Don’t Fear the Repo

Ying Jiang
William Hessert
Sang Hun Kang

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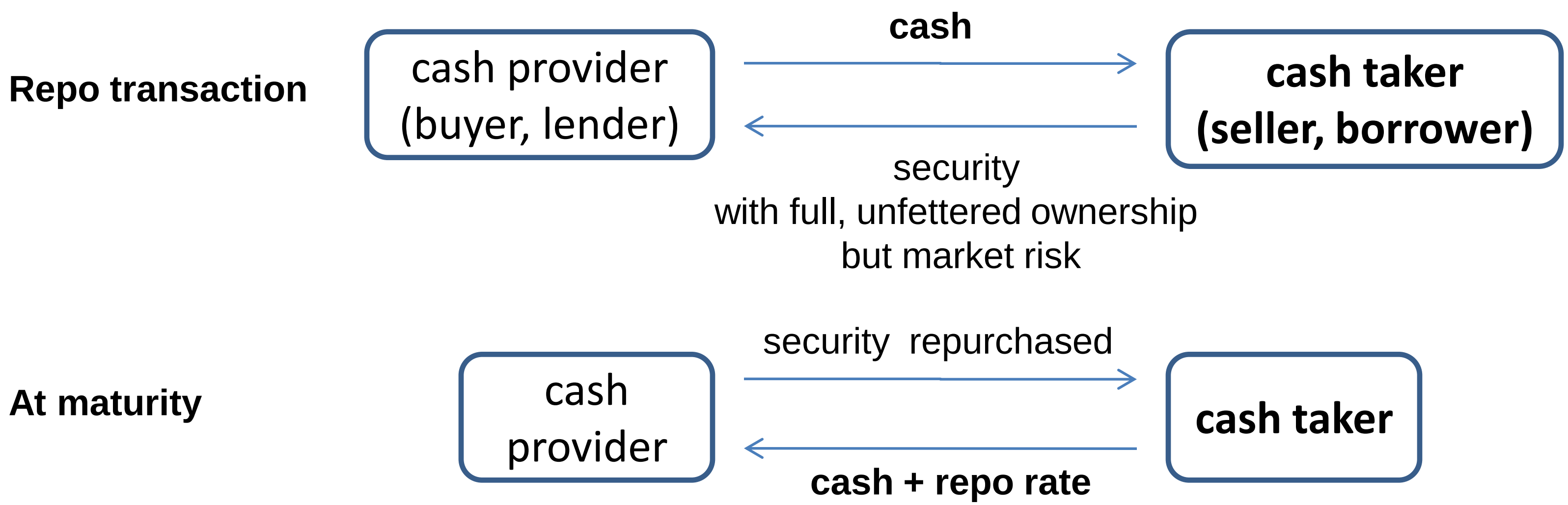
Overview

- Repurchase agreement: structure & history
- Tri-party repo
- General collateral repo
- Fall of Bear Stearns
- Primary dealer credit facility as a backstop for repos

Repurchase agreement: structure



- Sale of securities coupled with agreement to repurchase for a set price at a later specified date
- Cash transaction + forward agreement
- Money market (short-term borrowing/lending) instrument
- Similar to secured loan

Repo: property rights

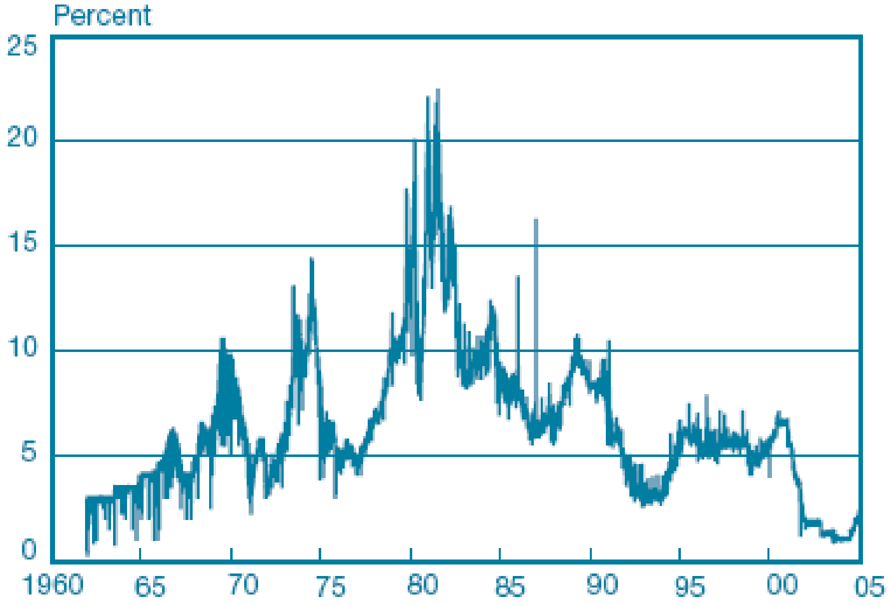
- Security seller(cash borrower)
  - Right to coupon payments: to be entitled to any coupons paid on repo securities during the term of a repo
  - Right of substitution: to retrieve a security if it identified an opportunity to sell the security at an attractive price in an outright transaction
  - Security buyer(cash provider)
  - Right to sell and deliver: to sell securities or deliver repo securities in settlement of a prior sale during the term of the repo
  - Right to substitution: for general collateral repo only

Repo: history

- 1917 - Federal reserve banks used to extend credit to member banks when wartime tax made commercial paper less attractive
- 1920’s - New York Fed used to extend credit to nonbank dealers to encourage the development of a liquid secondary market for banker’s acceptances
- 1951 – after disuse during Great Depression and WWII repos reappeared after Federal Reserve gained control of monetary policy
- 1970’s – repo market expanded due to successive new heights in short-term interest rates, high level of volatility in short & long interest rates (risk management), and growing marketable Treasury debt

