Quick Overview Chapter 1-10

## **Financial Markets**

- On the evening news you have heard that the bond market or stock market have been booming.
- Does this mean that interest rates will fall so that it is easier for you to finance the purchase of a new computer system for your retail business?
- Will the economy improve in the future so that it is a good time to build a new building or add to the one you are in?
- Should you try t use to raise funds u issuing stock or bonds, or instead go to the bank for a loan?
- If you improve goods from abroad should you be concerned that they will become more expense or your exports cheap?

## **Financial markets**

- 1. Channels funds from savers to investors, thereby promoting economic efficiency.
- 2. Affects personal wealth and behavior of business firms.
- 3. Debt markets, or bond markets, allow governments, corporations, and individuals to borrow and to finance activities.
- 4. There is a strong relationship between these markets and interest rates.

#### **Financial markets**

- The stock market is the market where stock, representing ownership in a company, are traded.
- Of all the active markets, it receives the most attention, probably because it is the place where people get rich (and poor) quickly.
- The foreign exchange market is where international currencies trade and exchange rates are set.
- Although most people know little about this market, it has a *daily* volume around \$1 trillion!



#### **Structure of Financial Markets**

Even though firms don't get any money, per se, from the secondary market, it serves two important functions:

- 1. Provide liquidity, making it easy to buy and sell the securities of the companies
- **2**. Establish a price for the securities.

#### **Structure of Financial Markets**

## We can further classify secondary markets as follows:

#### 1. Exchanges

Trades conducted in central locations (e.g., New York Stock Exchange, CBT)

#### 2. Over-the-Counter Markets

- Dealers at different locations buy and sell
- Best example is the market for Treasury securities
   <u>www.treasurydirect.gov</u>

#### **Interest rates**

We develop a better understanding of interest rates. We examine the terminology and calculation of various rates, and we show the importance of these rates in our lives and the general economy. Topics include:

- Measuring Interest Rates
- The Distinction Between Real and Nominal Interest Rates (Fisher equation => i (r) = i – Π) => 1+ i = (1+i(r)) + (1 + Π)
- The Distinction Between Interest Rates and Returns

#### Maturity and the Volatility of Bond Returns

- 1. Only bond whose return is equals the yield to maturity is the one whose time to maturity is the same as the holding period
- 2. For bonds with maturity longer than its holding period, when i ↑ then P↓ implying capital loss.
- 3. The Longer is maturity, the greater is the bond's price change associated with interest rate change.
- 4. The longer is a bond to its maturity, the lower the rate of return associated with the increase in the interest rate.
- 5. Bond with high initial interest rate can still have negative return if i  $\uparrow$
- 6. Prices and returns more volatile for long-term bonds because have higher interest-rate risk
- 7. No interest-rate risk for any bond whose maturity equals holding period

#### Reinvestment Risk

- Occurs if an investor's holding period is longer than the term to maturity of the bond, since the i at the time of reinvestment is uncertain.
- 2. If the holding period is longer than the term to maturity of the bond, then (2.1) the investor gain from  $i \uparrow$ , (2.2) lose when  $i \downarrow$

#### Calculating Duration i = 20%, 10-Year 10% Coupon Bond

TADIE /

Calculating Duration on a \$1000 Ton Yoar 10% Coupon Pond

TABLE 4	When Its Interest Rate Is 20%					
(1)	(2)	(3)	(4)	(5)		
Year	Cash Payments (Zero-Coupon Bonds) (\$)	Present Value ( <i>PV</i> ) of Cash Payments ( <i>i</i> = 20%) (\$)	Weights (% of total <i>PV</i> = <i>PV</i> /\$580.76) (%)	Weighted Maturity (1 × 4)/100 (years)		
1	100	83.33	14.348	0.14348		
2	100	69.44	11.957	0.23914		
3	100	57.87	9.965	0.29895		
4	100	48.23	8.305	0.33220		
5	100	40.19	6.920	0.34600		
6	100	33.49	5.767	0.34602		
7	100	27.91	4.806	0.33642		
8	100	23.26	4.005	0.32040		
9	100	19.38	3.337	0.30033		
10	100	16.15	2.781	0.27810		
10	\$1000	161.51	27.808	2.78100		
Total		580.76	100.000	5.72204		

