



THE BANK OF NEW YORK MELLON



Expo LA

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Money Market Innovation: Repurchase Agreements

Presented by:

Keneth Vallen

Product Manager, Treasury Services

The Bank of New York Mellon

Agenda

- Repo Market Overview
- Repo Overview
- Brief Historical Synopsis
- Market Participants, Motivating Factors, and Current Market Conditions
 - Investors
 - Dealers
 - Leveraged Investors
 - Central Banks
- Market Innovation
- Focus on the Investor
- Q&A

- **Repo Market Overview**

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Repo Market – Size and Growth

The repo market is a critical element in developed fixed income markets

- Represents 20% - 25% of total assets of the top five Wall Street dealers*
- Over 6 trillion USD a day market in the US*
- Over 5.8 trillion EUR a day market in Europe*

Repo markets continue to grow in developing and developed markets

- According to International Securities Finance magazine, the repo market is the fastest growing of all capital markets
- European repo market growth drivers
 - Growth in the European Bond Market
 - New entrants' comfort with raising financing across broad range of assets
 - Documentation standardization
- Basel II
 - Capital requirements exemptions for repo deals with 0% margin and dealing through a counterparty
- Other growth drivers
 - Developing markets
 - New market participants (hedge funds)
 - Growing interest from corporate treasurers

*As of 3/28/2008

Repo Market — Current Events

Since mid-February of 2008, conditions in the repo market changed dramatically

- Risk re-pricing decreases value of collateral
- Only the safest collateral widely accepted
- Increase in margin requirements for non-treasury collateral

Differences in usage across developed markets

- United States
 - A majority of repo transactions are overnight in duration
- Europe
 - A majority of repo transactions are term deals

The repo sector is constantly evolving to meet new demands brought on by participants looking to address changing financing and investment needs

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Repo Overview — What is a repo

- Repo is short for “repurchase agreement”
 - Repo buyer lends money and receives securities
 - Repo seller borrows money and delivers securities
- Short-term secured instrument
 - Economically similar to a secured loan
 - Buyer receives collateral for money lent
 - Seller receives funding in exchange for collateral
- Technically a single transaction
- General motivation is the borrowing/lending of cash
- At the end of the agreement, principal, interest, and securities are returned

Repo Overview — Mechanics

• Repo Seller

- Agrees on a “repo rate” for the transaction
- Sells the security
- Agrees to repurchase it at an agreed upon date
- Delivers the security to the counterparty (lender)
- Receives cash
- Receives security, delivers principal and interest when the transaction reaches maturity

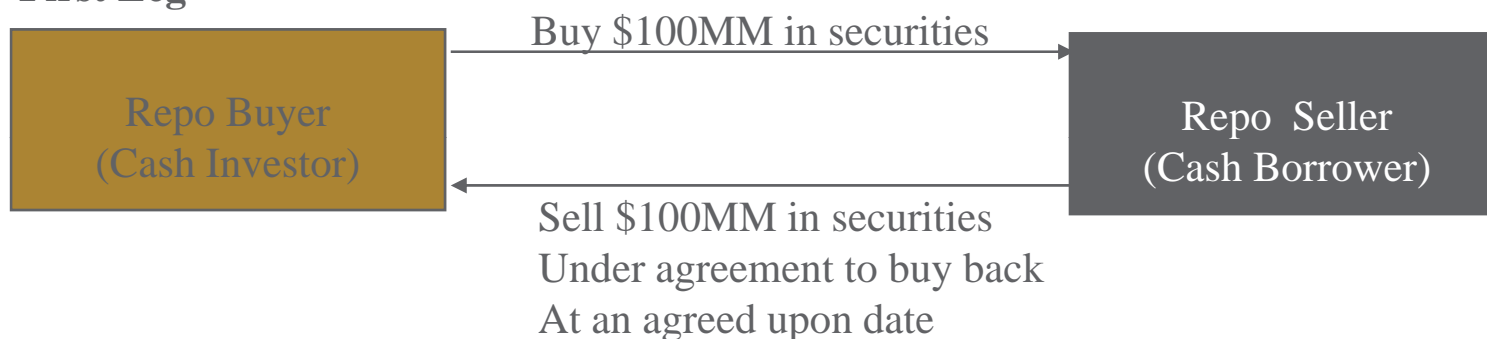
• Repo Buyer

- Agrees on a “repo rate” for the transaction
- Purchases the security
- Agrees to sell the security back at a later date
- Delivers cash to the counterparty (borrower)
- Receives the security delivered by the counterparty (borrower)
- Receives principal and interest when the transaction reaches maturity, delivers security