Repo: history

Overnight Federal Funds Rate

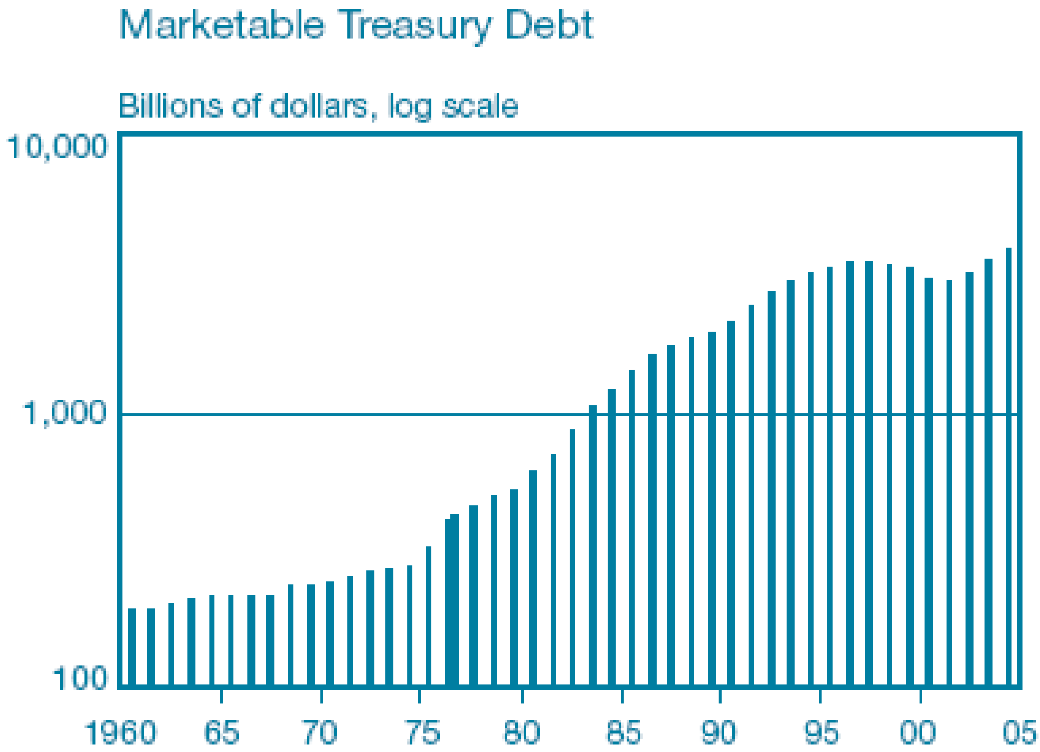


Source: Federal Reserve Statistical Release H.15.

Yields on Ten-Year Treasury Securities

Source: Federal Reserve Statistical Release H.15.

Repo: history

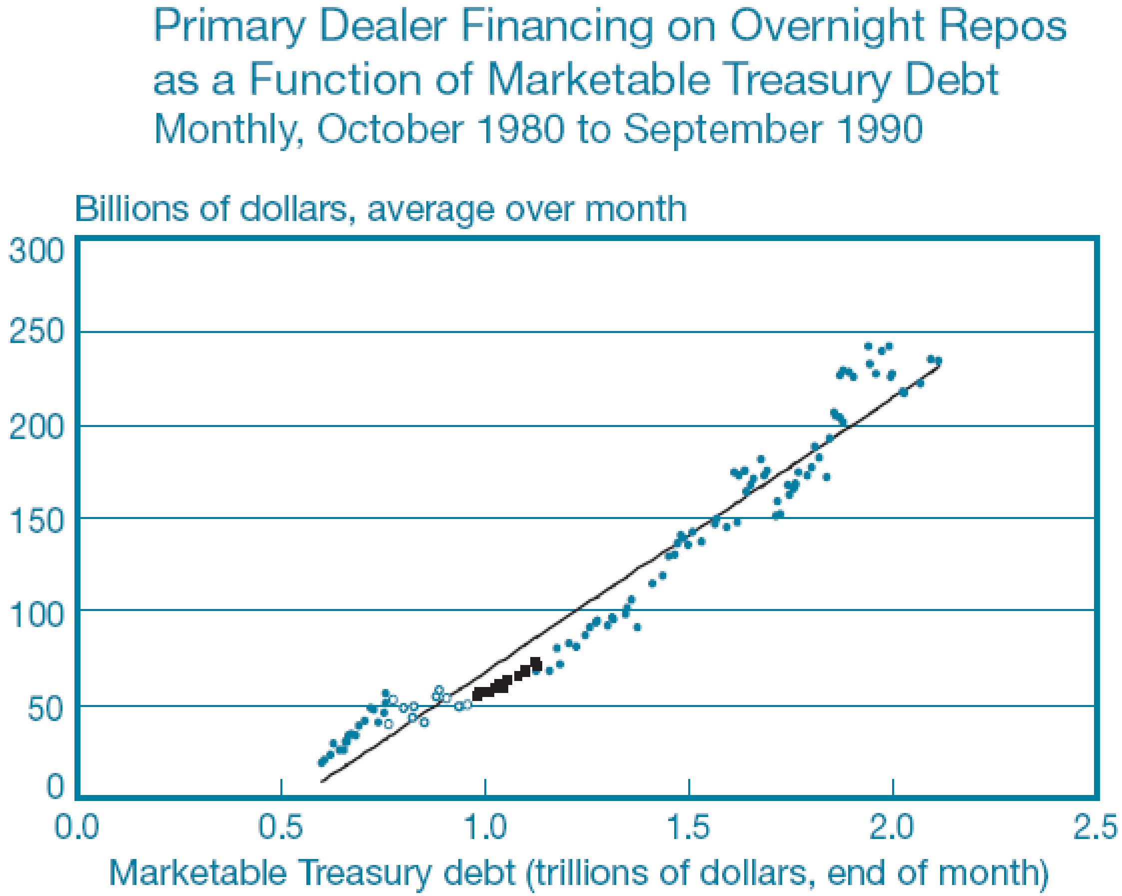


Source: *Treasury Bulletin* (various issues).

