Money Market

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Outlines

- Reading: Textbook Chapter 5
- Definition
- Types of money market securities
- Issuance and trading
- Participants

Definition and Purpose of Money Markets

- The Money Markets are associated with the issuance and trading of short-term (less than 1 year) debt obligations of large corporations, FIs and governments
- Only High-Quality Entities can borrow in the Money Markets and individual issues are large
- Investors in Money Market Instruments include corporations and FIs who have idle cash but are restricted to a short-term investment horizon
- The Money Markets essentially serve to allocate the nation's supply of liquid funds among major short-term lenders and borrowers
- Very active secondary market

Types of Money Market Securities

- Treasury bills
- Federal funds
- Negotiable certificates of deposits
- Commercial paper
- Repurchase agreements
- Banker’s acceptances

Money Market Instruments Outstanding, December 1990 and 2004 (in billions of dollars)

TABLE 5–3 Money Market Instruments Outstanding, 1990 and 2010
(in billions of dollars)

	Amount Outstanding		Rate of Return	
	1990	2010	1990	2010
Treasury bills	$527	$1,856	6.68%	0.16%
Federal funds and repurchase agreements	372	1,656	7.31	0.20
Commercial paper	538	1,083	8.14	0.43
Negotiable certificates of deposit	547	1,822	8.13	0.53
Banker's acceptances	52	1	7.95	0.55

Source: Federal Reserve Board Web site, May 1991 and June 2010, various tables. **www.federalreserve.gov**

1. Treasury Bills

- Issued to meet the short-term needs of the U.S. government
  - Standard Original Maturities of 13 weeks, 26 weeks, or 52 weeks
- Attractive to investors
  - Minimal default risk—backed by Federal Government
- Excellent liquidity for investors
  - Short-term maturity
  - Very good secondary market
- Bidding was covered in the last lecture.

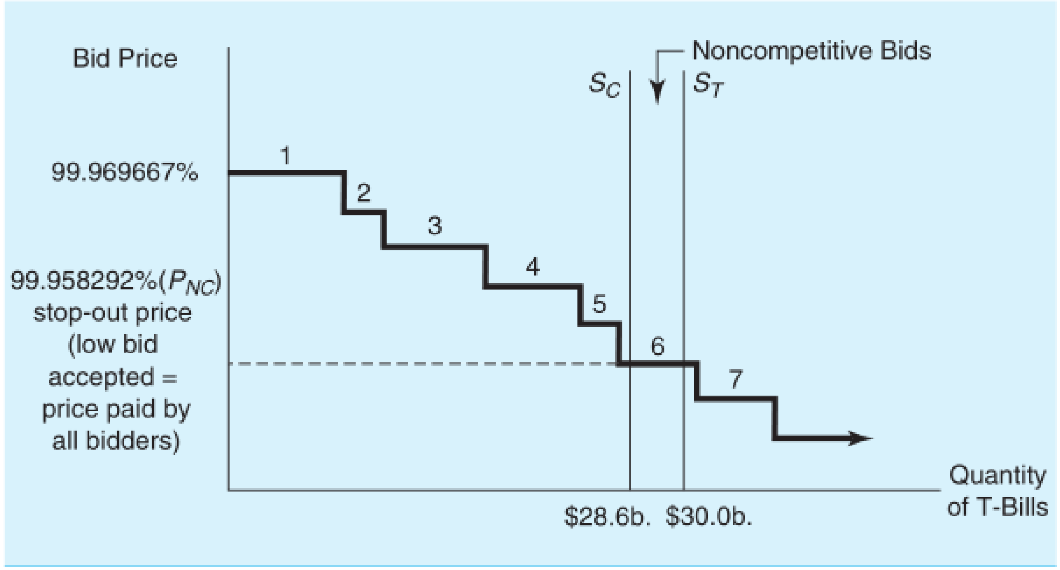
Treasury bill auctions

- Every week (usually on a Thursday), the amount of new 13-week and 26-week T-bills the Treasury will offer for sale is announced.
- Allocations and prices are announced the following morning (Tuesday), and the T-bills are delivered on the Thursday following the auction. (35% max)

