Money Market

Money Market

- IOUs issued by government, banks, corporations
- Short-term financial instrument
  - Usually matures in less than one year
- Liquid and high denominations
- No physical trading floors
  - trading over the phone, telex or fax
  - Price info supplied by Reuters, Telerate, brokers

Participants

- Borrowers
  - Corporations, banks, governments
- Investors (lenders)
  - Pension funds, insurance companies, mutual funds, corporate treasurers
- Dealers (quoting bid and offer prices)
  - Investment banks, securities houses
- Brokers (highest bid and lowest offer)

Factors affecting value of debt

- Credit Risk
  Issuer not being able to meet its obligations.
  Higher risk for longer term.
- Liquidity Risk
  Not heavily traded. Wide spread quotes.
- Market Risk
  Change in market conditions.

Time Value of Money

In most developed markets, government securities is assumed credit risk-free.

For stable market conditions, should long-term rates be higher or lower than short-term rates? Why?

Yield Curve

Yield curve displays graphically the relationship between interest rates for different maturities – the term structure of interest rates.

Yield curve reflects expectations about future interest rates. An upward slope means that short-term rates are expected to rise/fall?
What if the yield curve is flat?

Yield Curve Example

Credit Risk

In bank lending the bank determines the credit risk of the borrower and adjusts its rates accordingly.

Credit ratings agencies:

- Standard & Poor's
- Moody's Investor Service
- Fitch Ratings

Credit ratings – long-term paper

	S&P	Moody's
Best-quality grade	AAA	Aaa
	AA+	Aa1
High-quality grade	AA	Aa2
	AA-	Aa3
	A+	A1
Upper-medium grade	A	A2
	A-	A3
	BBB+	Baa1
Medium grade	BBB	Baa2
	BBB-	Baa3

Credit ratings – short-term paper

S&P	Moody's
A1+	P1
A1	
A2	P2
A3	P3

Sample Rating

		FITCH		MOODY'S		STANDARD & POOR'S	
		RATING	OUTLOOK	RATING	OUTLOOK	RATING	OUTLOOK
The Hongkong and Shanghai Banking Corporation Ltd	HKD issues						
	Long Term/Senior	Not rated		Aa2	Stable	AA-	Stable
	Short Term	Not rated		P-1		A-1+	
	Non-HKD issues						
	Long Term/Senior	AA-	Stable	Aa2	Stable	AA-	Stable
	Short Term	F1+		P-1		A-1+	

Money Market Instruments

	Issuers
■ Treasury bill	Government
■ Time Deposit Certificate of Deposit	Bank
■ Banker's acceptance	Bank
■ Commercial Paper	Corporation
■ Repurchase agreement	Government / Bank

Terminology

Eurodollar
: U.S. dollar-denominated deposits at banks outside of the U.S.

Coupon
: Interest rate stated on an instrument when it is issued

Discount Instrument
: An instrument which does not carry a coupon is a “discount” instrument. Discount equals the difference between the price paid for a security and security’s par value.

Bearer/registered
: A “bearer” security is one where the issuer pays the principal (and coupon if there is one) to whoever is holding the security at maturity.

Terminology

Fixed Income Security

Money market instrument whose future cash flows have been contractually defined and can be determined in advance.

Yield to Maturity

YTM is the rate of return that you would achieve on a fixed income security, if you bought it at a given price and held it to maturity

LIBOR, HIBOR

Interbank offered rate – interest rate at which one bank offers money to another bank.

DAY/YEAR Conventions

$$\text{Interest paid} = \text{interest rate quoted} \times \frac{\text{days in period}}{\text{days in year}}$$

Most money markets use ACT/360

Exceptions using ACT/365:

International and domestic:
Sterling, Hong Kong dollar, Singapore dollar, Malaysian ringgit, Taiwan dollar, Thai baht, South African rand

Domestic (but not international):
Japanese yen, Canadian dollar, Australian dollar, New Zealand dollar

Eurodeposit

Round-the-clock business spanning Singapore and Hong Kong, Bahrain, Frankfurt, Paris, London and New York

LIBOR – the rate dealers charge for lending money (they offer funds)
LIBID – the rate dealers pay for taking a deposit (they bid for funds)

In London, quote (offered rate – bid rate)
Other places, quote (bid rate – offered rate)
Rule: pay the higher rate for a loan, receive the lower for a deposit

Fixed Date Conventions

Short Dates

Overnight (O/N)	Starting today and maturing tomorrow
"Tom-next" (T/N)	Starting tomorrow and maturing the next day
Spot-next (S/N)	Starting on the spot date and maturing the day after spot
Spot-one week (S/W)	Starting spot and maturing seven days later

Fixed Date Conventions (Modified Following)

End/End Rule

If the spot date is a month-end, then all forward fixed dates will be month end

Month-End Roll Back

If the forward date lands on a month-end and that happens to be a weekend or a holiday, then it cannot be rolled forward to the next month. Settlement will be rolled back to the last working day of the same month

Example:

A two-month Eurodeposit booked in London on 26 February will be for value 28 February, the spot date. Since this a month-end, the deposit will mature on 30 April. If 30 April is a Sunday, the deposit will mature on 28 April.