Note: The chart depicts marketable debt on June 30 until and including June 30, 1976, and on September 30 thereafter.

Repo: history

- 1980's – dealer failures accelerated the growth of tri-party repo and led to recognize accrued interests and exemption from "automatic stay" of bankruptcy law was effected

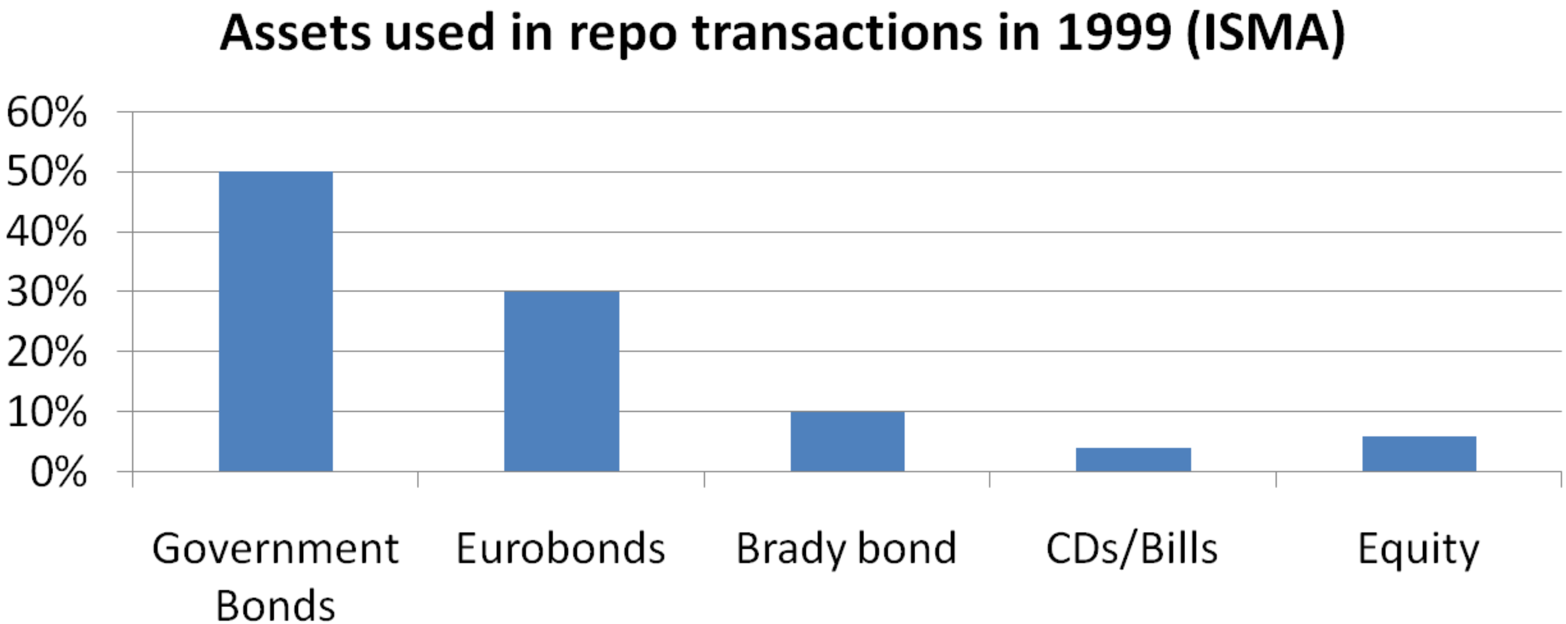


Note:
white circle:
June 1982-May 1983
square:
June 1983-May1984

Repo: forms

- Hold in custody: collateral pledged placed in internal account by borrower, risky with cash lender
- Tri-party repo: collateral held by a neutral third party responsible for transaction & marking to market
- Whole loan repo: collateral is loan. e.g mortgage receivables
- Equity repo: collateral is equity
- Sell/buy backs: benefiting lower cost of financing available for collateralized loan
- Securities lending: borrowing/lending of securities such as to cover short positions/use in complex financial structures
- Reverse repo: repo from buyer's viewpoint

Repo: market



- $4.5 trillion was outstanding as of March 5 2008, according to Miller Tabak. Of that, $3 trillion was through overnight/short-term borrowings
- $2.5 trillion turns over in the repo market daily

Repo: applications

- Opportunity for short-term secured investment, good liquidity & competitive rates, e.g. Investors, Fund managers, Corporate treasurers
- To obtain short-term loan to fund long-term positions, gain access to cheaper funding to cover short positions in securities or for other speculative investments, e.g. traders in trading firms
- To capture spread btn reverse repo and repo rates, bearing no market risk but credit risk, e.g. bond dealers & market makers:
- To manage liquidity by central bank operations

Repo: risk

Credit risk	Market risk	Liquidity risk
Counterparty risk	Interest rate risk	Market illiquidity
Default	Collateral price volatility	Collateral illiquidity
Operational risk	FX risk	Banking liquidity exposure
Regulatory failure	Interest rate gap exposure	Interest rate gap exposure

Operational risk	Legal risk	Collateral risk
System failure	Lack of documentation	Issuer default
Settlement failure	Translation risk	Lack of liquidity
Fraud, procedural risk		Collateral price volatility