#### Formula for Duration

$$DUR = \sum_{t=1}^{n} t \frac{CP_{t}}{(1+i)^{t}} / \sum_{t=1}^{n} \frac{CP_{t}}{(1+i)^{t}}$$

- Key facts about duration
  - 1. All else equal, when the maturity of a bond lengthens, the duration rises as well
  - 2. All else equal, when interest rates rise, the duration of a coupon bond fall
- 1. The higher is the coupon rate on the bond, the shorter is the duration of the bond
- 2. Duration is additive: the duration of a portfolio of securities is the weighted-average of the durations of the individual securities, with the weights equaling the proportion of the portfolio invested in each
- 3. The greater is the duration of a security, the greater is the percentage change in the market value of the security for a given change in interest rates
- 4. Therefore, the greater is the duration of a security, the greater is its interest-rate risk

## Why interest rates change?

#### 1. Determinants of asset demand

- 1. Wealth total resources owned
- 2. Expected returns return expected over the next period on one asset compared other assets
- 3. Risk degree of uncertainty associated with r
- 4. Liquidity ease and speed of converting assets to \$

## 2. Supply and demand in the bond market

- **1.** Demand Curve
- 2. Supply Curve
- 3. Market Equilibrium
- 4. Supply and demand analysis
- 3. Changes in equilibrium interest rates

#### **Expected returns**

 Is the return expected over the next period on one asset relative to alternative assets

$$R^{e} = p_{1}R_{1} + p_{2}R_{2} + \dots + p_{n}R_{n}$$

R<sup>e</sup> – Expected return

n- number of possible outcomes

R<sub>i</sub>- return in the *i*-th state of nature

 $p_1$  – probability of occurrence of the return  $R_i$ 

An increase in an asset's expected return relative to that of an alternative asset, holding everything else unchanged, raises the quantity demanded of the asset The degree of uncertainty associated with the return on one asset relative to alternative assets
Standard deviation as a measure of risk

$$\sigma = \sqrt{p_1(R_1 - R^e)^2 + p_2(R_2 - R^e)^2 + \cdots + p_n(R_n - R^e)^2}$$

Holding everything else constant, lf an asset's risk rises relative to that of alternative asset, its quantity demanded will fall

### Changes in Equilibrium Interest Rates

#### Shifts in the Supply of Bonds

- Expected profitability of investment opportunities: In a business cycle expansion, the supply of bonds increases, and the supply curve shifts to the right. In a recession, when there are far fewer expected profitable investment opportunities, the supply of bonds falls, and the supply curve shifts to the left
- Expected inflation: An increase in expected inflation causes the supply of bonds to increase and the supply curve shifts to the right
- Government budget: Higher government deficits increase the supply of bonds and shift the supply curve to the right. Government surpluses decrease the supply of bonds and shift the supply curve to the left

## How do risk and term structure affect interest rates?

#### Risk structure of interest rates

- Interest rates on different categories of bond differ from one another in any given year
- The spread between interest rates varies over time
- Default risk

#### Term structure of interest rates

- Expectations theory
- Market segmentation theory
- Liquidity premium theory

## Default Risk



Figure 5.2 Response to an Increase in Default Risk on Corporate Bonds

A bond with default risk will always have a positive risk premium, and an increase in its default risk will raise the risk premium

#### Term structure of interest rates

- Bonds with identical risk, liquidity, and tax characteristics may have different interest rates because the time remaining to maturity is different
- Yield curve- a plot of the yields on bonds with differing terms to maturity but the same risk, liquidity and tax considerations. It describes the term structure of interest rates for particular types of bonds.
  - upward sloping, flat, downward sloping (inverted yield curve)

 Proposition: the interest rate on long-term bond will equal an average of short-term interest rates that people expect to occur over the life of the long-term bond

- Key assumption: buyers of bonds do not prefer bonds of one maturity to another. If bonds with different maturities are perfect substitutes, the expected return on these bonds must be equal
- Market segmentation: Markets for different-maturity bonds are completely separate and segmented