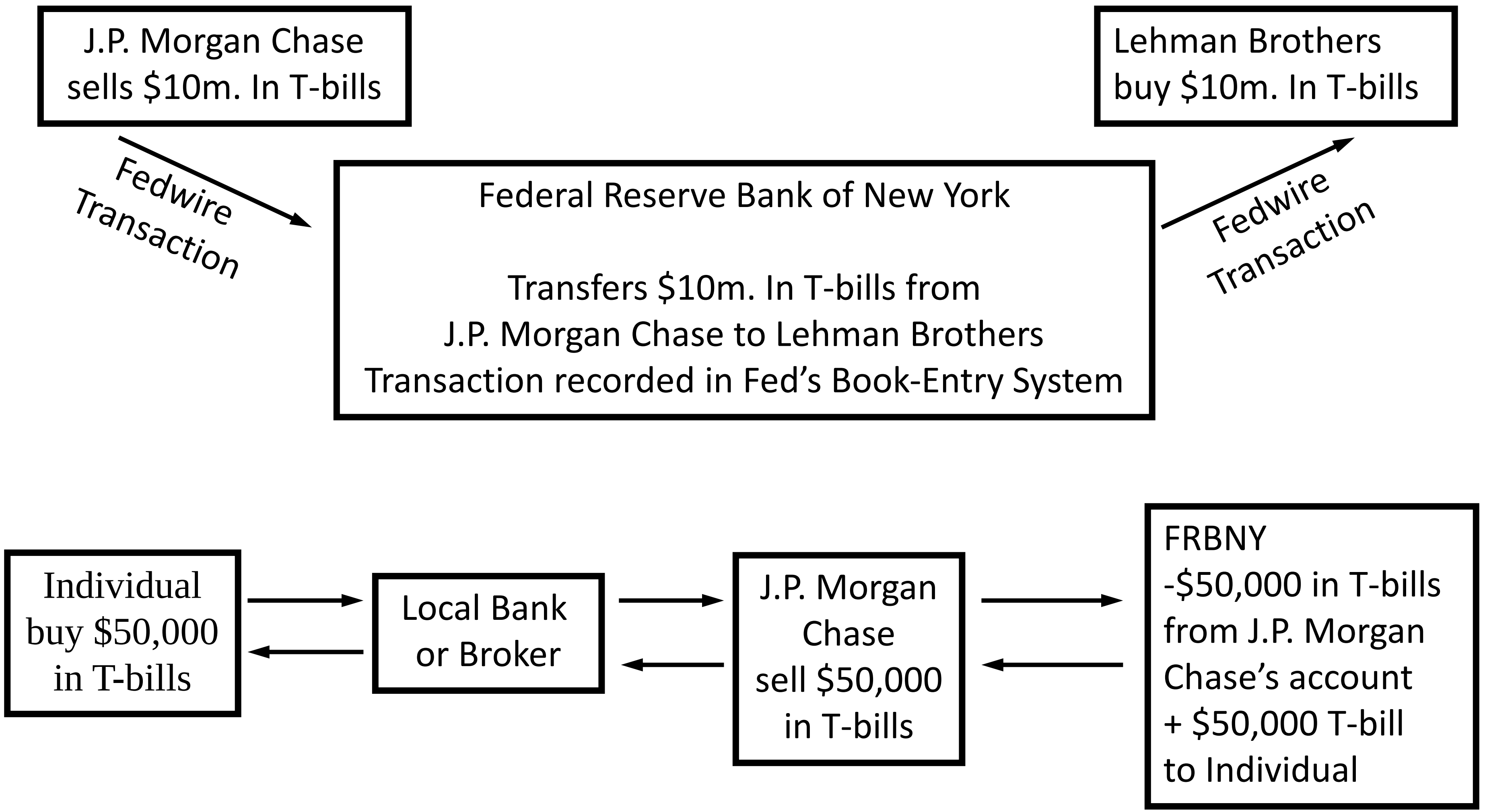
Competitive bid: Submit price and quantity
Non-competitive bid: submit quantity (<1m, guaranteed)

Pro-rata rule apply for the lowest bidding price.

Figure 5–1 Treasury Auction Results



Secondary Market T-bill Transaction



Basis of interest accrual

- Day/year conventions
- US terms – usually 90/360 or A/360.
- Japanese terms – usually Actual/365
- Singapore – Actual/365, or Actual/Actual
- Example, a T-bill is issued with 90 days to maturity is quoted at 5%. What is its price according to different conventions?
  - 90/360: Price = $100-5(90/360) =$98.75
  - 90/365: Price = $100- 5(90/365) = $98.77
  - Make sure you know which convention applies.

http://www.treasurydirect.gov/instit/annceresult/press/preanre/2015/R_20150203_1.pdf

Computing bond equivalent yields (BEY)