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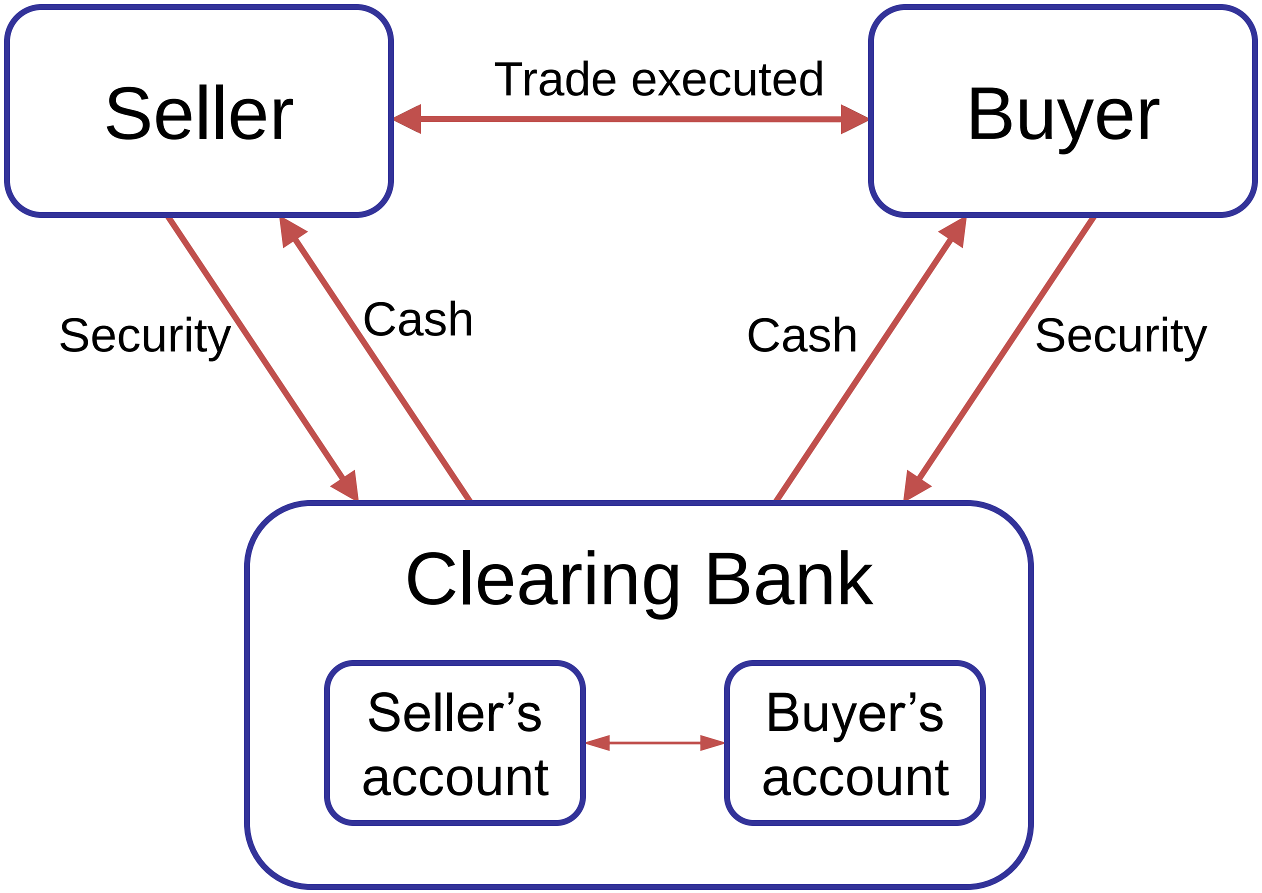
Tri-party Repo

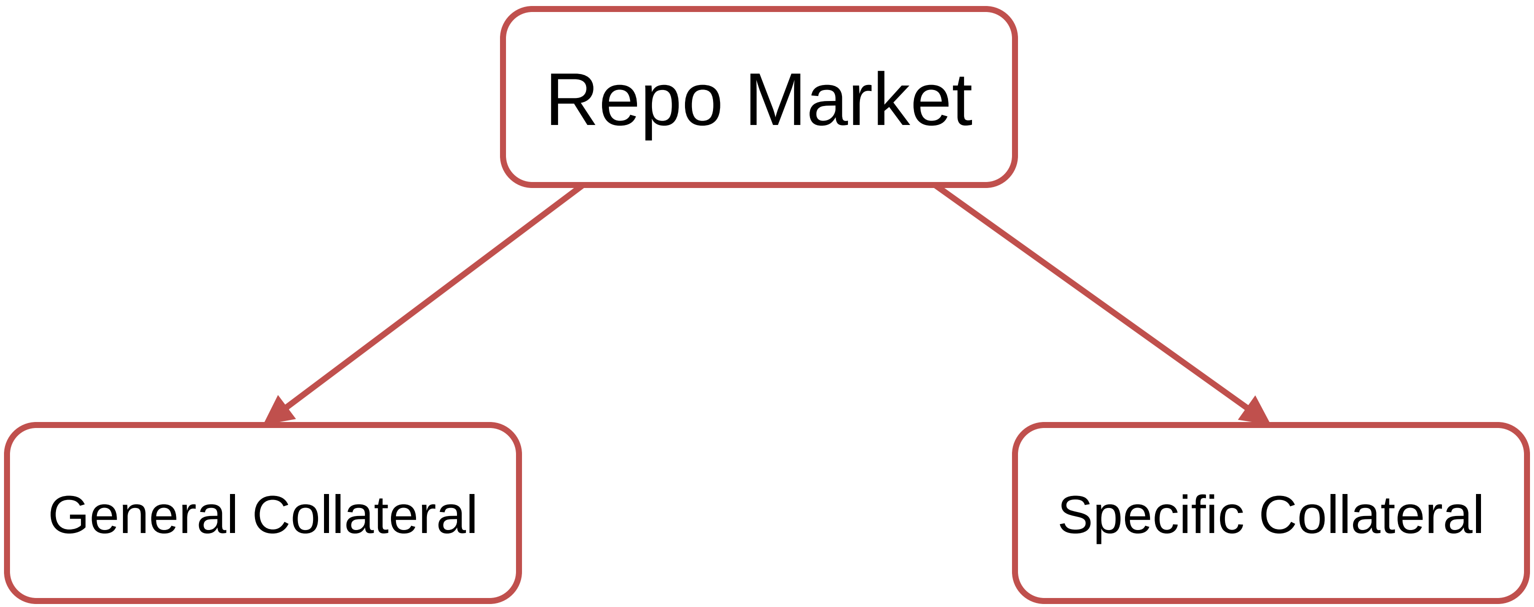


Why Tri-party Repo?

