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FINANCIAL MARKETS AND INSTITUTIONS

2° BIEM/BIEF

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OVERVIEW OF THE FINANCIAL SYSTEM

Function of financial markets

- Financial Markets are critical for producing an efficient allocation of resources among individuals
 - Funds are not equally distributed in the economy
 - Financial markets serve to allocate resources to those individuals who have the most productive investment opportunities, even though they may be lacking funds
- Direct Finance
 - Borrowers borrow funds directly from lenders in financial markets by issuing financial instruments (securities)
 - Securities are claims on the borrower's future income or real assets
 - For the individual selling these securities, they are liabilities
- Indirect Finance
 - Borrowers borrow indirectly from lenders via financial intermediaries by issuing financial assets
 - Financial intermediaries borrow funds from lenders-savers and, using these funds, make loans to borrowers-spenders
- The principal lenders-savers are households, while the principal borrowers-spenders are businesses and governments
- We may underline a distinction between real and financial assets:
 - Real Assets → Entity producing flow of goods and services
 - Financial Assets → Contract giving its owner a claim to payments

Structure of financial markets

There are different dimensions behind the structure of financial markets:

- Type of securities → Debt, Equity, Derivatives
- Type of issuance market → Primary VS Secondary Markets
- Maturity → Short-term and Long Term

Debt and equity markets

Firms and individuals can obtain funds in a financial market in 2 ways

- Debt (bond) Markets
 - Contractual agreement by the borrower to pay the holder of the instrument fixed amounts at regular intervals until a specified date
 - The maturity is the number of years until the expiration date
- Equity Markets
 - Claims to share in the net income and the assets of a business
 - Equities often make periodic payments (dividends)
 - Equities are considered long-term securities as they do not have an expiration date
- Derivatives
 - Financial instruments whose value depends on the value of an underlying asset

Primary and Secondary markets

- Primary Markets



- Financial market in which new issues of a security are sold to initial buyers by the corporation or government agency borrowing the funds
 - Primary Markets are not well known to the public because the selling of securities to initial buyers often takes place behind closed doors
 - Investment Banks are financial institutions that assist the initial sale of securities in the primary market (IPOs)
- Secondary Markets
 - Distinguished between exchanges and OTC
 - Financial market in which securities that have been previously issued can be resold
 - Brokers are agents of investors who match with buyers and sellers of securities
 - Dealers link buyers and sellers by buying and selling securities at stated prices
- Corporations acquire new funds only when their equities are first sold in the primary market
- Secondary Markets are important for 2 reasons:
 - 1- Make the financial instrument more liquid and thus more desirable in the primary market
 - 2- Investors who buy securities in the primary market are willing to pay them no more than the price they think the secondary market will set for this security (the higher the price on the secondary market, the more funds a firm can raise)

Exchanges and Over-the-Counter Markets

- Exchanges
 - Buyers and sellers of securities meet in one central location to conduct trades
- Over the Counter (OTC)
 - Dealers in different locations who have an inventory of securities stand ready to buy and sell securities “over the counter” to everyone who comes to them and is willing to accept their price
- Many common stocks are traded over the counter, however the majority of the largest corporations have their shares traded at organized stock exchanges

Money and Capital Markets

Markets can be distinguished based on the maturity of the securities traded

- Money Markets
 - Financial market in which only short-term debt instruments (less than one year) are traded
 - Are usually more traded than longer-term securities and thus tend to be more liquid
 - Short-term securities have smaller fluctuations in prices than longer-term securities, making them safer investments
- Capital Markets
 - Financial market in which longer-term debt and equity instruments are traded



Function of Financial Intermediaries

- Financial intermediation
 - Process of indirect finance using financial intermediaries
- Financial intermediaries are an extremely important source of finance for corporation because of transaction costs, risk sharing and information costs in the financial market

Transaction costs

- Transaction costs
 - are the money and time spent in carrying out financial transactions
 - can be a major problem for individuals who have excess funds to lend
- Financial Intermediaries can dramatically reduce transaction costs because:
 - They developed expertise in lowering them
 - They take advantage from economies of scale
- Financial Intermediaries' low transaction costs allow them to provide customers with liquidity services that make it easier for customers to conduct transactions

Risk Sharing

- Reduce exposure to uncertainty about investments returns
- Help individuals to diversify by investing in a portfolio with assets whose returns do not always move together
- Asset transformation:
 - Intermediaries use returns from low-risk portfolios to make riskier investments
 - Profit is made on the spread between returns they earn on risky investments and payments they make to holders of low-risk portfolios

Asymmetric Information

One party of a transaction may know more about the value of the trade than the other.

a. Adverse Selection (Hidden Characteristics)

- Problem created by asymmetric information *before* the transaction occurs
- Occurs when potential borrowers that are most likely to produce an undesirable outcome are the ones that most likely seek a loan and, thus, most likely to be selected
- Since adverse selection makes it more likely that loans might be made to bad credit risks, lenders may decide not to make any loans, even though good credit risks exist in the marketplace

b. Moral Hazard (Hidden Action)

- Problem created by asymmetric information *after* the transaction occurs
- It is the risk that the borrower may engage in activities that are undesirable from the lender's point of view because they make it less likely that the loan will be paid back
- Since moral hazard reduces the probability that the loan is repaid, lenders may decide that they would rather not make a loan

Financial intermediaries can reduce the malfunctioning in the economy coming from asymmetric information because:

- Can better screen out bad credit risks from good ones (Adverse Selection)
- Develop expertise in monitoring the parties they lend to (Moral Hazard)



- ➔ Therefore, Intermediaries are able to pay lenders-savers interest or provide substantial services and still earn profit

Economies of Scope and Conflicts of Interest

- ➔ Economies of scope:
 - Intermediaries can lower the costs for information production for each service by applying one information resource to many different services
- ➔ Conflicts of interest:
 - Are a type of *Moral Hazard* problem that arises when an individual has multiple objectives and, as a result, has conflicts between those objectives
 - Are likely to occur when a financial institution has multiple interests (“Chinese Walls” are created between the departments of financial institutions in order to prevent conflicts of interest)

Regulation of Financial Markets

- The financial sector is one of the most heavily regulated sectors in the economy for different reasons:
 - Increase information to investors
 - Ensure the soundness of the financial system

Types of financial intermediaries

The principal financial intermediaries can be classified in 3 main categories.