Moody's		S&P		Fitch		
Long-term	Short-term	Long-term	Short-term	Long-term	Short-term	
Aaa		AAA		AAA	F1+	Prime
Aa1		AA+	A 11	AA+		High grade
Aa2	D 1	AA	A-IT	AA		
Aa3	P-1	AA-		AA-		
A1		A+	A 1	A+	F1	
A2		А	A-1	А		Upper medium grade
A3		A-	A 0	A-	E2	
Baa1	P-2	BBB+	A-2	BBB+	FZ	
Baa2	P-3	BBB	A 2	BBB	F3	Lower medium grade
Baa3		BBB-	A-J	BBB-		
Ba1	Not prime	BB+		BB+		Non-investment grade
Ba2		BB		BB		
Ba3		BB-		BB-	Р	opeculative
B1		B+	D	B+	D	
B2		В		В		Highly speculative
B3		B-		B-		
Caa1		CCC+				Substantial risks
Caa2		CCC				Extremely speculative
Caa3		CCC-	С	CCC	С	
		00				Default imminent with little

## **Efficient Market Hypothesis**

- The Efficient Market Hypothesis
- Stronger Version of Efficient Market Hypothesis
- Evidence on the Efficient Market Hypothesis
- Evidence Against Market Efficiency
- Behavioural Finance

#### The Efficient Market Hypothesis

• The prices of securities in financial markets fully reflect all available information

$$R = \frac{P_{t+1} - P_t + C}{P_t}$$

$$R^{\rm e} = \frac{P_{t+1}^{\rm e} - P_t + C}{P_t}$$

$$P_{t+1}^{\rm e} = P_{t+1}^{\rm of}$$

Current prices in a financial market will be set so that the optimal forecast of a security's return using all available information equals the security's equilibrium return.

$$R^{\rm e} = R^{\rm of}$$

$$R^{\rm e} = R^*$$

$$R^{\mathrm{of}} = R^*$$

#### Rationale behind the hypothesis

- Arbitrage, in which market participants (arbitrageurs) eliminate unexploited profit opportunities, i.e., returns on a security that are larger than what is justified by the characteristics of that security.
- Pure arbitrage no risk

$$\begin{array}{l} R^{\mathrm{of}} > R^* \to P_t \uparrow \to R^{\mathrm{of}} \downarrow \\ R^{\mathrm{of}} < R^* \to P_t \downarrow \to R^{\mathrm{of}} \uparrow \end{array} \right\} \text{ until } R^{\mathrm{of}} = R^*$$

- In an efficient market, all unexploited profit opportunities will be eliminated
- Not everyone in a financial market must be well informed about a security or have rational expectations for its price to be driven to the point at which the efficient market condition holds

## **Dynamics of crises**

#### • Stage one (initiation)

- Financial liberalization (credit boom)
- Asset price boom and bust
- Spikes in interest rates
- Increase in uncertainty

## All of the above worsen the adverse selection and moral hazard

#### Stage two (banking crises)

- Economic activity declines
- Banking crisis (balance sheet, panic,
- o Adverse selection and moral hazard problems worsen

#### • Stage three

• Debt deflation

#### Top 10 causes of crisis

- 1. **Credit bubble** (developing countries building up large capital surpluses (post-Asia crisis) and lend to US and Europe, causing interest rates to fall credit spreads narrowed cheap to finance risky investments increased investments to high-risk mortgages US monetary policy (post Internet bubble contributed)
- 2. Housing bubble 1990-2000s large sustained housing bubble in the US
- 3. Nontraditional mortgages tightened credit spread optimistic outlook for house prices (flood of credit to US + poor origination standards) led to high risk investment to non-traditional mortgages mortgage sellers deceived home buyers, who made poor financial decisions and borrowed beyond their ability to pay
- 4. Credit rating and securitization Credit rating failures + securitization led to toxic assets buyers failed to do proper due diligence
- **5. Financial institutions concentrated correlated risk -**Concentrated exposure to one asset class (knowingly +unknowingly)

#### Causes contd.

- **6.** Leverage and liquidity risk too little capital to offset higher risk reliance on repo market for short-term liquidity
- 7. Risk of contagion too big to fail one fail can lead to another fails
- 8. **Common shock** Failed bets on housing unconnected financial firms failed
- **9. Financial shock and panic** Problem in large 10 firms triggered finance panic confidence and trust in the financial system began to evaporate asymmetric information
- Financial crisis causes economic crisis severe contraction in the real economy, until today

