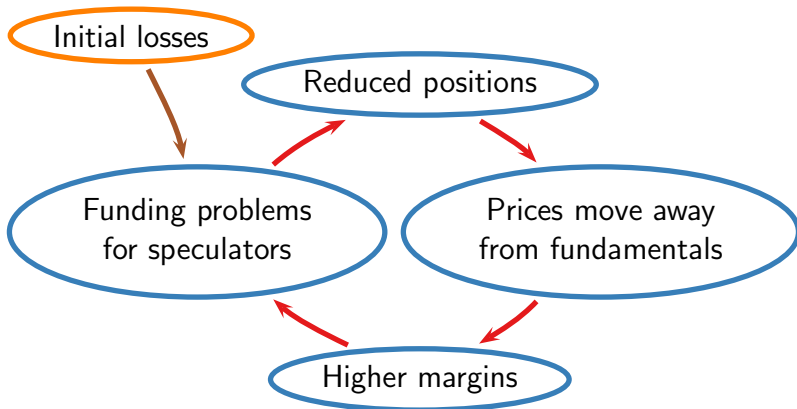
# Vicious liquidity feedback loops



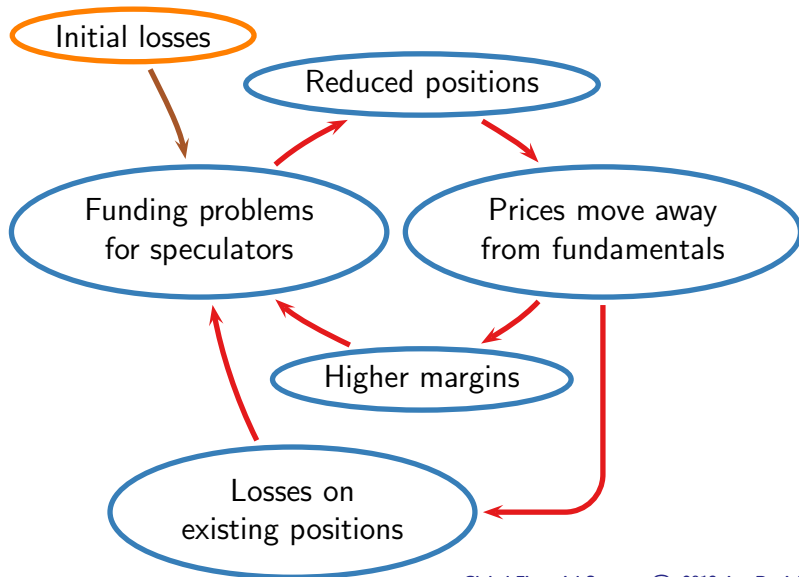
# Vicious liquidity feedback loops



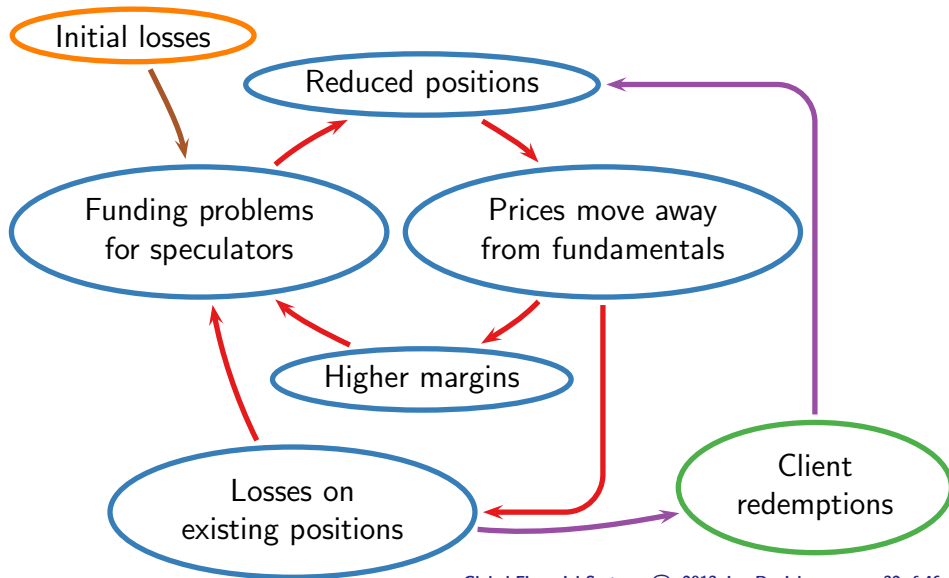
# Vicious liquidity feedback loops



# Vicious liquidity feedback loops



# Vicious liquidity feedback loops





# Feedbacks

- This shows how market liquidity and funding liquidity can adversely feed on each other during crisis
- A similar process works in reverse when things are good
- This is yet another example of the alternating vicious and virtuous feedback loops so prevalent in the financial system
- All contributing to the problem of financial instability

# Liquidity and Asset–Pricing

# Cash-in-the-market pricing

Allen and Gale

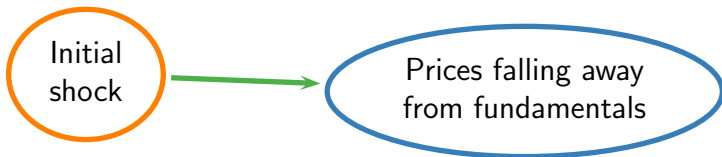
- Markets are incomplete
- Financial institutions may be forced to sell assets to obtain liquidity
- Supply of, and demand for liquidity is likely to be inelastic in the short run
- Small aggregate uncertainties may result in large fluctuations in asset prices
- Can become so severe that financial institutions are unable to meet their obligations, ending in a crisis.