1. Depository Institution

Financial Intermediaries that accept deposits from individuals and institutions and make loans.

- Commercial Banks
 - Raise funds primarily by issuing checkable deposits, savings deposits, time deposits
 - Use funds to make commercial, consumer and mortgage loans and to buy U.S. securities
- Savings and Loan Associations and Mutual Savings Banks
 - Raise funds through savings deposits and time and checkable deposits
 - In the past they could just make mortgage loans for residential housing
 - Today, the distinction with commercial banks has blurred
- Credit Unions
 - Small cooperative lending institutions organized around a particular union
 - Acquire funds from deposits and primarily make consumer loans

2. Contractual Savings Institutions

- Financial intermediaries that acquire funds at periodic intervals on a contractual basis



- Liquidity of assets is not as important as it is for depository institutions because they can predict with reasonable accuracy how much they will have to pay out in benefits in the coming years
- They invest in long-term securities
- Life Insurance Companies
 - Insure people against financial hazards following a death and sell annuities
 - Use the funds from the premiums people pay to invest in corporate bonds and mortgages
- Fire and Casualty Insurance Companies
 - Insure the policyholders from theft, fire and accidents
 - Greater possibility of loss than Life Insurance Companies translates in more liquid assets
- Pension Funds and Government Retirement Funds
 - Provide retirement income in the form of annuities to employees who are covered by a pension plan
 - Funds are acquired by contributions from employers and employees
 - Asset holdings consist in corporate bonds and stocks

3. Investment Intermediaries

- Finance companies
 - Raise funds by selling commercial paper (short-term debt instrument) and by issuing stocks and bonds
 - Lend funds to consumers and small business
- Mutual Funds
 - Acquire funds by selling shares to many individuals and use the proceeds to purchase diversified portfolios of bonds and stocks
 - Allow shareholders to reduce transaction costs when buying large blocks of stocks and bonds and to hold more diversified portfolios
- Money Market Mutual Funds
 - Sell shares to acquire money market instruments that are safe and liquid, then paying interests to shareholders
 - Shareholders can write checks against their shareholding
- Hedge Funds
 - Type of mutual funds with special characteristics
 - Limited Partnerships with minimum investment ranging from \$100k to more than \$1M
 - Subject to weaker regulations than other mutual funds
 - Invest in many types of assets (bonds, stocks, foreign currencies...)
- Investment Banks
 - Intermediary that helps corporations issue securities
 - Advises on which type of security to issue (stocks or bonds) and helps to sell by purchasing them from the corporation at a predetermined price and reselling them in the market
 - Acts as dealmaker by helping corporations in M&A



CHANGES IN THE INTEREST RATES

Determinants of Asset Demand

- An asset is a piece of property that is a store of value
- Demand for a certain asset is determined mainly by 4 factors:

Wealth

- When wealth increases, individuals have greater purchase power, therefore the quantity demanded increases
- *Ceteris Paribus*, an increase in wealth raises the quantity demand of an asset

Expected Returns

- Expected return is the weighted average of all possible returns, where the weights are the probabilities of occurrence of that return
- *Ceteris Paribus*, an increase in an asset's expected return relative to that of an alternative asset raises the quantity demanded of the asset

$$E(R) = \sum_{i=1}^N p_i \times R_i$$

Risk

- The degree of risk or uncertainty of an asset's returns also affects demand for the asset
- Can be measured through the standard deviation
- The higher the standard deviation, the greater the risk on the asset
- *Ceteris Paribus*, if an asset's risk increases relative to that of alternative assets, its quantity demanded will fall

$$\sigma(R) = \sqrt{\sum_{i=1}^N p_i \times (R_i - E(R))^2}$$

Liquidity

- *Ceteris Paribus*, the more liquid an asset is relative to alternative assets, the more desirable it is, and the greater will be the quantity demanded

Supply and demand in the Bond Market

- A bond is a security that assures the holder the payment of a specified amount (face value) at the end of its maturity, as well as the payment of periodic coupon interest
- ➔ If the terms of the repayment are not met by the bonds' issuer, the bond holder has a claim on the assets of the bond issuer
- Considering a one-year zero-coupon-bond, the expected return is:

$$i = R^e = \frac{F - P}{P}$$



Demand for bonds

- Demand for bonds is downward sloping: the lower the price, the higher the quantity demanded
- The higher the interest rate, the lower the price of the bond

- ➔ Shifts:
 1. Increases in wealth will shift the demand for bonds rightward because demand for bonds rises
 2. Increases in expected future interest rates lowers the expected return for long-term bonds, decreasing the demand, and shifting the demand curve leftward
 3. Increases in expected inflation lowers the expected return for bonds, causing their demand to decline and the demand curve to shift left
 4. Increases in risk causes the demand for bonds to fall, shifting left the demand curve
 5. Increases in liquidity increase the demand for bond, shifting the demand curve rightward

Supply for bonds

- Supply of bonds is upward sloping: the higher the price, the higher the quantity supplied