- Money market instruments are quoted in discount yields. For example, a 90-day T-bill quoted at 3%
  - Price = \$100 – 3(90/360) = \$99.25
- The bond equivalent yield will be greater than 3%.
- Find the bond equivalent yield by using the actual price paid and actual number of days in the year (assume its is 365 in this case).

$$i_{bey} = [(P_f - P_0)/P_0](365/h)$$

where

P_f = Face value
P_0 = Purchase price of the security
h = Number of days until maturity

$$\frac{0.75}{99.25} \times \frac{365}{90} = 3.06\%$$

2. Federal Funds

- Interbank lending and borrowing, usually for a period of one day
- Federal funds rate usually slightly higher than T-bill rate
- Fed district bank debits and credits accounts for purchase (borrowing) and sale (lending)
- Federal funds brokers may match up buyers and sellers using telecommunications network
- Usually $5 million or more
- Commercial banks conduct the majority of transactions in the fed funds market
- single-payment loans—they pay interest only once, at maturity.

3. Negotiable Certificates of Deposit

- NCDs are issued by large commercial banks
- Minimum denomination of $100,000 but $1m more common
- Purchased by nonfinancial corporations or money market funds
- Secondary markets supported by dealers in security
- Rate above T-bill rate to compensate for lower liquidity and lower safety
- Often purchased by money market mutual funds with pools of funds from individual investors

Trading Process for NCDs

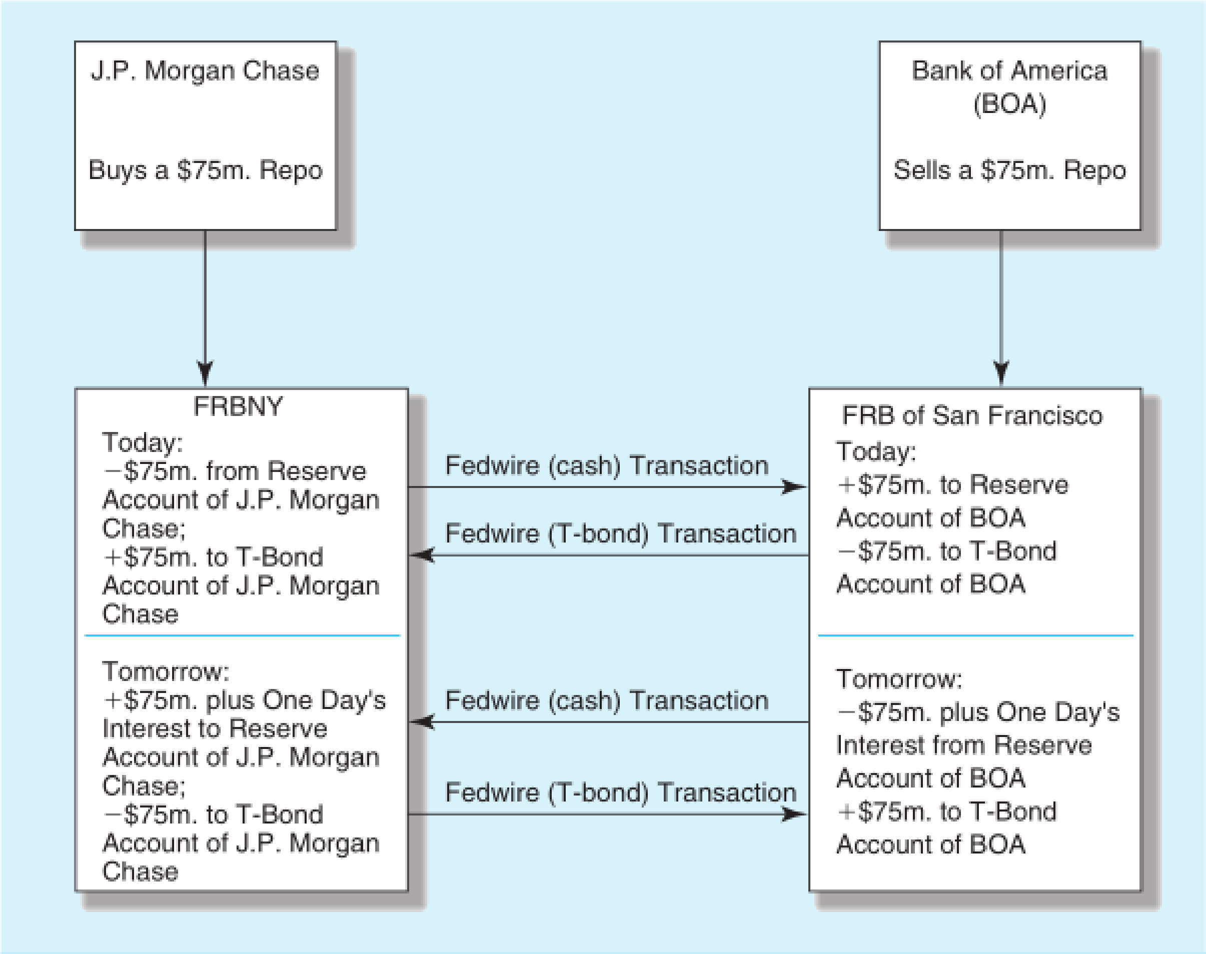
- Banks issuing NCDs post daily rates for the more popular maturities and subject to funding needs, tries to sell to investors who are likely to hold them as investments rather than sell them to the secondary market
- In some cases, the bank and investor negotiate the size, rate and maturity
- Secondary market consists of a linked network of approximately 15 brokers and allows investors to buy existing CD's rather than new issues