Repo Overview – Mechanics (illustrated)

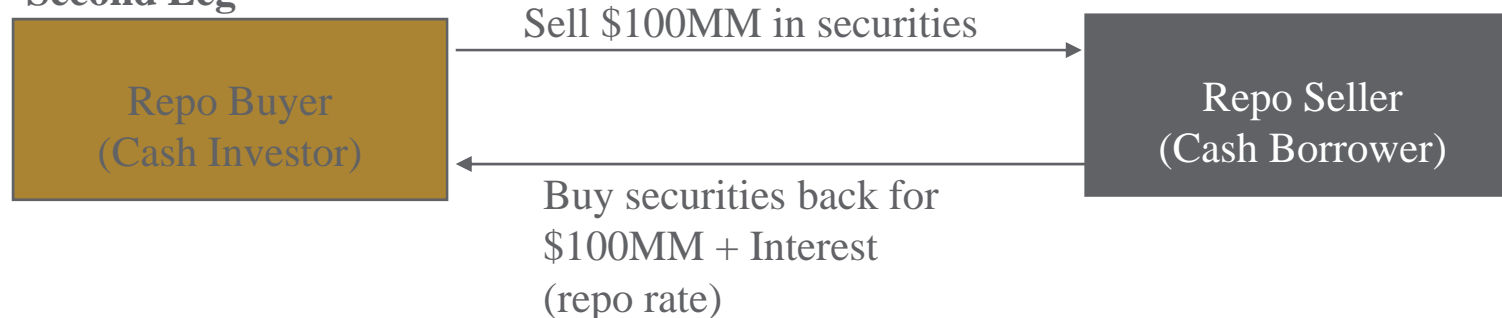
- A repo seller (cash borrower) and a repo buyer (cash lender/investor) agree to enter into a repo agreement

First Leg



- At the end of the agreement, the repo seller returns the principal cash amount plus interest to the repo buyer

Second Leg



Repo Overview — Rates

- Rates can be fixed or floating
- Rates driven by market conditions
- Rates are quoted by market participants
 - Banks
 - Dealers
 - Etc.
- Rate calculation
 - 360 day basis
 - $\text{Principal} * \text{Repo Rate} * (\text{days}/360)$
- Rate drivers
 - Underlying collateral
 - Deal term
 - Deal amount

Repo Overview — Collateral

- **Types**

- General Collateral
 - > Collateral that meets the cash lender's collateralization requirements – does not require specific securities issues
- Special
 - > Specific collateral defined by the cash lender in the transaction

- **Substitution**

- The cash borrower may substitute the underlying collateral with the cash lender's consent

- **Margin**

- Over-collateralization received by the cash lender, which reduces risk resulting from market value fluctuations of the collateral underlying the transaction

- **Contractual rights**

- Cash Lender
 - > The cash lender retains full legal title to lend or sell the securities to a third party
- Cash Borrower
 - > The cash borrower retains economic benefits of the underlying security (coupon payments, market appreciation/depreciation, etc)

Repo Overview — Collateral Examples

- US Government securities
- Agency securities
- MBS
- Agency and private label (pass through CMOs)
- Asset-backed securities
- Money market instruments (MTNs, CP, CDs)
- Corporate Bonds
- Emerging market obligations
- Whole loans (mortgage and asset-backed)
- The list continues to grow...