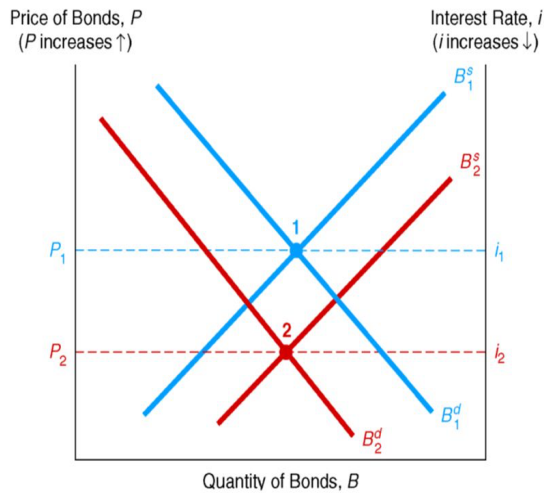
- ➔ Shifts depend on:
 1. Increases in the **profitability of investments** will increase the supply of bonds as firms will need to borrow more to fund the investments
 2. Increases in **expected inflation** decrease the real cost of borrowing, thus increasing the supply of bonds. (This is because the real cost of borrowing is given by the real interest rate, which is equal to the nominal minus the expected inflation, $r=i-\pi$)
 3. Increases in **government deficits** will increase the bond supply as the government will issue more bonds to finance the deficit
- At the market equilibrium condition, demand for bonds must equal the supply of bonds:
 $B_d=B_s$
- Excess supply
 - quantity supplied is greater than the quantity demanded
 - sellers will decrease price to sell more
- Excess demand
 - When the price is below the equilibrium price, quantity demanded is greater than quantity supplied
 - Suppliers will raise prices

- ➔ Market Clearing means that market forces will tend to equate quantities demanded and supplied at the equilibrium price/interest rate

- **Fisher Effect:**
 - If expected inflation increases, the bond demand curve shifts leftward because individuals demand less bond as the expected returns are lower
 - The bond supply curve shifts rightward
 - Price of bonds falls, and the equilibrium interest rate rises
 - ➔ When expected inflation rises, interest rates will rise as well



Changes in π^e : the Fisher Effect



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➤ **Increases in wealth:**

- Bond supply curve shifts rightward because businesses are more willing to borrow money in order to follow good investment opportunities
- Bond demand curve will shift rightwards because individuals are able to buy more bonds
 - ➔ The effect on price (and interest rate) is ambiguous without quantitative tools
 - ➔ Empirically, we can see that interest rates tend increase during business cycle expansion and fall during recessions



INTEREST RATES AND VALUATION

Measuring Interest Rates

- Debt instruments generate very different cash flows
- **Present Value**
 - ➔ Basic principle is that a dollar paid one year from now is less valuable than a dollar paid now
- **Yield-to-Maturity**
 - ➔ Interest rate that makes the present value of a debt instrument equal to its price today
 - ➔ If $P = PV$, then $i = YTM$

Simple Loan

- Lender provides the borrower with a principal that must be repaid at the maturity date, along with an additional payment for the interest

$$PV = \frac{FV}{(1+i)^n}$$

Fixed Payment Loan

- Lender provides the borrower with an amount of funds, which must be repaid by making the same payment every period, consisting of the principal and interest for a set number of years

$$LV = \frac{FP}{1+i} + \frac{FP}{(1+i)^2} + \dots + \frac{FP}{(1+i)^n}$$

Coupon Bond

- Pays the owner of the bond a fixed interest payment every year until the maturity date, when the face value is paid

$$P = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \dots + \frac{C}{(1+i)^{n-1}} + \frac{FV}{(1+i)^n}$$

- $P = FV$ (at par) $\rightarrow i = C/FV$
 - $P < FV$ (at discount) $\rightarrow i > C/FV$
 - $P > FV$ (at premium) $\rightarrow i < C/FV$
1. When the coupon bond is priced at its face value, the yield to maturity equals the coupon rate
 2. The price of a coupon bond and the yield to maturity are negatively related
 3. The yield to maturity is greater than the coupon rate when the bond price is below its face value
- Perpetuity
 - Coupon bond that has no maturity and no repayment of the principal

$$P_c = \frac{C}{i_c}$$

- **Current yield ($i = C/P_c$)** is a useful approximation to the YTM for long-term-bonds, with price near par because CF very distant in time have a low PV
-



Zero-Coupon-Bond

- Bought at a price below the face value and the face value is repaid at maturity

$$i = \frac{F - P}{P}$$

- If the zero-coupon-bond is held for a longer period, the price and the yield are

$$P = \frac{FV}{(1+i)^n} \rightarrow i = \sqrt[n]{\frac{FV}{P}} - 1$$

Difference between Real and Nominal interest Rates

- Real interest rates give the real cost of borrowing
- Real interest rates are calculated by subtracting the rate of expected inflation from the nominal interest rates

$$r = i - \pi^e$$

- Real interest rates in the US are observable only starting from 1997, when the US Treasury started to issue indexed bonds, whose interest and principal payments are adjusted to inflation

Distinction between Interests Rates and Returns

- Rate of return
 - ➔ Gives measure of how well a person does by holding a bond or any other security over a particular time period
 - ➔ For any security, the rate of return is defined as the payments to the owner plus the change in its value, expressed as a fraction of the purchase price
 - ➔ The Rate of Return on a bond is NOT necessarily equal to the interest rate

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

- The equation can be rewritten like this:

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

- $i_c = \frac{C}{P_t}$

- ➔ The first part of the equation is the current yield:
Coupon payment over purchase price

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

- ➔ The second part of the equation is the rate of capital gain:
Change in the bond price relative to the initial purchase price

- $R = i_c + g$

- ➔ The return on the bond is the current yield plus the capital gain



NB

- The only bond whose return is equal to the interest rate is one whose time to maturity equals the holding period
- A rise in the interest rates is associated with a fall in prices, resulting in capital losses on bonds whose terms to maturity are longer than the holding period
- The more distant a bond's maturity, the greater the size of the price change associated with an interest-rate change
- The more distant a bond's maturity, the lower the rate of return that occurs as a result of the increase in the interest rate
- Even though a bond has a high initial interest rate, its rate of return can turn out to be negative if interest rates rise