4. Repurchase Agreements

- An arrangement where one party sells a security to another party and simultaneously agrees to repurchase the same security at a subsequent date at an agreed price
- The security involved is usually a treasury bond
- This is collateralized borrowing
  - Collateral pledged in a repurchase agreement has a “haircut” applied, which means the collateral is valued at slightly less than market value
- The implicit interest is the difference between the purchase price and the repurchase price.

A Repurchase Agreement Transaction

Figure 5–4 **A Repurchase Agreement Transaction**



5. Commercial Paper

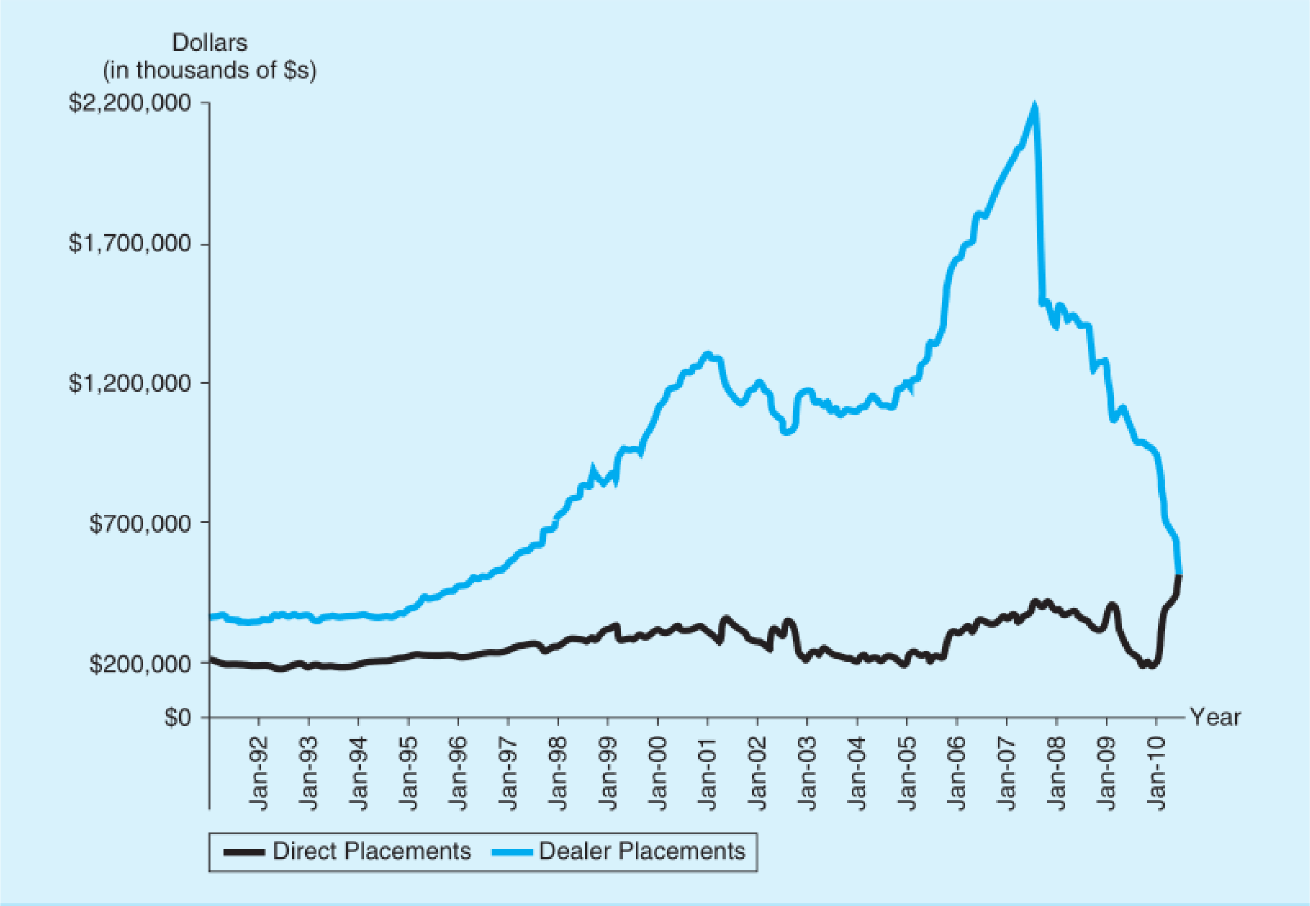
- Unlike NCDs, CP is usually issued by a company and not a bank
- Alternative to bank loan for the company
- Generally sold in denominations of $100,000, $250,000, $500,000 and $1 million with maturities of 1-270 days (if maturity is greater than 270 days, SEC requires registration)
- Used only by well-known and creditworthy firms
- Usually unsecured, therefore higher yields required. Less liquid too.
- Commercial paper liquidity dried up during sub prime crisis.