#### Post-crisis regulation

- Oversight and supervision of financial institutions (Special Council to monitor systemic risks (leverage, liquidity and contingent capital)
- Creation of new agencies
- Stringent regulatory capital requirements (SEC)
- Over the **counter derivatives** (clearing, counterparties)
- Credit rating agencies regulation
- Corporate **governance** and executive **compensation** practices (proper incentives and voting on bonuses)
- Volcker Rule (no prop. trading, owning, sponsoring or investing in hedge or PE funds)
- **Registration of advisers** to private funds (Ponzi schemes)
- Securitization market changes (more of credit risk is retained)

### Why do we need Central Banks?

Prevent banking crisis
Stability of financial sector
Ensuring deposits
Providing macroeconomic stability
Monetary policy

### **Goals of Monetary Policy**

#### • 6 Goals

- 1. Inflation targeting
- 2. High employment
- 3. Economic growth
- 4. Stability of financial markets
- 5. Interest-rate stability
- 6. Foreign exchange market stability
- Goals often in conflict (inflation and employment and economic growth)

## Taylor Rule

- It is a monetary-policy rule that stipulates how much the central bank should change the nominal interest rate in response to changes in inflation, output, or other economic conditions.
- In particular, the rule stipulates that for each one-percent increase in inflation, the central bank should raise the nominal interest rate by more than one percentage point.
- The rule was first proposed by the U.S. economist John B. Taylor in 1993. It is intended to foster price stability and full employment by systematically reducing uncertainty and increasing the credibility of future actions by the central bank.

# Ch. 11 The Money Markets

#### Today's Lecture Overview

- 1. The Money Market: definition, purpose and participants
- 2. Money Market's instruments:
  - **D** The Treasury Bills
  - I Federal Funds
  - Repurchased agreements
  - Negotiable CDs
  - Commercial papers
  - Bank acceptance
  - Eurodollars
  - Money market mutual funds



#### The Money Markets

#### Money Market's securities:

- 1. Maturity is less than 1 year and liquid
- 2. Money market securities are usually sold in large denominations:
  - Wholesale markets (\$1MM)
- 3. They have low default risk
- 4. Have an active secondary market (liquid)
  - Telecommunications, terminals and etc.

#### **Purpose of Money Markets**

- <u>Investors</u>: the money markets provide a place for warehousing surplus funds for short periods of time.
- <u>Borrowers:</u> the money markets provide a low-cost source of temporary funds.
- Money market Rates (Prime rate 3.25%, Federal funds – 0.19%, Commercial paper – 0.23%, 1 month CDs – 0.23%, LIBOR – 0.45%, Eurodollar – 0.30%, T-bills – 0.16%)

#### Participants in Money Markets

- Government's Treasury (e.g. US Treasury Department)
- Central Bank (e.g. Federal Reserve System)
- Commercial Banks
  - Money center banks
- Businesses
- Investment and Securities Firms
  - Investment companies: market-makers in the money markets instruments
  - Finance companies
  - Insurance companies
  - Pension funds
- Individuals (mostly through money market mutual funds)

#### **Money Market Instruments**

- 1. Treasury Bills
- 2. Federal Funds
- 3. Repurchase Agreements
- 4. Negotiable Certificates of Deposit
- 5. Commercial Papers
- 6. Banker's Acceptances
- 7. Eurodollars
- 8. Money market mutual funds

#### **Treasury Bills**

- Short-term borrowings of the federal government (31 days, 182 days, 12 months maturity)
- 2. Sold at discount
- 3. Zero default risk
- 4. Deep market
- 5. Liquid market
- 6. Sold through the Treasury Bills auctions

#### **Discounting Example**

 You pay \$9850 for a 91-day T-bill. It is worth \$10,000 at maturity. What is its annualized yield?

$$\dot{I}_{yt} = \frac{F - P}{P} \times \frac{365}{n} \tag{1}$$

$$i_{yt} = \frac{\$10,000 - \$9,850}{\$9,850} \times \frac{365}{91} = 0.0611 = 6.11\%$$

### **Treasury Bill Auctions**

- Every Thursday, the Treasury announces how many 91-days and 182-days Treasury bills are offered for sale.
   12 months Treasury bills are offered only once per month.
- <u>Competitive</u> and <u>non-competitive bids</u> are available
- If you submit **competitive bid**, you must state the amount of securities desired and the price you are willing to pay
- If you submit **non-competitive bids** you state only the desired amount of securities.