➤ Interest-Rate Risk

- ➔ Prices and returns for long term bonds are more volatile than those for shorter-term bonds
- ➔ Changes in the interest rate make investment in long-term bond quite risky (interest-rate risk)
- ➔ Shorter-term debt instruments don't have any interest-rate risk:
 - Bonds with maturity equal to the holding period have no interest-rate risk, indeed the rate of return equals the yield to maturity, which is known at the time of purchase

➤ Reinvestment-Risk

- ➔ If an investor's holding period is longer than the term to maturity of the bond, the investor is exposed to a type of interest-rate risk called reinvestment-risk
- ➔ It occurs because the proceeds from the short-term bond need to be reinvested at a future interest rate that is uncertain

Duration

- In order to measure then interest-rate risk, it is necessary to have precise information on the capital gain/loss occurred when the interest rate changes by a certain amount
- Duration
 - ➔ Average lifetime of a debt security's stream of payments
 - ➔ The fact that 2 bonds have the same term of maturity does NOT mean that they have the same interest-rate risk
 - ➔ a coupon bond makes payment earlier than a zero-coupon-bond, therefore it has an effective maturity (term to maturity that accurately measures interest-rate risk) that is shorter than the zero-coupon-bond
- For a zero-coupon-bond, the effective maturity is equal to the actual term to maturity
- For a coupon bond, the duration is a weighted average of the maturities of cash payments

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

➤ *Ceteris Paribus*

- ➔ The longer the term to maturity of a bond, the longer its duration
- ➔ When interest rates rise, the duration of a coupon bond falls
- ➔ The higher the coupon rate on the bond, the shorter the bond's duration



- The duration of a portfolio of coupon bonds is a weighted average of all the durations of the individual securities, where the weights reflect the proportion of the portfolio invested in each security (*additive property of duration*)
- Duration is used to measure the interest-rate risk because it provides a good approximation of the change in price of a security, following a change in the interest rate:

$$\% \Delta P = -DUR \frac{\Delta i}{1 + i}$$

- The greater the duration of a security, the greater the percentage change in the market value of the security for a given change in the interest rates
 - ➔ greater duration = greater interest-rate risk



THE MONEY MARKETS

The Money Market Defined

- Money market is a misnomer, because currency is not traded in the money market, but the securities that are traded are short-term and highly liquid, thus being close to money
- Money market securities have 3 main characteristics:
 - Sold in large denominators
 - Low default risk
 - Mature in one year or less from their original issue date
- Money market securities are mainly traded on OTC markets
- Money markets are wholesale markets, since most transactions are very large (Exceeding \$1 million)

- Money markets exist in situations where asymmetric information between borrowers and lenders is not severe, thus allowing them to have a significant cost advantage wrt banks in providing short-term funds

- 1970s-1980s
 - Regulations that set a ceiling on the interest rate that banks could pay for funds, set in 1933 by the Glass-Steagall Act, became troublesome as inflation pushed short-term rates above the level that banks could legally pay
 - Investors pulled their money from the banks and put it into money market security accounts offered by many brokerage firms, causing the money market to grow rapidly
 - In 1986 interest-rate ceilings were removed, but the money markets were already well established

Purpose of the money market

- Lenders / Buyers
 - Well-developed secondary market for money market instruments makes the money market the perfect place for a firm to store surplus funds until they are needed
 - Goal for investors is to use the money market as an interim investment that provides a higher return than bank accounts
 - ➔ Holding surplus cash is expensive in terms of opportunity cost deriving from the lost interest rate and the money market reduces this opportunity cost
- Borrowers / Sellers
 - Since cash inflows and outflows are rarely synchronized, corporations, banks and the US government may borrow short-term funds from the money market and pay them back after they get cash inflows
 - Money markets provide a low-cost source of funds to firms, the government and intermediaries that need a short-term infusion of funds

Participants in the money market

Most money market participants operate on both sides of the market

➤ *US Treasury Department*

- Is always a demander of money market funds and never a supplier
- It issues Treasury Bills (T-Bills)
- Short term issues allow the government to raise funds until tax revenues are received



- **Federal Reserve System**
 - FED holds vast quantities of Treasury securities that it sells if it believes that interest rates should be raised, and buys if it believes that interest rates should be lowered
 - FED is the most influential participant in the US money market
- **Commercial Banks**
 - Hold a percentage of U.S. government securities only second to pension funds, partly because they are forbidden from owning risky assets
 - Are the main issuer of Negotiable Certificates of Deposit (CDs), federal funds and repurchase agreements
- **Businesses**
 - Larger corporations usually buy and sell securities in the money markets to warehouse surplus funds and raise short-term funds
- **Investment and Securities Firms**
 - ➔ Investment Companies
 - The primary function is to make a market for money markets securities by maintaining an inventory from which to buy and sell
 - Are fundamental in maintaining the liquidity of the money market
 - ➔ Finance Companies
 - Raise funds in the money markets by selling commercial paper
 - They then lend these funds to consumers for the purchase of goods
 - ➔ Insurance Companies
 - Must maintain liquidity because of unpredictable need for funds
 - They hold money markets securities in order to sell them quickly to raise cash
 - ➔ Pension Funds
 - Invest a portion of their cash in the money markets so that they can take advantage of investment opportunities that they may identify in the stock or bond markets
 - Must have sufficient liquidity to meet their obligations, which are reasonably predictable, making large money market securities holding unnecessary

Money Market Instruments

Treasury Bills (T-Bills)