# Cash-in-the-market pricing

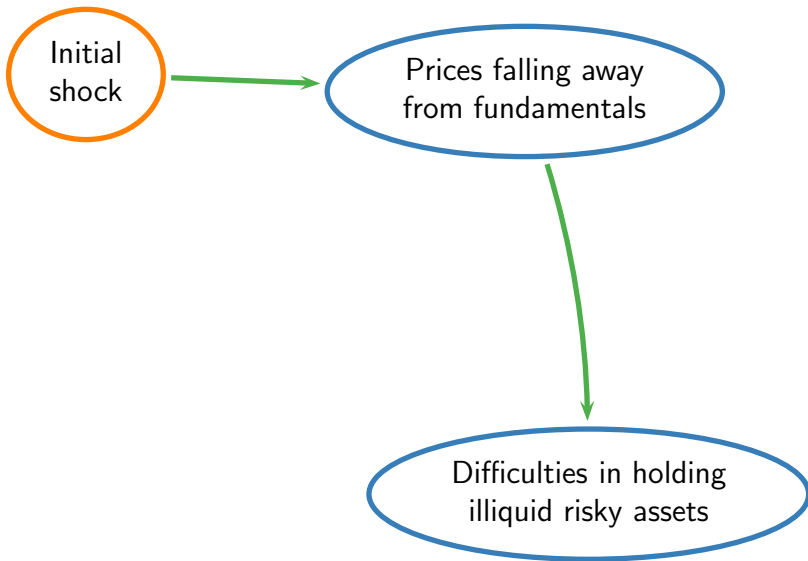


Initial  
shock

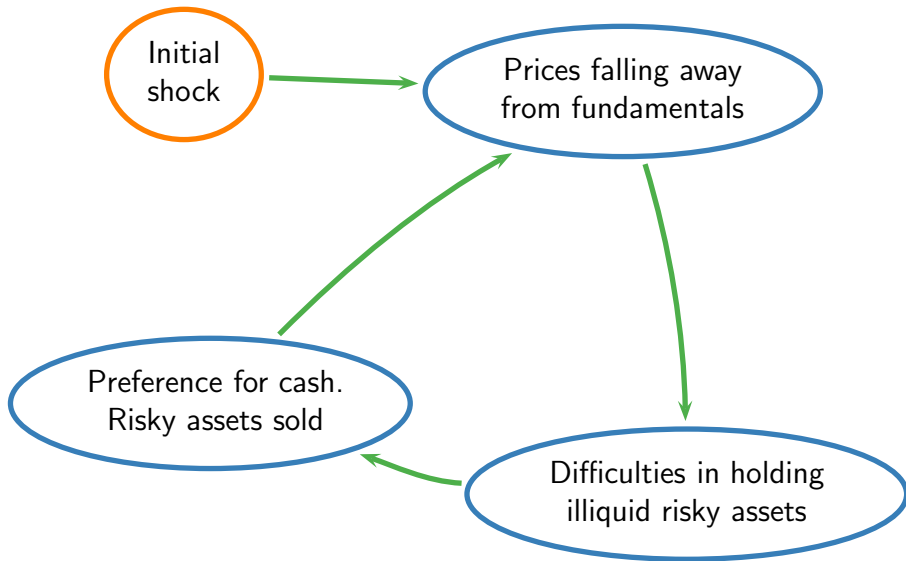
# Cash-in-the-market pricing



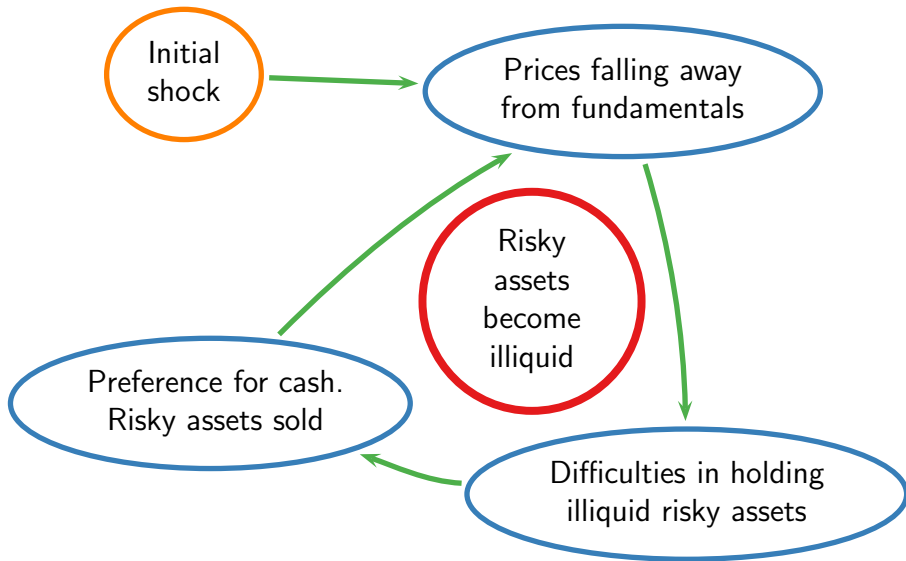
# Cash-in-the-market pricing



# Cash-in-the-market pricing



# Cash-in-the-market pricing





## So...

- Asset prices are low in states where banks need more liquidity
- This is exactly the wrong time from an efficiency point of view for there to be a transfer from the banks needing liquidity to the providers of liquidity.

# Policy

# Motivation

- Small changes in funding conditions or liquidity demand
- Can lead to sharp reductions in liquidity
- Even crises
- Suggests a role for policy

# Central bank liquidity injections

- Central banks can break the vicious feedback loops
- By providing sufficient cash to market participants
- Or even promising to do so
- However, the amounts of money have to be substantial — even infinite
- It may be good to employ *constructive ambiguity*
- Problems discussed elsewhere in book — e.g. Asian crisis and European sovereign debt crisis

# What about moral hazard?

- If banks take liquidity injections for granted, it incentivizes them to misbehave
- Danger of a central bank becoming the liquidity provider of first resort
- Just like the ECB seems to aspire to

# Crisis from 2007

- Massive liquidity injections (discussed later)
- EU promises very large amounts (but is there anything behind it?)
- Liquidity regulations (LCR and NSFR) introduced — and discussed later
- Highlights the need for understanding the network structure of the financial system
- Where are the underlying liquidity vulnerabilities?