The Repo Market

Outline and Reading

- Repurchase Agreement
- Typical Market Participants
- Using Repo to Finance a Long Position
- Using Repo to Take a Short Position
- Credit Risk in Repo, Haircut, Marking to Market
- Systemic Risk
- General Collateral vs. Specific Issue Repo
- Triparty vs. Bilateral Repo
- Special Repo Rates
- Pledgeability and Bond Pricing: Evidence from Chinese Corporate Bond Markets

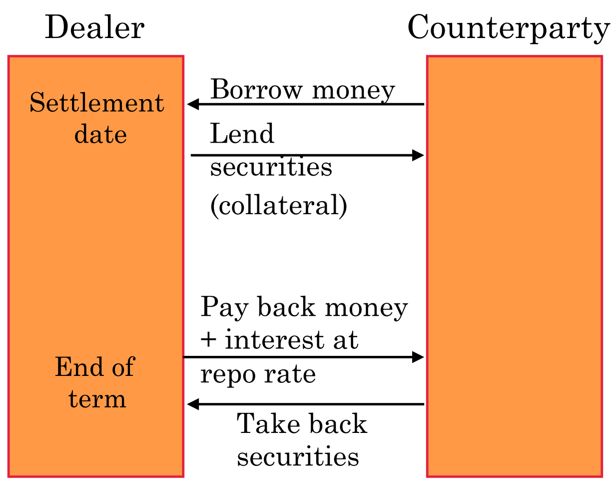
- Tuckman and Serrat, Chapter 12
- Chen, Chen, He, Liu, Xie (2018) http://www.zhiguohe.com/uploads/1/0/6/9/106923057/haircut7.pdf

Repos

- We often talk about buying and shorting securities.
- In the fixed income market, these transactions are accomplished with the use of the **repo market**.
- A **repurchase agreement**, or **repo**, is a sale of securities for cash with a commitment to repurchase them at a specified price at a future date.
- In the absence of credit risk, the repurchase agreement by itself is simply a **collateralized loan**.
- However, in the event of default by the borrower, the repo lender is exempt from automatic stay imposed on other creditors, and can seize the collateral and sell it.

Repurchase Agreement or "Repo"

- A repurchase agreement is the sale and simultaneous forward purchase of securities, typically one day later.
- When the dealer is the lender, it's called "reverse repo."



Example of a Repo

- Dealer repos $30 million par of a Treasury bond to a customer (lender) for 51 days.
- The market value of the collateral is $31,228,715.
- The customer takes a **2% haircut**, lending 98% of the market value, or $30,604,141 at a repo rate of 5.25%.
- After 51 days, the customer returns the $30 million bonds, and the dealer repays $30,604,141 (1+0.0525 x 51/360) = $30,831,759.
- Repo rates are *simple interest* rates that use an *actual/360* calendar (in the U.S.--some other countries use actual/365).

Typical Repo Market Participants

Cash Providers	Securities Providers
Money Market Funds	Securities Lenders
Insurance Companies	Hedge Funds /
Corporations	Levered Accounts
Municipalities	Central Banks
Central Banks	Commercial Banks
Securities Lenders	Insurance Companies
Commercial Banks	

Types of Collateral

Treasuries, Agencies, MBS, corporate bonds, equity, ABS

Term of the Loan

- If the term of the loan is one day, the agreement is called an **overnight repo**. Approximately 50% of the market is overnight repo.
- Otherwise the agreement is a **term repo**. The term can be as long as one year. The vast majority of repos have maturities of three months or less.
- **Open repo** is an overnight repo whose term is renegotiated on an ongoing basis. Most overnight repo is open repo.
- Conceptually, rolling over 6-month term repo is like synthesizing a semi-annual floater.
- *Except the borrower is subject to "rollover risk" that the repo market dries up or lenders run.*
- This is a key gap between theory and practice, as we will see with swap spreads…

Using Repo to Finance a Long Position

- Dealers do not own all their inventory outright.
- They can finance the purchase of a Treasury by simultaneously entering into a repo using the same Treasury as collateral.
- This is an easy way to execute a levered bet on bond prices rising.
- Similarly, they can use reverse repo to implement a short position by borrowing and selling securities, and then buying them back later, a bet on bond prices falling.