#### **Treasury Bill Auction**

- Competitive bids are satisfied starting from the lowest yield to highest or alternatively from the highest price to the lowest
- All **noncompetitive bids** will be satisfied, but at the <u>auction price</u>
- Auction price is the weighted average of all accepted competitive bids
- Regulation for competitive bids: no one dealer is allowed to buy more than 35% of any issue.

#### **Example: Treasury Bill Auctions**

The Treasury auctioned \$2.5 billion par value 91-day T-bills, the following bids were received:

Bidder Bid AmountBid Price per 100\$ of face value

- 1 \$500 million \$99.40
- 2 \$750 million \$99.01
- 3 \$1.5 billion \$99.25
- 4 \$1 billion \$99.36
- 5 \$600 million \$99.39

The Treasury also received \$750 million in noncompetitive bids.

1) Who will receive T-bills, what quantity, and at what price?

2) What is the action price?

#### **Treasury Bill Auctions Example**

You have \$1.750 BN left for competitive bids because all non-competitive will be satisfied but at auction price (2.5 bill – 0.750 bill = 1.750 bill)

The Treasury accepts the following bids *starting from the highest price*:

E	<u>Bidder</u>	<u>Bid An</u>	nount	<u>Bid Price</u>
1	\$500	million	\$99.4	10
5	\$600	million	\$99.3	39
4	\$650	million	\$99.3	36

Noncompetitive bidders pay the weighted-average price (auction price): \$99.38 = (500 x \$99.40 + 600 x \$99.39 + \$650 x \$99.36 ) / 1,750

#### Federal Funds

- Short-term funds transferred (loaned or borrowed) between financial institutions, usually for a period of one day.
- Fed funds are usually overnight investments.
- Most fed funds borrowings are unsecured.
- Federal Funds Rate is the interest rate on the overnight loans of reserves from one bank to another.
- Fed funds rate is determined by the supply and demand for the funds.

#### Repurchase agreements (Repos)

- Repo is a securities sale contract with an agreement to repurchase them back at a pre-specified date in future.
  It is similar to a short-term collateralised loan.
  - "To repo" = to sell the securities (collateral) = to borrow money
    "To depo" = to buy the securities (collateral) = to lend money
- <u>Inverse Repos (Depos)</u> a securities purchase contract with the agreement to sell them back at a pre-specified date in future.
- Repos are usually secured by the T bills.
- The maturities of repos can vary.
- Banks and non bank firms can participate.
- Interest rate on Repos is determined by the parties.

#### **KAZAKHSTAN REPOs:**

- Government securities and the private A-rated (at KASE) securities can be transacted and serve as collateral.
- Maturities of the Repos : 1,2,3,7,14 and 28 days.
- Repo currency: KZT
- At maturity you have to repurchase the securities back paying interest to the holder.

### Repo formula

- $Pc = (i/365) \times n \times (P_0/100) + P_0$ , were
- Pc = closing price
- I = annual interest rate on Repos
- N = maturity in days
- P<sub>o</sub> = opening price (or the current price of the security)

#### Example of the Repo transaction

- BTA needs a one day funds of \$10 MM and enters Repo with Kazkom
- BTA sells Kazkom a specified amount of securities for L = \$10 MM with the agreement to purchase them back the following day for L + I.
- Kazkom lends L = \$10 MM to BTA and receives L+I from BTA in the following day.
- If the Repo interest rate is 3.2%, what will be L+I amount?
- $(L+I) = Pc = (i/365) \times n \times (P_0/100) + P_0 =$ = (3.2/365) \* 1 \* (\$10 MM/100) + \$10 MM == \$10,000,877.
  - Kazkom will receive \$10,000,877

### Negotiable Certificates of Deposit

- A bank-issued security that documents a deposit and specifies the interest rate and the maturity date.
- Considered as the bearer instrument: whoever holds the instrument at maturity receives the principal and interest.
- The CD can be bought and sold until maturity.
- Denominations range from \$100,000 to \$10 million
- Typical maturity is from 1 to 4 months.
- The interest rate on CDs are negotiated between the bank and the customer.