- ***Make the repo arrangement accessible to a wider range of market counterparties. (e.g. smaller banks, cash-rich investors)***

1. No requirement to install repo settlement and monitoring systems
2. No requirement to take delivery of collateral, or to maintain an account at the clearing agency
3. Independent monitoring of market movements and margin requirements
4. In the event of default, the clearing bank will implement default measures

General Collateral Repo



A broad class of collateral specified by credit rating, etc.

e.g. AA-rated Government bond

e.g. specific US treasury bond or common stock, etc.

General Collateral Finance Repo Service

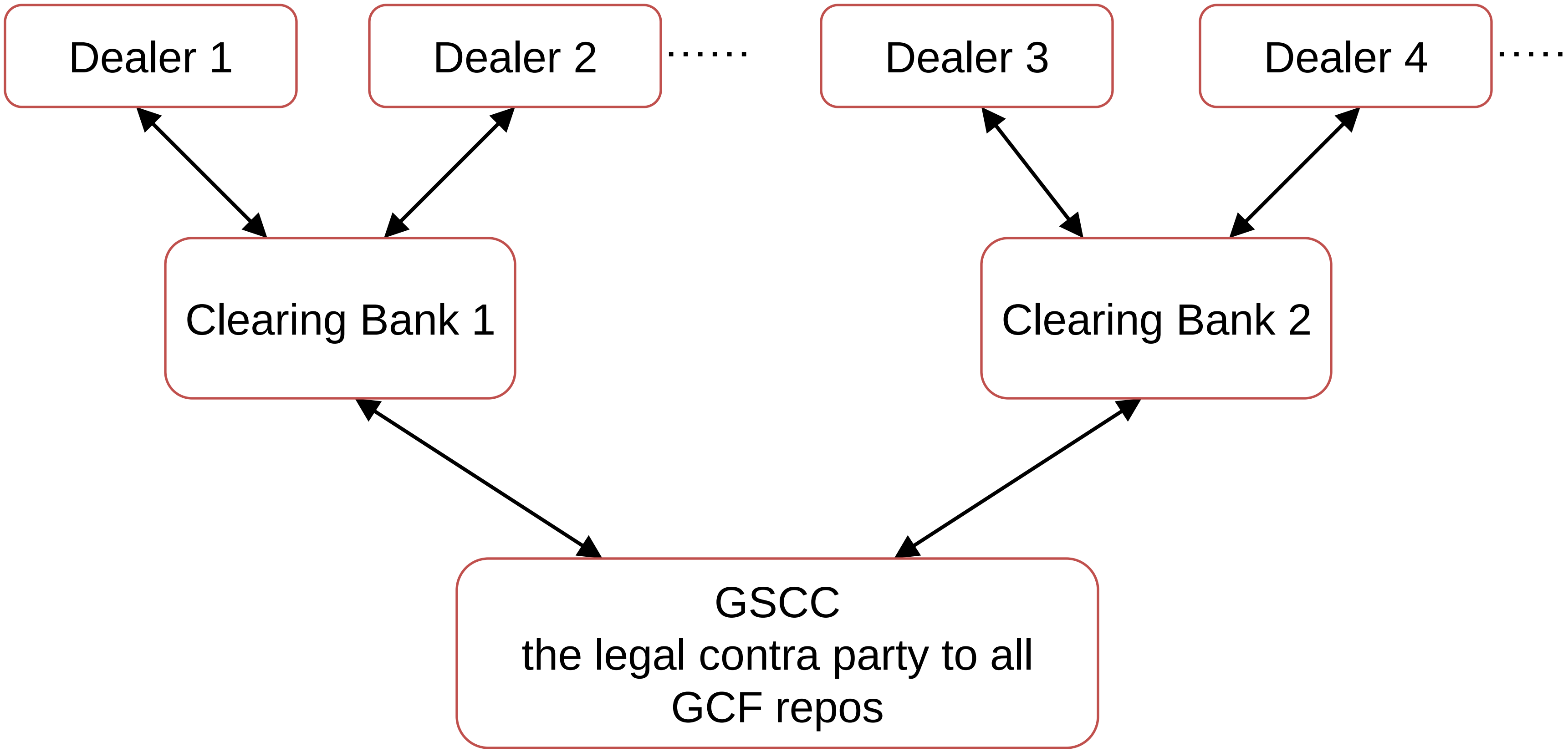
- **Dealers trade general collateral Repos <u>on a blind basis</u> via authorized brokers without requiring intraday, trade-for-trade settlement on a delivery-versus-payment (DVP) basis.**

- **Standardized Generic <u>CUSIPS</u>** (*Committee on Uniform Security Identification Procedures*) **are used to specify the <u>acceptable type of underlying collateral</u>.**

- **GCF processing has its own <u>net at end of day.</u>**
Securities are pledged via a <u>Tri Party mechanism</u> and the interbank cash component is moved via Fedwire.

- **In the morning the pledges are unwound, funds are returned to <u>net funds lenders</u> and securities returned to <u>net funds borrowers</u>.**

Operations of GCF Repo with GSCC



- GSCC-Government Securities Clearing Corporation;
- Dealers above should have an existing clearing arrangement with one of GSCC's two clearing banks: the Bank of New York or Chase Manhattan Bank.