- Issued by the US Treasury to finance the national debt
- Most widely held and liquid security
- Are issued at a discount from par, therefore the investor's yield comes from the increase in the value of the security between the time it was purchased and the time it matures
- Risk
 - Zero risk of default because the government could just print more money to redeem them at maturity
 - Extremely DEEP and LIQUID market because buyers and sellers are many and securities can be sold quickly with low transaction costs
 - Because of the zero risk, interest rates is the lowest among the economy



- Auctions
 - *Competitive Bidding*, Treasury accepts the bids in ascending order of yield (descending order of price) until the offering amount is reached. Bidders select price and quantity.
 - *Non-Competitive Bidding*, buyers specify only the quantity and pays the same price as competitive bidders
- Discounting T-Bills:
 - Discount rate → $i_{discount} = \frac{F-P}{F} * \frac{360}{n}$ [F as denominator]
 - Investment rate → $i_{investment} = \frac{F-P}{P} * \frac{365}{n}$ [P as denominator]

Federal Funds

- Short term funds transferred between financial institutions, usually for a period of one day (overnight)
- Since the FED has set minimum reserve requirements that banks must hold, to meet these requirements banks must keep a certain percentage of their deposits with the Federal Reserve
- Banks analyze their reserve position on a daily basis and either borrow or invest in fed funds, depending on whether they have deficit or excess reserves
 - ➔ If a bank has excess reserves, it will sell them to the bank that offers the higher rate. Then, the bank with excess funds will communicate to the FED to take funds out of its account and deposit them into the borrower's account. The next day, funds are transferred back, and the process begins again
- The Federal Reserve cannot directly control the interest rate on Fed Funds:
 - What the Fed does is setting a *target Fed Funds rate*
 - Demand and supply for reserves will then determine the *effective rate*, which moves around the target rate → The Fed indirectly controls the effective rate
 - ➔ If the Fed buys securities, investors' proceeds from the sale are deposited in the Bank Account at the Fed, thus increasing the supply of reserves and lowering the interest rate
 - ➔ If the Fed sells securities, investors buy them by withdrawing cash from the Bank Account at the Fed, thus reducing the demand for reserves and increasing the interest rate

Repurchase Agreements (REPOs)

- A firm can sell Treasury securities in a repurchase agreement whereby the firm agrees to buy back the securities at a specified future date
- Dealers sell the securities to a bank with the promise to buy the security the next days, making repos essentially a short-term collateralized loan.
- Security dealers mainly use repos to manage their liquidity and to take advantage of anticipated changes in interest rates
- The Federal Reserve uses repos in conducting the monetary policy, which typically requires the Fed to adjust bank reserves on a temporary basis: to do so, the Fed will buy or sell Treasury securities in the repo market
- Low risk corresponds to low interest rate



Negotiable Certificates of Deposit

- Bank issued security that documents a deposit and specifies the interest rate and the maturity date
- CD is a term security because it has a specified maturity date, and cannot be withdrawn before maturity (as opposed to demand deposits)
- A negotiable CD is a bearer instrument because whoever holds the instrument at maturity receives the principal and the interest
- Very large instrument because dealers have established the round lot size, which is the minimum quantity that can be traded without incurring in higher brokerage fees, to be \$1 million
- Since the level of risk is relatively low, interest rates are low. Large banks can charge even a lower interest because investors believe that the government would not allow one of the nation's largest banks to fail

Commercial Papers

- Unsecured promissory notes issued by corporations, with a maturity of maximum 270 day:
 - Since they are unsecured, only the largest creditworthy corporations issue them
 - The interest rate reflects the level of risk of the firm
- The maximum maturity date is 270 days from issuance in order to avoid the need to register the security issue with the SEC
- Commercial Papers are usually issued on a *discount basis* (like T-Bills)
- 60% of commercial papers is sold directly by issuers to buyers and due to the very low maturity it does NOT exist a secondary market

- Non-bank corporations use commercial papers to finance the loans that they extend to customers by using direct placement, that is the sale of the security directly to investors, without intermediation
- Most issuers back up their commercial papers with a line of credit at a bank: in the event that the firm cannot pay off a maturing paper, the bank will lend the firm funds for this purpose, thus reducing the risk for the purchaser and lowering the interest rate

- Asset Backed Commercial Papers
 - Between 2004-2007 these assets were mostly securitized mortgages with high credit ratings from rating agencies, but the quality was poorly assessed
 - After the securitized mortgages market exploded between 2004 and 2007, it was exposed the poor quality of these mortgages in 2008, triggering a run on ABCP
 - Investors tried to sell them in a saturated market
 - Problems extended to money market mutual funds, which found that the issuers of ABCP had exercised the option to extend the maturities at low rates
 - Therefore, the FED set up a program to prevent the collapse of money market mutual fund market and allow an orderly liquidation of their ABCP

Banker's Acceptances

- It is an order to pay a specified amount of money to the bearer on a given date, and they are used to finance goods that have not yet been transferred from the seller to the buyer
- Bank essentially substitutes its creditworthiness for that of the purchases
- Banker's Acceptances are payable to the bearer, and they can be bought and sold until maturity
- Banker's Acceptances are sold on a discounted basis
- Interest rates are low because of the low default risk



Eurodollars

- Many payments all over the world are done in US dollars because of the currency stability
- With the Cold War there was fear that deposits held on US soil could be expropriated, thus London banks started to hold dollar-denominated deposits in British Banks (Eurodollars)
- The market for Eurodollars grew rapidly because:
 - Less regulation than in the US
 - Higher competition and therefore, more favorable rates
 - Depositors receive a higher rate of return on a dollar deposited in the Eurodollar market rather than in their domestic market
 - Borrowers receive a more favorable rate in the Eurodollar market rather than in their domestic market
- LIBOR → London Interbank Offer Rate, rate at which funds are offered for sale
- LIBID → London Interbank Bid Rate, rate paid by banks buying funds
 - ➔ The market is very competitive, making the spread between bid and offer very narrow
- Eurodollars deposits cannot be withdrawn for a specified period
- LIBOR and Fed funds rate are very close because they are nearly perfect substitutes
- Since Eurodollars are time deposits, they are to a certain extent illiquid:
 - New securities called Negotiable Certificates of Deposit were created in order to solve this problem
 - However, since Eurodollars deposits are short term, the market for Eurodollar negotiable CDs is limited