Repo Overview – Risk

- **Counterparty default risk**
- **Underlying collateral**
 - Quality
 - Price volatility
 - Value
- **Interest rate**
- **Operational**

Repo Overview — Tenor

- **Overnight**

- One-day maturity transaction

- **Term**

- A repurchase agreement with a specific end date

- **Open**

- A repurchase agreement with no end date – either party is free to terminate the agreement whenever

Repo Overview — Settlement Options

• Deliverable

- Wirable
 - > Fedwire, Depository Trust Company (DTC), and Participants Trust Company (PTC)
- Physical
 - > Physical transfer of the certificate
- DVP
 - > Delivery of securities versus payment
- Tri-party
 - > The custody bank facilitates the deal
- Quad-Party Repo
 - > Like tri-party, but the cash borrower chooses a local custodian for safekeeping

• Non-deliverable

- Hold In Custody
 - > The securities are held in custody by the cash borrower

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Repo Overview — Settlement Options

- 1910s

- The Federal Reserve (the Fed) used repo to extend credit to member banks

- 1920s

- The Fed used repo to extend credit to dealers in bankers' acceptances to create liquid secondary BA market

- Great depression through World War II

- Repo fell into disuse but reappeared following the restoration of the Fed control of monetary policy in 1951

- 1950s – 1970s

- After the treasury-fed accord of 1951, repo was used by non-bank government securities dealers to finance their securities positions with large non-financial corporations and state/local governments
- Rising interest rates and growing Treasury indebtedness attracted investors in the 1970s
- Rising rates and volatility encouraged dealers to expand their hedging activities through the use of reverse repo arrangements as a form of securities borrowing that was required for short sales deliveries

- 1980s

- Repo market growth and the high-profile collapse of broker/dealers generated changes in margin conventions
 - > Right to sell the underlying securities in the event of a counterparty default was put into place
- Cash lender legally able to take possession of the securities underlying the repurchase agreement
- Documentation Standardization
 - > The Bond Market Trade Association developed the Master Repurchase Agreement (MRA), which is a standardized document used by most repo market participants today

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Investors

Investor Motivation

Repo transactions offer investors an opportunity to invest cash in investment vehicles that offer safety, liquidity, flexibility, and yield

- Safety: Investments are backed by collateral while margins on collateral help to ensure preservation of principal
- Liquidity: Investors can choose overnight and open tenor options
- Flexibility: Tenor, collateral options, investment amount, rates, currency, and other investment parameters can be adjusted, based on investor preferences
- Yield: Repurchase agreements quickly adjust to rate changes and extends yields close to the fed funds target rate

Current Market Conditions

A widespread “flight to quality” sentiment lead to a high demand for short-term US treasury securities, which resulted in yield metrics not seen in over 50 years

- US Treasury securities were trading at negative yields in late March
- Treasury-backed Money Market Mutual Funds yielded low rates, and were closed to new investments, in certain cases
- Repo rates associated with US Treasury (UST) collateral are unattractive due to the flight to quality
- Opportunity exists for investors willing to enter into repo deals backed by non-US T collateral

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Dealers

Motivating Factors

Dealers are able to gain access to alternative financing and securities lending facilities, while being able to profit from market-making activities

- Financing/Inventory financing
- Short covering
- Matched book

Current Market Conditions

The repo market is experiencing liquidity issues driven by flight to quality sentiment, resulting in financing troubles and settlement failures

- Market-wide effort to reduce reliance on repo financing
- Repo financing expensive and difficult for non-UST collateral
- Settlement fails
 - > Lack of supply in UST
 - > Difficulty in covering short positions
 - > Unwillingness of UST holders to reverse

Case Study: Bear Stearns

- **Market conditions**

- Flight to quality
- Illiquid repo market
- Sub-prime contagion

- **Bear Stearns**

- Reliant on the repo market for financing
- Mortgage-Backed Securities (MBS) supply
- Margin requirements
- Inability to roll over repo contracts

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Leveraged Investors

Motivating Factors

Leveraged investors, (hedge funds, private equity investors, high net worth investors) access the repo market for investment purposes, financing, and securities lending transactions