### **Commercial Paper**

- Unsecured promissory notes, issued by corporations, that mature in no more than 270 days.
- Issued by the largest and most creditworthy corporations.
- The interest rate on the corporation is charged reflects the firm's level of risk.
- Have relatively low default risk.
- Most commercial papers are issued at discount basis.
- There is no strong secondary market for commercial papers.

#### **Banker's Acceptances**

- A banker's acceptance is an order to pay a specified amount to the bearer on a given date if specified conditions have been met, usually delivery of promised goods.
- They are used to finance goods that have not been transferred from the seller to the buyer.
- Because banker's acceptances are payable to the bearer, they can be bought and sold until they mature.
- They are sold on a discounted basis.
- To discount a banker's acceptance = to sell it for immediate payment.
- In the US only large money center banks are involved in this market and => the risk of BAs default is low => their interest rates are low



### Advantages of Banker's Acceptances

- 1. Essentially, without the banker's acceptances many international trade transactions would not occur because the parties would not feel properly protected from losses.
- 2. Exporter paid immediately
- 3. Exporter shielded from foreign exchange risk
- 4. Exporter does not have to assess the financial security of the importer
- 5. Importer's bank guarantees payment

#### Eurodollars

- Dollar denominated deposits held in foreign banks
- Time deposits with fixed maturities
   Largest short term security in the world
- London interbank bid rate (LIBID)
   The rate paid by banks buying funds
- London interbank offer rate (LIBOR)
  - The rate offered for sale of the funds

#### Money Market Mutual Funds

- Money market mutual funds (MMMF) are open-edned investment funds that invest only in money market securities.
- Most funds do not charge investors any fee for purchasing or redeeming shares.
- Many MMMF have check-writing privileges.
- Most brokerage firms contract with banks to provide the check processing facilities.
- The risk of MMMF is low because the funds are invested in the money market instruments



Copyright © 2003 Pearson Education, Inc.

# Next week read chapters 0 12 Bond Market 0 13 Stock Market

### Basel Accords (Macro prudential)

- **Basel III** (or the Third Basel Accord) is a global, voluntary regulatory standard on bank capital adequacy, stress testing and market liquidity risk.
- As of September 2010, proposed Basel III norms asked for ratios as: 7–9.5% (4.5% + 2.5% (conservation buffer) + 0–2.5% (seasonal buffer)) for common equity and 8.5–11% for Tier 1 capital and 10.5–13% for total capital.
- **Capital requirements** effective as of 2019 (7% for the common equity ratio, 8.5% for the Tier 1 capital ratio) could increase bank lending spreads by about 50 basis points.
- **Tier 1 capital** is the core measure of a bank's financial strength from a regulator's point of view. It is composed of *core capital*, which consists primarily of common stock and disclosed reserves (or retained earnings), but may also include non-redeemable non-cumulative preferred stock. The Basel Committee also observed that banks have used innovative instruments over the years to generate Tier 1 capital; these are subject to stringent conditions and are limited to a maximum of 15% of total Tier 1 capital.

#### News





#### Abe Wins Confirmation for BOJ Picks Likely to Push Stimulus

Kuroda Brings Oxford Mindset After Chicago-Alum Shirakawa

#### **Top Headlines**

Asian Stocks Advance on U.S. Jobless Claims, BOJ Governor •

Wen's Failure to Tame China Home Prices Leaves Li With Challenge •

JPMorgan Misled Investors, Dodged Regulator: Report 🖷

Vietnam Tries to Tame Its Corporate Offspring •

China Bad Bank Said to Plan \$3 Billion Offering in Hong Kong €

Samsung-Apple Phone Fight Creating Winner in Korean Air 🖲

Chinese Vitamin Makers Lose \$162M Antitrust Verdict 1

More Top News >>

#### Top Videos »



Samsung Galaxy S4: Hands-On With an iPhone-Hunter

A Share

"30% Club" Pushing for Gender Equality in the Boardroom

These Headphones Select Music Based on Your Mood 🖿

#### More Top Videos »

- *Russia's* president, Vladimir Putin, chose a long-standing ally to be the new head of the Central Bank. Elvira Nabiullina was appointed as Mr Putin's minister for economic development and trade in 2007 and is currently his chief economic adviser, though she has little expertise in banking and finance.
- *Xi Jinping* was officially appointed as China's president by the National People's Congress. Mr Xi has already taken up the two most important domestic political positions of general secretary of the Communist Party and head of the military commission.