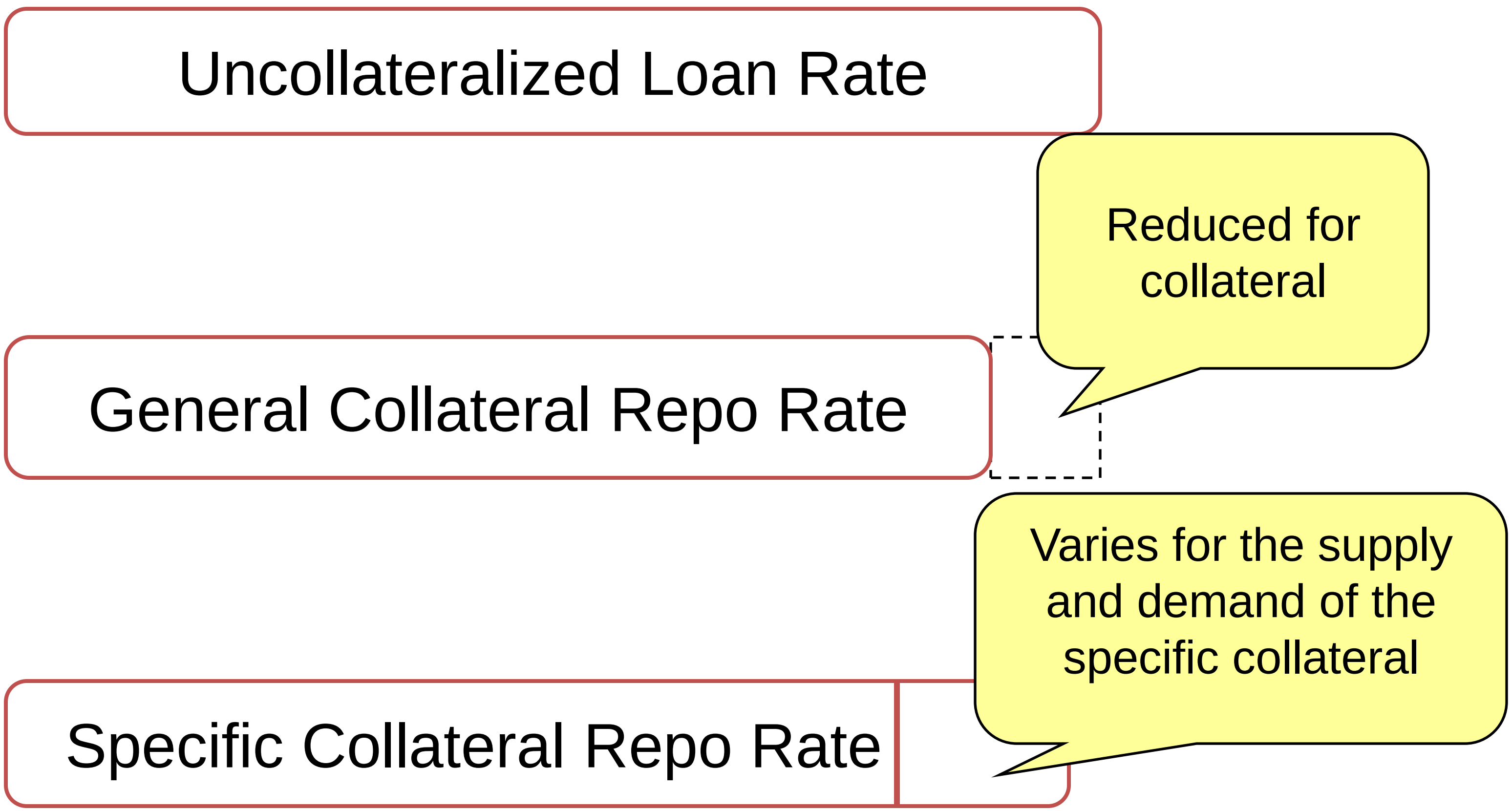
Why GCF?

- GCF Repo transactions settle on a **net rather than gross basis**, reducing movements of funds and securities and thereby lowering settlement costs. In 2002, for example, average daily net settlement volume of GCF Repo was $101 billion while average daily gross settlement volume was $721 billion.

- GCF Repo settles entirely **on the books of the clearing banks** and does not require movement of Treasury securities on Fedwire. GCF Repo can thereby accommodate settlement later in the day, allowing a borrower of money to defer deciding what securities to use as collateral until 4:30 p.m.

- GCF Repos are **reversed every morning and renewed every afternoon**. A borrower of money can therefore use collateral securities to settle unrelated transactions during the day and can easily change collateral securities without exceptional provisions for collateral substitutions.

General Collateral Repo Rate



- The "general collateral" market is one in which repos are priced as collateralized loans.

Treasuries' Scarcity Triggers Repo Market Failures Bloomberg 20 Mar2008

Investors seeking the safety of government debt amid **the loss of confidence in credit markets** pushed rates on three-month bills today to 0.387 percent, the lowest level since 1954. Institutions worldwide have reported $195 billion in write-downs and losses related to subprime mortgages and collateralized debt obligations since the start of 2007,making **firms reluctant to hold anything but Treasuries as collateral on loans.**

……

Overnight general collateral repo rates have traded lower than the Fed's target rate for overnight lending every day this year. The rate on general collateral repo closed today at 0.9 percent, according to data from GovPX Inc., a unit of ICAP Plc, the world's largest inter-dealer broker, compared with 1.25 percent yesterday. Today's rate is 135 basis points below the Fed's target rate for overnight lending of 2.25 percent.