Comparing Money Market Securities

- Interest Rates
 - ➔ Since the money markets are very deep and competitive, all have low risk and short-term, and they are all close substitutes, money markets instruments tend to move together
 - ➔ If one should depart from the others, market supply-and-demand forces would soon cause a correction
- Liquidity
 - ➔ The depth of the secondary market where a security can be sold determines its liquidity
 - ➔ Depth of the secondary market for money markets securities is not as critical as it is for long-term securities such as stocks and bonds
- Valuation
 - ➔ Money market securities are usually priced by discounting future cash flows to the current period

$$PV = \frac{FV}{(1 + i)^n}$$



Money Market Security	Issuer	Buyer	Usual Maturity	Secondary Market
Treasury bills	U.S. government	Consumers and companies	4, 13, and 26 weeks	Excellent
Federal funds	Banks	Banks	1 to 7 days	None
Repurchase agreements	Businesses and banks	Businesses and banks	1 to 15 days	Good
Negotiable certificates of deposit	Large money center banks	Businesses	14 to 120 days	Good
Commercial paper	Finance companies and businesses	Businesses	1 to 270 days	Poor
Banker's acceptance	Banks	Businesses	30 to 180 days	Good
Eurodollar deposits	Non-U.S. banks	Businesses, governments, and banks	1 day to 1 year	Poor

The Capital Market

- Firms and investors that operate in the Capital Market have different motivations than those that operate in the Money Market
 - Firms and individuals use the Capital Markets for long-term investments
 - If a firm needs to finance a new plant, it can issue (short-term) Money Market Securities, and reissue them when they mature
 - If interest rates are stable, no problem
 - If interest rates have increased in the meanwhile, they will have to reissue at a higher interest rate
 - In the latter case, the firm may not have enough cash flows or income to afford the debt
 - ➔ If long term securities are issued, the increase in the interest rate will cause no problem, but the long-term interest rate will be higher due to risk premia
- The primary issuers of capital market securities are federal and local governments and corporations:
 - The Federal Government issues long-term notes and bonds to fund the national debt
 - State and Municipal Governments issue long-term notes and bonds to fund capital projects
 - Governments NEVER issue stock because they cannot sell ownership claims
 - Corporations issue both bonds and stocks because they do not have sufficient capital to fund investment opportunities or because they want to preserve their capital to protect against unexpected needs
 - ➔ Availability of efficiently functioning capital markets is crucial to the continued health of the business sector



- The largest purchasers of capital market securities are households, since they deposit funds in financial institutions that use them to purchase capital market instruments such as bonds or stock
- Capital market trading occurs in either the Primary Market or the Secondary Market:
 - The primary market is where new issues of stocks and bonds are introduced
 - Investment funds, corporations and individuals can all purchase securities offered in the Primary Market
 - When firms sell securities for the first time in the Primary Market, the issue is an Initial Public Offering (IPO)
 - The secondary market is where the sale of previously issued securities takes place
 - Secondary markets are critical in capital markets because most investors plan to sell long-term bonds at some point before they reach maturity
 - There are 2 main types of exchanges in the Secondary Market: Organized exchanges and Over-the-Counter Exchanges (OTC)
- Bonds
 - Securities that represent a debt owed by the issuer to the investor
 - They obligate the issuer to pay the investor at a certain date a specified amount, generally with periodic interest payment
 - The Par Value of the bond is the amount the issuer must pay at maturity
 - The Coupon Rate is the rate of interest that the issuer must pay (coupon payment)
 - The Coupon Payment is generally fixed for the duration of the bond and does not fluctuate with market interest rates
 - If the terms of the bond are not met, the holder has a claim on the assets of the issuer

Treasury Notes and Bonds

- U.S. Treasury issues notes and bonds to finance the national debt:
 - Notes have a maturity of 1 to 10 years
 - Bonds have a maturity of 10 to 30 years
- The prices of Treasury notes, bonds and bills are quoted as a percentage of \$100 face value
- Federal government notes and bonds are free from default risk because the government can always print new money to pay off the debt (this does NOT mean that they are risk-free)
 1. *Treasury Bonds Interest Rates*
 - Have very low interest rates because they have no default risk
 - The rate of return on short term bills is below that on the 20-year-old bill
 - Short-term rates are more influenced by the expected rate of inflation
 2. *Treasury Inflation-Protected Securities (TIPS)*
 - Inflation indexed bonds have an interest rate that does not change throughout the term of the security
 - The principal amount used to compute the interest payment changes based on the Consumer Price Index
 - The advantage of TIPS is that they give a chance to buy a security whose value is not influenced by inflation
 3. *Treasury STRIPS*
 - Separate Trading of Registered Interest and Principal Securities (STRIPS) separates the periodic interest payment from the final principal repayment



- When a Treasury fixed-principal or inflation-indexed note or bond is “stripped”, each interest payment and the principal payment becomes a zero-coupon security (investors will receive payments only at maturity)
 - Each component has its own identifying number and can be traded separately
4. *Agency Bonds*
- Congress has authorized a number of U.S. agencies to issue bonds
 - The government does not explicitly guarantee agency bonds, though most investors feel that the government would not allow these agencies to default
 - Agencies issue bonds to raise funds that are then used for purposes that the government has deemed of national interest
 - The risk is very low because
 - they are usually secured by the loans that are made with the funds raised by the bond sales
 - federal agencies may use the line of credit with the Treasury Department, should they have trouble meeting their obligations
 - it is unlikely that the federal government would permit its agencies to default on their obligations