LONG POSITION **REPO**

	Open market		Dealer		Customer
Time 0		→	Buy securities worth P_0	→	Receive collateral of securities worth P_0
		←	Pay P_0	←	Lend P_0 x (1-hc)

Time 0 cash flow to dealer = $-P_0$ x hc

	Open market		Dealer		Customer
Time T		←	Sell securities	←	Give back collateral
		→	Receive P_T	→	Get P_0 x (1 - hc) + repo int

Time T cash flow to dealer = P_T - (P_0 x (1-hc) + repo interest)

P&L: Time 0 cash flow + Time T cash flow

= P_T - P_0 - repo interest

Using Repo to Take a Short Position

- Suppose a dealer wants a position that will profit if bond prices decline.
- He can simultaneously enter into a reverse repo and sell the collateral.
- He borrows the bond and sells it, using the proceeds of the sale to lend into the reverse repo.
- At the end of the term of the repo, his loan is repaid with the agreed upon interest, and he buys the bond back in the open market to deliver into the reverse repo.

Credit Risk in Repo

- Both parties are subject to credit risk, because the market value of the collateral can change over the life of the loan.
- For example, in 2007, Merrill Lynch was a major repo lender to two Bear Stearns hedge funds with CDOs on subprime mortgage-backed securities as collateral.
- As the collateral value deteriorated, the funds failed to meet margin calls. Merrill seized $850 million of CDOs but was only able to sell $100 million worth.

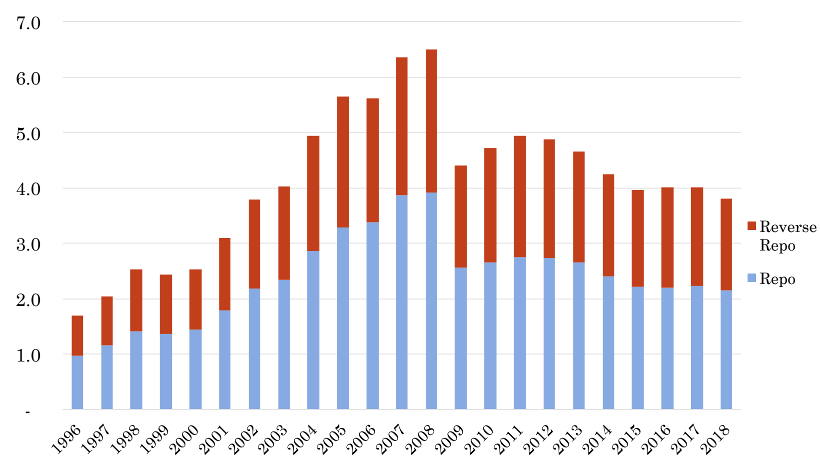
Mechanisms for Limiting Credit Risk

- Margin (Haircut) - Lenders often require a margin, or overcollateralization to limit their credit exposure, typically 1% to 3% for high grade collateral, but as high as 50% for some kinds of collateral.
- Marking to Market – As collateral value changes, collateral levels or loan balances are adjusted.

Repo Markets and Systemic Risk

- A major contributor to the crisis of 2007-09 was a run on the shadow banking system, especially repo markets.
- E.g., in early 2008, Federated and Fidelity refused to roll over $5B each of repo financing to Bear Stearns which had been using the repo market to finance an $85B position in MBS. Bear's lending pool quickly dried up and it was taken over by JP Morgan.
- Repo haircuts and repo fails shot up over 2008.
- The repo market contracted sharply between 2008 and 2009.
- The drying up of repo funding forced fire sales of illiquid assets by repo lenders unable to manage large MBS books, aggravating the crash in MBS prices and contributing to widespread bankruptcy.