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- **Primary dealer credit facility as a backstop for repos**

Repos and the fall of Bear Stearns

- How did a bank with $35 billion in liquidity suffer from such an immediate and severe liquidity shortage?
- Liquidity as a % of total assets was lower than other banks and the only broker dealer to be below 10% – also relatively small and undiversified.
- BSC had significant “net” repo borrowing positions (repo financing minus repo lending) of $74.5 billion – more than double its liquidity position.
- As other firms refused to provide repo financing to BSC, the company didn’t have enough overnight repo loans outstanding that it could call in to repay the financing. This mismatch put a significant strain on cash in the short-term as competitors terminated repos.

	Total Repo's/ Total Assets	Excess Liquidity & Other Unencumbered Collateral/ Total Repo's	Total Assets/ Total Equity
Bear Stearns	26%	33%	33.5
Goldman Sachs	14%	98%	26.2
Lehman Brothers	26%	107%	30.7
Merrill Lynch	23%	85%	31.9
Morgan Stanley	16%	72%	33.4
Broker Peer Average	21%	79%	

Source: Company Filings, SNL Financial and Sandler O'Neill

Last Days of Bear Stearns: Friday 3/07/2008 -> Fri 3/14/2008

Friday before the buyout, a major bank rebuffed Bear's request for a short-term $2b repo loan.

The firm had $17b in cash. But also 35:1 leverage. Bear CFO says "There is absolutely no truth to the rumors of liquidity problems that circulated today in the market."

Tuesday: Goldman email stops deals with Bear as counterparty due to high risk.

By the end of the day, banks refused to issue further credit protection on Bear's debt.

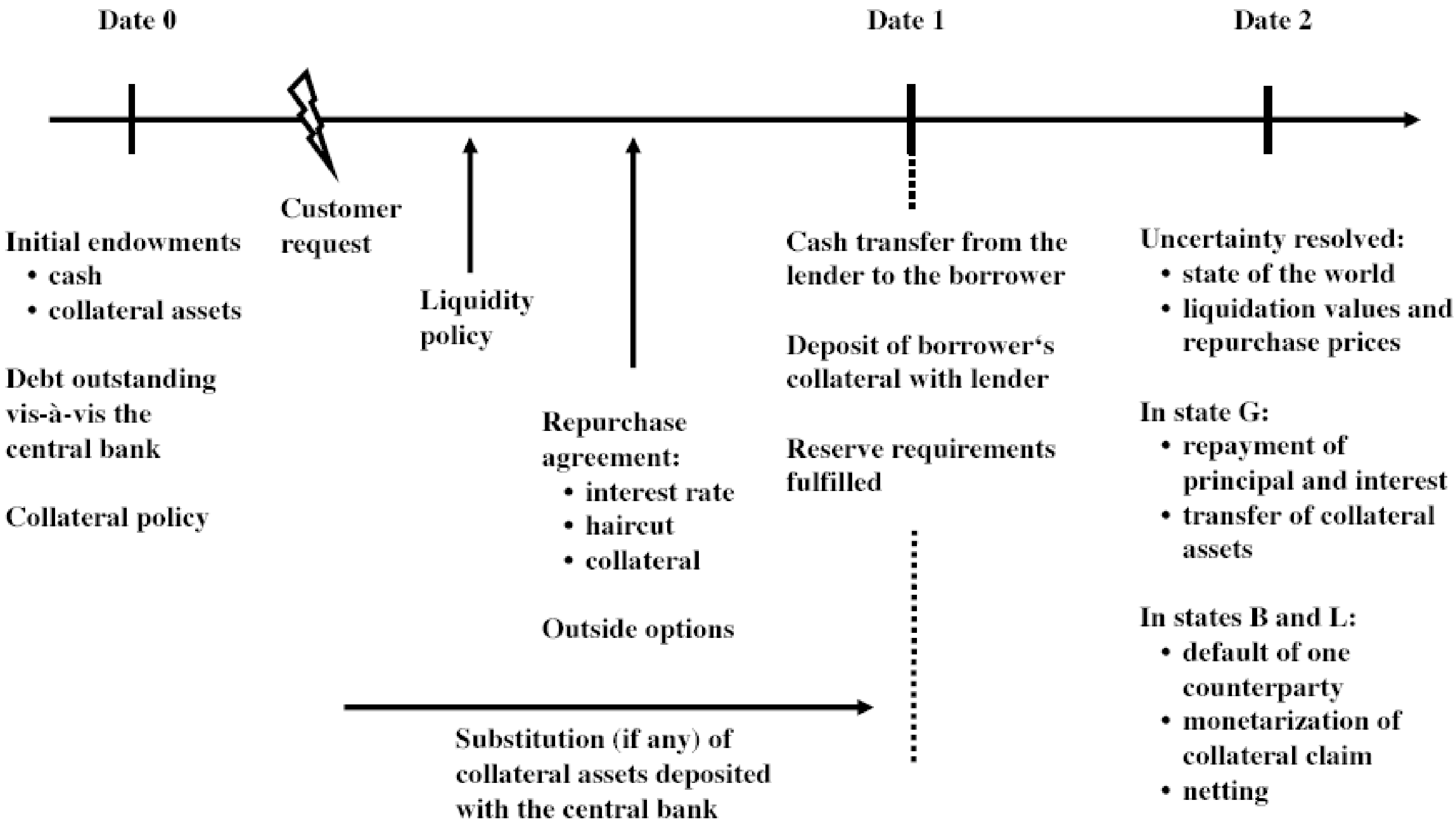
Wednesday: CEO Alan Schwartz, "We don't see any pressure on our liquidity, let alone a liquidity crisis."

Friday: Bear's liquidity crisis peaks. Bear Sterns falls and is bought out for by J.P. Morgan and the govnmt.

How did Bear's liquidity dry up so quickly?