Municipal Bonds

- Securities issued by local, county and state governments in order to finance public interest projects
- Since the interest earned from Municipal Bonds is exempt from taxation, it allows municipality to borrow at a lower cost because investors will be satisfied with lower interest rates on tax-exempt bonds:

$$\text{Equivalent tax free rate} = \text{taxable interest rate} * (1 - \text{marginal tax rate})$$

- However, Municipal Bonds are not Default Free
- Two main types of municipal bonds:

1. *General Obligation Bonds*

- Do not have specific assets pledged as security or a specific source of revenue allocated for their repayment
- Backed by “full-faith and credit” of the issuer; which means that the issuer promises to use every resource available to repay the bond
- Most general obligations bonds must be approved by taxpayers because the taxing authority is pledged for their repayment

2. *Revenue Bonds*

- Backed by the cash flow of a particular revenue-generating project
- If the revenues are not sufficient to pay the bonds, they may go into default because local governments cannot print money and there are real limits on how they can raise taxes
- Tend to be issued more than general obligations bonds

Corporate Bonds

- Large corporations may need to borrow funds for long periods of time
- Most corporate bonds have face value of \$1000 and pay semi-annual interest
- Most corporate bonds are *callable*, meaning that the issuer may redeem the bonds before maturity
- *Bond Indenture* → contract that states the lender’s rights and privileges and borrower’s obligations



- The *Degree of risk* varies widely among different bond issues because the risk of default depends on the company's health, which can be affected by a number of variables
 - The spread between the different rated bonds varies over time (the spread between AAA and BBB rated bonds has historically averaged 1%)
 - A bond's interest rate depends on the level of risk and its features

- Characteristics of corporate bonds, included in the *bond indenture*:
 1. *Restrictive Covenants*
 - Stockholders have the power to hire, fire and compensate the manager, thus the latter will be more interested in protecting stockholders interests rather than those of bondholders
 - In order to get protection, bondholders may impose some restrictive covenants in the indenture, in order to protect their interests
 - Covenants limit the amount of dividends that the firm can pay and the ability of the firm to issue more debt
 - The more restrictions are put in place, the lower the interest rate will be because the bond is deemed safer

 2. *Call Provisions*
 - Most corporates include in the indenture a call provision, which states that the issuer has the right to force the holder to sell the bond back
 - The price bondholders are paid is usually par, or slightly above
 - Since bondholders generally do NOT like Call Provisions, callable bonds must have a higher yield than comparable noncallable bonds
 - Firms are willing to pay higher prices for callable bonds because they allow higher flexibility
 - Firms may include Call Provisions for 4 main reasons:
 - a) If interest rates fall enough, the price of the bond will rise above the call price, and the firm will call the bond
 - ➔ Since call provisions may put a limit to the earnings of investors after an appreciation of the bond's price, the feature is not liked
 - b) Call Provisions allow the issuers of bond to buy back their bonds according to the terms of the *sinking funds*
 - ➔ Sinking fund is a requirement in the bond indenture that the firm pay off a portion of the bond each year
 - ➔ Since it reduces the risk of default, the feature is attractive to bondholders
 - c) Firms may have to retire the bond issue if the covenants of the issue restrict the firm from some activity that it feels is in the best interest of stockholders
 - d) Firms may choose to call bonds if they decide to alter the capital structure:
 - ➔ A firm with excess cash flow may wish to reduce its debt load if few attractive investment opportunities are available

 3. *Conversion option*
 - Some bonds can be converted in shares of Common Stock, thus allowing bondholders to share in the firm's good fortune if the stock price rises
 - Most convertible bonds will state that the bond may be converted in a certain number of shares, at the discretion of the bondholder



- The conversion ratio is such that the price of the stock must rise substantially before conversion is likely to occur
- Bondholders like the feature of convertible bonds, thus the price will be higher than comparable non-convertible bonds and the interest rate lower
- Issuing convertible bonds is a way for firms to avoid sending a negative signal to the market:
 - In the presence of asymmetric information, when a firm chooses to issue stock, the market interprets this action as indicating that the stock price is relatively high or that it is going to fall in the future
 - ➔ If managers believe that the stock price will increase in the future, they can issue convertible bonds:
 - if managers are correct and the stock price increases, bondholders will convert their bonds at a relatively high price
 - if managers are wrong, bondholders have the option not to convert the bond

➤ Type of corporate bonds:

1. *Secured Bonds*

- Bonds with a collateral attached like Mortgage Bonds
- In the event a firm fails to meet its obligations, mortgage bondholders have the right to liquidate the property in order to be paid
- Since they are less risky than comparable unsecured bonds, the interest rate is lower

2. *Unsecured Bonds*

- **Debentures** are long-term unsecured bonds that are backed only by the general creditworthiness of the issuer:
 - no specific collateral is pledged to repay the debt
 - in the event of default, bondholders must go to court to seize assets
 - usually have an attached contract (indenture) that states the terms of the bond and the responsibilities of the management
 - have lower priority than secured bonds in case of default, thus they are riskier and have a higher interest rate
- **Subordinated Debentures** have a lower priority claim wrt debentures, thus having a higher interest rate due to the higher risk
- **Variable-rate bonds** have an interest rate that changes over time as market rates change

3. *Junk Bonds*

- Bonds that are below the investment grade rating (BBB) because they are considered highly speculative
- In the past, if companies ran into financial difficulties, their bond ratings would fall, making the bond difficult to sell since there was no well-developed secondary market
- Investment banks started to make a market for these kinds of bonds, but also to renegotiate the debts of firm in difficulty in order to minimize the risk of default
- In the mid-1980s, many firms took advantage of junk bonds to finance the takeover of other firms, thus highly increasing the leverage of the firms