Average Daily Repo Outstanding 1996-2018 in $Trillions



Financing by U.S. government primary dealers involving U.S. government, federal agency, corporate and federal agency MBS securities. Source: SIFMA.

Running a Matched Book

- The dealer may simply act as a market maker, or intermediary, entering into repo transactions with some counterparties, and offsetting reverse repos with others.
- The dealer's compensation is that the reverse repo rate (the dealer' s lending rate) is typically about higher than the repo rate (the dealer' s borrowing rate).
- Post-crisis banking regulation has raised capital requirements for these positions, significantly reducing the liquidity and size of this market.

Two Repo Markets, Two Mechanisms

- General Collateral: this market is about the money – investors lending money to securities holders.
- Specific Issue: this market is about the bonds – getting and giving possession of specific securities.
- Tri-party Repo: In which a custodian bank (either JP Morgan or BNY Mellon) stands between the counterparties, holds the collateral, administers marking to market. This is where most dealer borrowing occurs.
- Bilateral Repo: Where most dealer lending occurs. All specific issue repo is bilateral—the only reason to pay up for a specific issue (through a special repo rate) is to get possession of the issue, for example to cover a short position.

Determinants of the Repo Rate

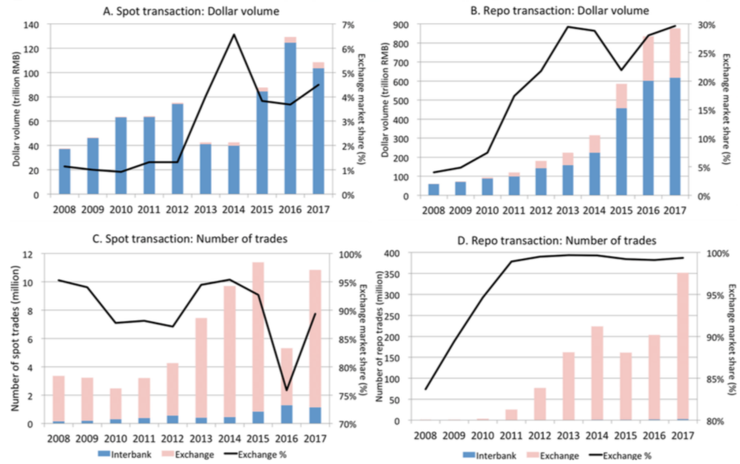
The repo rate can vary with

- the quality of the collateral (agencies and mortgages may also serve as collateral in addition to Treasuries),
- the term of the loan, and
- the nature of the delivery of the collateral. If the lender requires delivery of the collateral, they may get a lower rate than if they allow the counterparty merely to move the collateral to a separate account at his bank.
- Specific issue repo rates depend on total issuance size, lendable supply, distribution of supply, size and distribution of the short base.

Special Repo Rates

- Sometimes certain Treasury bonds go on *special*.
- Current issues are often on special.
- A *short squeeze* in which a lot of dealers who have shorted a particular bond need to cover their short positions can cause the issue to become special.
- Reverse repos provide the dealer an opportunity to borrow issues on special.
- In that case, the issue commands a *special repo rate* below the repo rate for general collateral.

Repo in Chinese bond markets



From Chen, et al. (2018); sources: CFETS, SHSE, SZSE.

- Repo on the interbank market is like tri-party repo in the US, with collateral, haircut, and repo rate negotiated bilaterally.
- Repo on the exchanges is through the exchange acting as a central clearing party.

Pledgeability and Bond Pricing

- A recent paper by Chen, Chen, He, Liu, and Xie studies the effect of a shock to bond plegeability as repo collateral in the Chinese bond market.
- In Dec 2014, the gov't surprised the market by declaring AA+ and AA corporate bonds on the exchange markets ineligible for repo collateral.
- The paper finds that this adverse policy shock increased these bonds' yields by 40-80 basis points.