- Finance positions and invest the proceeds
- Access cash without liquidating securities, while retaining the economic benefits
- Reduce costs associated with financing

Current Market Conditions

A lack of repo market liquidity is contributing to the destructive cycle of forced asset sales, liquidation, and devaluation; while margin requirements increase the cost of access to financing

- Repo buyers are worried that pricing of ABS/MBS securities does not properly reflect value
- Financing ABS/MBS books is more costly/difficult as repo buyers become increasingly risk averse
- Leveraged investors are forced to liquidate assets when they are unable to access sources of financing

Case Study:

Carlyle Group Mortgage Fund and Thornburg Mortgage, Inc

• Carlyle Group Mortgage Fund

- Margin calls
 - > Adverse market conditions resulted in loss of value on firm's assets
- Repo financing
 - > Financing ABS/MBS became more expensive and difficult
- Liquidation
 - > Inability to finance via repo to meet margin calls lead to liquidation

• Thornburg Mortgage, Inc

- Securities pricing
 - > Declining asset prices decreased the value of collateral used in repo
- Repo financing
 - > Not enough money raised through repo transactions to meet margin calls
- SEC filing
 - > Thornburg filed a default notice with the SEC and share prices collapsed

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Central Banks

Motivating Factors

Central banks are active participants in the repo market – by lending and borrowing money, central banks are able to modify bank reserve levels

- Central banks use repo to adjust deposit levels and rates
 - > Repo is used to offset temporary swings in reserves, which can move rates beyond target levels
 - > Rate increases are offset by buying repo, while rate decreases are offset by selling repo
- Repo is a precision liquidity tool – liquidity can be injected into various markets

Current Market Conditions

Risk aversion results in non-UST asset funding difficulties, prompting central banks to promote liquidity by accepting alternative repo collateral

- Traditional repo transactions
 - > Backed by government-issued or backed securities
- Alternative funding arrangements
 - > Central banks are accepting different repo collateral to distribute liquidity to parched areas

Case Study: The Federal reserve

• Primary Dealer Credit Facility

- Federal reserve repo financing availability extended
 - > Primary dealers are able to conduct financing deals directly with the Fed
- Good collateral goes first
 - > Securities need to be liquidated to meet margin calls in the absence of financing
 - > Market participants reluctant to purchase securities without high ratings
 - > Highly-rated securities sold at fire-sale prices raise money needed to meet obligations
 - > Value of all highly-rated securities decline, resulting in a vicious value reduction cycle
- Initiative to repair market liquidity issues by accepting a wide range of collateral for repo
- Precision liquidity
 - > By accepting highly-rated securities as collateral in repo deals, the Fed funds dealers
 - > Instead of selling highly-rated securities to meet financial obligations, dealers can finance their positions to avoid default
 - > The impact may result in alleviating pricing pressures and ending the liquidation cycle

• Term Securities Lending Facility

- Dealers able to exchange riskier debt for UST
- Response to trade fails in the repo market while allowing dealers to finance their books
 - > Cash lenders were able to borrow funds at 0% against UST

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Market Innovation – Intermediation

- General Collateral Finance (GCF)

- GCF repo provides advantages to dealers through settlement netting, late day settlements, and ease of collateral substitution
- GCF repo reduces costs, enhances market liquidity, and contributes to the overall repo market growth

- Tri-party Repo

- In tri-party repo, an administrator handles the transfers of cash and securities, monitors security compliance, marks the securities to market, and screens the securities pledged against legal and risk preferences
- Outsourcing the administration of a repo to a tri-party agent is a cost-effective and comprehensive solution for accessing the market

- Quad-party repo

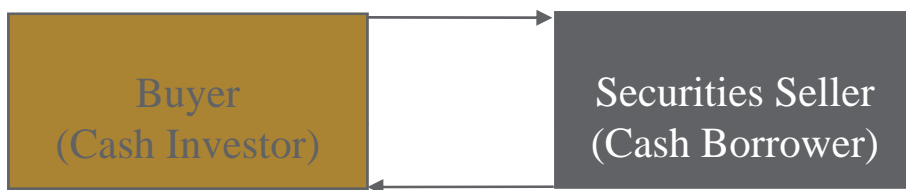
- An extension of the tri-party repo, with the addition of a fourth party. The fourth party is a local agent bank, which is designated by the cash taker to hold assets in safekeeping – this is a way to enable the cash taker to determine where to hold assets they wish to finance