Time deposit/loan

term	1 day to several years, but usually less than 1 year
interest	usually all paid on maturity
quotation	as an interest rate
currency	any domestic or international currency
settlement	generally same day for domestic, 2 working days for international
registration	no
negotiable	no

Certificate of deposit (CD)

term	generally up to one year
interest	usually pay a coupon
quotation	as a yield
currency	any domestic or international currency
settlement	generally same day for domestic, 2 working days for international
registration	usually in bearer form
negotiable	yes

CD - Pricing

$$\text{Price} = \text{present value}$$

Consider CD paying only one coupon at maturity:

$$\text{maturity proceeds} = \text{face value} \times \left(1 + \text{coupon rate} \times \frac{\text{coupon period (days)}}{\text{year}}\right)$$

$$\text{Price} = \frac{\text{face value} \times \left(1 + \text{coupon rate} \times \frac{\text{coupon period (days)}}{\text{year}}\right)}{\left(1 + \text{interest rate} \times \frac{\text{days}_{\text{purchase to maturity}}}{\text{year}}\right)}$$

CD - Return

$$\text{yield} = \left(\frac{\text{FV}}{\text{PV}} - 1 \right) \times \frac{\text{year}}{\text{days}}$$

$$\text{yield} = \left(\frac{\text{sale price}}{\text{purchase price}} - 1 \right) \times \frac{\text{year}}{\text{days held}}$$

$$\text{yield} = \left(\frac{\left(1 + \text{interest rate}_{\text{purchase}} \times \frac{\text{days}_{\text{purchase to maturity}}}{\text{year}} \right)}{\left(1 + \text{interest rate}_{\text{sale}} \times \frac{\text{days}_{\text{sale to maturity}}}{\text{year}} \right)} - 1 \right) \times \frac{\text{year}}{\text{days held}}$$

CD - Example

issuer	XYZ
rating	A1P1
issue date	2 January 2014
maturity	2 January 2025
face value	$1,000,000
interest	5% pa

CD - Example

$$\text{maturity proceeds} = \$1{,}000{,}000 \times \left(1 + 0.05 \times \frac{365}{365}\right) = \$1{,}050{,}000$$

Now only 61 days left to maturity and current 2 month deposit rates are 4%

$$\text{Price} = \frac{\$1{,}050{,}000}{\left(1 + 0.04 \times \frac{61}{365}\right)} = \$1{,}043{,}027$$

CD - Example

You are offered $1,042,800 for the CD. What yield does this represent?

$$\$1{,}042{,}800 = \frac{\$1{,}050{,}000}{\left(1 + \text{yield} \times \frac{61}{365}\right)}$$

$$\text{yield (YTM)} = \left(\frac{\$1{,}050{,}000}{\$1{,}042{,}800} - 1\right) \times \frac{365}{61} = 0.0413$$

Secondary market price quote is 4.13%

CD – quoted price

If you were quoted 4.13 – 3.89 for the 5% XYZ CD, this means that the market maker is willing to buy it from you for a cash amount that will give him a yield 4.13%, or he will sell it to you for a cash sum that will yield you 3.89%

Treasury Bill (T-bill)

term	generally 13, 26 or 52 weeks
interest	mostly non-coupon bearing, issued at a discount
quotation	US and UK a "discount rate" basis; most places on a true yield basis
currency	usually the currency of the country
registration	bearer security
negotiable	yes

US Treasury Bills

- Federal Reserve auctions 13- and 26-week T-bills on behalf of the US government every Monday, for delivery on Thursday
- Also auctions 52-week bills every month
- Settlement in the secondary market is for the following business day, i.e., T+1
- "No" risk of default
  Are yields on T-bills lower or higher than those available in CDs?

Discount rate quote

The quoted rate on a US T-bill with 50 days to maturity is 4.12% (discount basis). How much would you have to pay for the bill, for a $1,000,000 deal?

$$\$1{,}000{,}000 - \left(\$1{,}000{,}000 \times 0.0412 \times \frac{50}{360} \right) = \$994{,}278$$

$$\text{Price} = \text{Face Value} \times \left(1 - \text{Discount Rate} \times \frac{\text{days to maturity}}{\text{year}} \right)$$

Discount to Yield Conversion

$$\text{Price} = \text{Face Value} \times \left(1 - \text{Discount Rate} \times \frac{\text{days to maturity}}{\text{year}}\right)$$

$$\text{Price} = \frac{\text{Face Value}}{\left(1 + \text{yield} \times \frac{\text{days to maturity}}{\text{year}}\right)}$$

$$\text{yield} = \frac{\text{discount rate}}{\left(1 - \text{discount rate} \times \frac{\text{days to maturity}}{\text{year}}\right)}$$

$$\text{discount rate} = \frac{\text{yield}}{\left(1 + \text{yield} \times \frac{\text{days to maturity}}{\text{year}}\right)}$$