Commercial Paper

- Commercial paper is generally held by investors from the time of issue until maturity.
  - Thus, there is no active secondary market for commercial paper.
- Some CP are backed by bank lines of credit
  - Bank line used if company loses credit rating
  - Bank lends to pay off commercial paper
  - Bank charges fees for guaranteed line of credit
- Some CP are asset-backed commercial paper (ABCP), popular in mid-2000.
- Quotations for CPs
  - http://www.federalreserve.gov/releases/cp/

Issuance of CP

Figure 5–6 Direct versus Dealer Placements of Commercial Paper



Source: Federal Reserve Board Web site, "Research and Data," July 2010. **www.federalreserve.gov**

6. Banker’s Acceptance

- A bank takes responsibility for a future payment of trade bill of exchange
- Used mostly in international transactions, where exporters send goods to a foreign destination and want payment assurance before sending
- Bank stamps a time draft from the importer ACCEPTED and obligates the bank to make good on the payment at a specific time
- Exporter can hold until the date or sell at a discount before maturity

TABLE 5–6 Money Market Participants

Instrument	Principal Issuer	Principal Investor
Treasury bills	U.S. Treasury	Federal Reserve System Commercial banks Mutual funds Brokers and dealers Other financial institutions Corporations Individuals
Federal funds	Commercial banks	Commercial banks
Repurchase agreements	Federal Reserve System Commercial banks Brokers and dealers Other financial institutions	Federal Reserve System Commercial banks Mutual funds Brokers and dealers Other financial institutions Corporations
Commercial paper	Commercial banks Other financial institutions Corporations	Brokers and dealers Mutual funds Corporations Other financial institutions Individuals
Negotiable CDs	Commercial banks	Brokers and dealers Mutual funds Corporations Other financial institutions Individuals
Banker's acceptances	Commercial banks	Commercial banks Brokers and dealers Corporations

Money Market in China

- SHIBOR (**Shanghai Interbank Offered Rate)**
  - http://www.shibor.org/
  - http://money.163.com/13/0624/07/924AS34

  - Daily volume (100 billion RMB)

Repo in China

- Started in 1991, banned in 1995, 1997 interbank-bond market.
- 90% of money market trading

International Aspects of Money Markets

- While U.S. money markets are the largest, the international market is growing
  - U.S. securities bought/sold by foreign investors
  - foreign money market securities
- Euro money market instruments
  - Dollar-denominated deposits held offshore in U.S. bank branches overseas and in other (foreign) banks are called Eurodollar deposits (Eurodollar CDs) and the market in which they trade is called the Eurodollar market.
  - Eurodollar deposits, Eurodollar CDs, Euro CP (can be in other currency)
- London Interbank Offered Rate (LIBOR)
  - the rate paid on Eurodollars

Short summary

- Large denominations
- Low default risk
- Short maturity

- Liquidity high: T-bill,
- Liquidity low: CP, NCD, banker’s acceptances
- Federal funds: over-night

Next Class

- Reading Chapter 9 for FX Market
- Case study for bond market