Market Innovation – Tri-party Repo

The key difference between a repo and a triparty repo is the existence of **multiple** buyers, an **intermediary**, and an **agent**

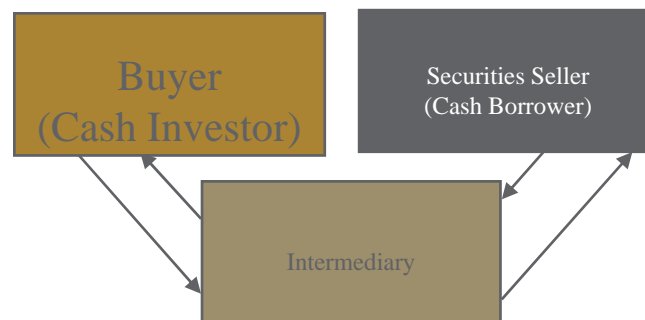
•Classic Repo Participants

- Buyer (Cash Investor)
- Securities Seller (Cash Borrower)



•Triparty Repo Participants

- Multiple Buyers (Clients)
- Securities Seller (Dealer)
- Intermediary



Market Innovation – Tri-party Repo (con't)

- Tri-party repo enables borrowers to access a wider range of cash lenders and promote financing of a wider range of collateral than they would using bi-lateral DVP repo
- Expansion through market globalization, intermediary consolidation, transition to electronic trading platforms (portals)
- Tri-party repo transfers the responsibility for collateralizing and administering repo transactions
- Tri-party deals allow for asset substitution, which is important during times of economic stress
- 40%-50% of US repo is executed through tri-party, while 10%-12% of European repo is tri-party – large growth potential in the European repo market for tri-party
- Tri-party allows dealers to finance more diverse inventory across asset classes and geographic regions, continue to trade collateral beyond regional cutoff times, and to leverage operational efficiencies offered by central collateral management

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Focus on the investor

• Repo as an investment

- Safety
 - > Backed by collateral
 - > Margin requirements
- Liquidity
 - > Tenor options allow for maximum liquidity
- Yield
 - > Quickly adjusts to rate changes/performs well in rising rate environment
 - > Realize diversification benefits by investing across various instruments
- Flexibility
 - > Investor can choose counterparty with which to deal
 - > Investor can choose underlying collateral
 - > Riskiness of underlying collateral included in repo rate calculation

Focus on the investor – Barriers to investing

- **Traditional investment barriers**

- Developing and maintaining trading/settlement systems
- Dedicating operations resources to collateral management and reconciliation
- Cost of securities safekeeping and other custody fees
- Trade execution, clearing, licensing, and other fees
- Presence of counterparty and operational risk

- **Circumventing barriers through intermediation**

- Intermediaries extend cost and risk benefits to the investor
 - > Outsource operations and administration
 - > Avoid large systems investments
 - > Significantly reduce operational and counterparty risk
 - > Avoid clearing and trading expenses
- Intermediaries help to increase investment options
 - > Cash lenders can access a wider range of borrowers and collateral

Focus on the investor – Viable investment option

- **Benefits of repo**

- Safe, liquid, and flexible
- Source of risk-adjusted return

- **Intermediation**

- Reduce costs and risks associated with repo investing
- Increase access to counterparties and collateral choices
- Increases overall investment accessibility through electronic interfaces (portals)

- **Current market conditions**

- Yield pickup opportunities for investors willing to take on risky collateral

- **Overall market direction**

- Robust growth
 - > Driven by innovation, evolving financing needs, and investor demand

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- **Keneth Vallen**

Product Manager, Treasury Services

(212) 815-4655

kvallen@bankofny.com



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