- Timing of short term repos was mismatched with longer timing of Bear's net lending position in its securities lending book. Securities lending agreements are typically longer than overnight (unlike most repos), and thus could not be pulled fast enough to pay down the repo lines.
- Declining sentiment and downward spiraling share value.
- Decreasing liquidity of certain securities.
- But… *If a repo is fully collateralized with sufficient haircuts where does the credit risk come from? How come counterparties stopped rollover of repos with Bear?*
- Ewerhart Tapking 2008 offers some explanation: A scenario is analyzed in which two commercial banks, a borrower and a lender, negotiate a repo.
  - In a private repo agreement, parties will not enter an agreement if collateral is too illiquid.
- Legal risks

Repo Agreement Structure



Repo break-down in times of distress

- Ewerhart Tapking 2008 offers an explanation for the observation that in times of financial distress and mutual distrust, Financial institutions may not be willing to exchange liquidity against relatively illiquid collateral. In reality, such a break-down may be driven by several, mutually reinforcing factors.
  1. Banks may perceive a higher probability of an individual default.
  2. Perceptions of potential illiquidity and riskiness may increase, making it more difficult to achieve conditions that are individually rational for both sides of the contract.
  3. Counterparties may also become more risk-averse.
  4. There may be the fear that liquidity needs still increase.
  5. Even if a lender would be willing to give cash for collateral today, this counterparty may be less confident that the collateral will be accepted tomorrow when the repo is to be rolled over.

Repo break-down in times of distress

- The joint effect of such developments may lead to a disruption even of the "secured“ segment of the interbank market.
- PDCFL: The Fed has repeatedly taken measures that aimed at making a broader collateral base available. Moreover, in a quite unconventional move, the Federal Reserve decided, effective on Tuesday, March 11, 2008, to offer primary dealers an amount of $200 bn in Treasury bonds and bills in exchange for mortgage-backed securities after spreads for the latter instruments widened dramatically.
- This was directly beneficial for the banking sector to the extent that illiquidity of collateral assets impairs the functioning of the repo market.
- More recently, the Bank of England implemented similar measures, yet on a smaller scale.

PDCF

Board of Governors of the Federal Reserve System

Press Release
March 16, 2008

“The Federal Reserve has announced that the Federal Reserve Bank of New York has been granted the authority to establish a Primary Dealer Credit Facility (PDCF).”

The PDCF will provide overnight funding to primary dealers in exchange for a specified range of collateral, including

- all collateral eligible for tri-party repurchase agreements arranged by the NY
- all investment-grade corporate securities
- municipal securities
- mortgage-backed securities and
- asset-backed securities for which a price is available.

“The PDCF will remain in operation for a minimum period of six months and may be extended as conditions warrant to foster the functioning of financial markets.”

PDCF

Board of Governors of the Federal Reserve System

Press Release
September 14, 2008

For immediate release

The Federal Reserve Board on Sunday announced several initiatives to provide additional support to financial markets, including enhancements to its existing liquidity facilities.

The collateral eligible to be pledged at the Primary Dealer Credit Facility (PDCF) has been broadened to closely match the types of collateral that can be pledged in the tri-party repo systems of the two major clearing banks. Previously, PDCF collateral had been limited to investment-grade debt securities.

These changes represent a significant broadening in the collateral accepted under PDCF.

PDCF (additional info)

Effective September 15, 2008

What is the Federal Reserve's Primary Dealer Credit Facility (PDCF)? Why are we introducing the PDCF and what are some of its terms?

The Primary Dealer Credit Facility (PDCF) is an overnight loan facility that will provide funding to primary dealers in exchange for any tri-party-eligible collateral and is intended to foster the functioning of financial markets more generally.

Who can participate?

Eligible participants include the primary dealers. They will participate through their clearing banks.

What are the terms of the loan?

Loans will settle on the same business day and will mature the following business day.

What is the rate of the loan?

The rate of the loan is the primary credit rate at the New York Fed, currently 25 basis points above the target federal funds rate.

What collateral is eligible for pledging?

Eligible collateral will include all collateral eligible in tri-party repurchase arrangements with the major clearing banks as of September 12, 2008.

How will collateral be valued?

The collateral will be valued by the clearing banks based on a range of pricing services.

How much can primary dealers borrow?

A primary dealer will be allowed to borrow up to the margin-adjusted collateral they can deliver to the Federal Reserve's account at the clearing banks.

How and when are the loans and collateral settled?

The loans will be made available to a primary dealer's clearing bank following the acknowledgment by the clearing bank that sufficient collateral has been placed in the New York Fed's tri-party account at the clearing bank. This will take place around 5:00 p.m. each day.

What is the duration of the loans made under the PDCF?

All loans are made for a duration of one day. New loans can be taken out each day.

Is this lending with recourse?

Yes, loans to primary dealers made under the PDCF are made with recourse beyond the collateral to the primary dealer entity itself.

What are the differences between this and other recent initiatives?

The Term Auction Facility program offers term funding to depository institutions via a bi-weekly auction, for fixed amounts of credit. The Term Securities Lending Facility will be an auction for a fixed amount of lending of Treasury general collateral in exchange for OMO-eligible and investment grade corporate securities, municipal securities, mortgage-backed securities, and asset-backed securities.

How long will the PDCF be in operation?

The PDCF will remain available to primary dealers until January 30, 2009 or longer if conditions warrant

What are Primary Dealers?

Federal Reserve Bank of New York trades U.S. government and select other securities with designated primary dealers, which include banks and securities broker-dealers. Weekly transaction, market share data and primary dealer lists are updated periodically. Much of the information is submitted voluntarily. The Bank expects primary dealers to submit accurate data, but the Bank itself does not audit the data..

Central Bank Repo Backstop and Illiquid Collateral

- Broader eligible collateral for central bank operations may lead to a welfare improvement for market participants. (Ewerhart Tapking 2008)
- The expansion of the set of eligible collateral will typically be accompanied by a replacement of liquid collateral by illiquid collateral
- i.e. bad collateral drives out good collateral in lending relationships with the central bank.
- Moreover, such replacement is not likely to be stopped by an adjustment of haircuts.

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