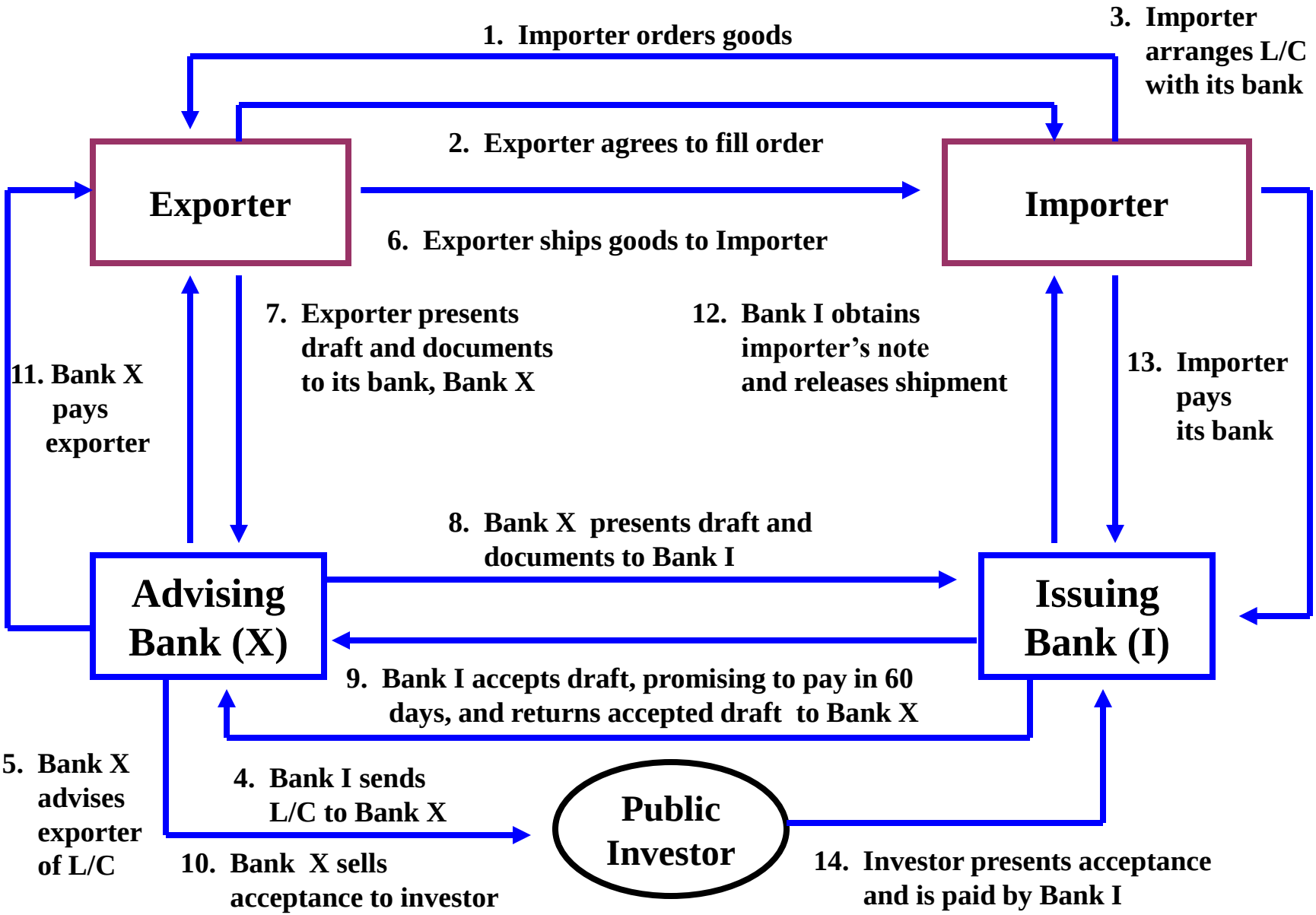
Commercial Paper (CP)

term	for US, from 1 to 270 days; usually very short-term for ECP, from 2 to 365 days; usually 30 to 180 days
interest	non-interest bearing; issued at a discount
quotation	for US, on a "discount rate" basis for ECP, as a yield
currency	for US, domestic US$ for ECP, any Eurocurrency but largely US$
settlement	for US, same day for ECP, 2 working days
registration	in bearer form
negotiable	yes

Bill of exchange/Banker's acceptance

term	From 1 week to 1 year but usually < 6 months
interest	non-interest bearing; issued at a discount
quotation	for US and UK, quoted on a "discount rate" basis elsewhere on a yield basis
currency	mostly domestic
settlement	available for discount immediately on being drawn
registration	none
negotiable	yes

International Trade



Repurchase agreement (repo)

term	usually for very short-term
interest	difference between purchase and repurchase prices
quotation	as a yield
currency	any currency
settlement	Generally cash against delivery of the security
registration	n/a
negotiable	no