- ➔ Frequently, part of the acquired firm was eventually sold to pay off the debt incurred by issuing the junk bonds
- Since its low in 1990, the junk bond market recovered until the financial crisis in 2008:
 - ➔ Considering that in 2008 the default rate on speculative bonds was very high, the behavior was rational

Financial Guarantees on Bonds

- Financially weaker security issuers frequently purchase financial guarantees to lower the risk of their bonds:
 - Financial guarantees ensure that the lender will be paid both interests and principal in case of default
 - Insurance companies write insurance policies to back bond issues
 - Bond buyers no longer have to be concerned with the financial health of the bond issuer
 - ➔ The resulting reduction in risk lowers the interest rate demanded by bond buyers
- Financial guarantees make sense only when when the cost of the insurance is less than the interest savings that result
- *Credit Default Swap (CDS)*
 - Provides insurance against default in the principal and interest payments of a credit instrument
 - In 2000, the Congress passed a law that deregulated derivatives such as CDSs, thus allowing investors to speculate on the possibility of default on securities they did not own
 - Between 2000 and 2008, AIG, Lehman Brothers and Bear Stearns were major CDS players, thus being highly exposed to the 2008 crisis

Current Yield Calculation

- Current Yield is an approximation of the yield to maturity on coupon bonds, defined as the yearly coupon payment over the price of the security:

$$i_c = \frac{C}{P}$$
- It is the same formula that calculates the yield to maturity of a perpetuity:
 - For a perpetuity, the current yield is an exact measure of the yield to maturity
 - When a coupon bond has a long-term maturity, it is very much like a perpetuity
- As the time to maturity of the coupon bond shortens, it behaves less and less like a perpetuity and so the approximation afforded by the current yield becomes worse and worse
- The current yield is also equal to the coupon rate when the bond is at par:
 - When the bond is at par, the current yield equals the yield to maturity
 - The nearer the bond price is to the bond's par value, the better the current yield will approximate the yield to maturity
- The current yield and the bond price are negatively related



- The current yield and the yield to maturity always move together, thus a rise in the current yield always signals that the yield to maturity has also risen
 - ➔ The current yield better approximates the yield to maturity when the bond's price is nearer to the bond's par value and the maturity is longer
 - ➔ The current yield becomes a worse approximation when the bond's price is further from the bond's par value and the bond's maturity is shorter

Finding the Value of Coupon Bonds

- The current price of a bond is the present value of all future cash flows:
 - The current price must be such that the seller is indifferent between keeping the bond and receiving the offer price
- Since bonds usually pay coupons semi-annually, we need to:
 - Divide by 2 the coupon payments
 - Finding the effective interest rate during one-half of the year
 - Double the number of periods

$$P_{semi} = \frac{C/2}{1 + i/2} + \frac{C/2}{(1 + \frac{i}{2})^2} + \dots + \frac{\frac{C}{2}}{(1 + \frac{i}{2})^{2n}} + \frac{F}{(1 + \frac{i}{2})^{2n}}$$

- Discount → Bond sells at less than par value
- Premium → Bond sell at more than par value

Investing in Bonds

- Bonds are a good alternative to stocks because:
 - Are lower risk because have higher priority of payment in case of default
 - Offer relative security and dependable cash payments
- Even though high-grade bonds seldom default, bond investors may face fluctuations in price due to interest rate movements
 - ➔ The possibility of suffering a loss because of interest rate changes is called interest-rate risk
 - ➔ The longer the maturity of the bond, the greater the interest-rate risk
- Changes in the market interest rates may cause a loss only to those investors that decide to sell before maturity:
 - Investors that hold bonds until maturity will receive the face value when the bond matures



THE STOCK MARKET

Investing in Stocks

- A share of stocks in a firm represents ownership:
 - Stockholder owns a percentage interest in a firm, consistent with the percentage of outstanding stock held
- Investors can earn a return from stock in 2 ways:
 - Increase in the price of the stock
 - Firm pays stockholders dividends
 - ➔ Frequently investors earn their return from both sources
- Stock is riskier than bond because
 - stockholders have a lower priority than bondholders when the firm is in trouble
 - dividends are less assured
 - stock price increases are not guaranteed
- Right of a *residual claimant*:
 - Stockholders have a claim on all assets and income left after all other claimants have been satisfied
- *Voting rights*
 - Stockholders have the right to vote for directors and on certain issues of the firm, such as amendments in the corporate charter and whether new shares should be issued
- *Taxation*
 - Equity funding is more costly wrt debt funding because interest-rate from bonds is tax deductible, while dividends are not
- There are 2 types of stocks:
 1. *Common Stock*
 - Entitle the holder to vote, receive dividends, and hope that the stock price increases
 - There are different types of common stock peculiar to each corporation, and the difference is based either on the distribution of dividends or on voting rights
 2. *Preferred Stock*
 - Entitles the stockholder to a fixed dividend that never changes (similarly to a bond)
 - Since the dividends do not change, the price is relatively stable
 - Usually, does not entitle the holder to any voting right
 - Have a claim on assets that has priority over the claims of common shareholders, but after that of creditors like bondholders
 - Preferred stocks are not very diffused because dividends, unlike bonds, are not tax deductible and therefore, usually have a higher price than debt
- Stocks are traditionally traded or organized exchanges or over the counter (Secondary Markets), however this distinction is blurring as electronic trading grows in both volume and influence
 1. ***Organized Securities Exchanges***
 - Traditionally, it is a specific location where buyers and sellers meet on a regular basis and trade securities using an open-outcry auction model
 - The NYSE is the world's largest and most liquid stock exchange



- This model is becoming less frequently used due to the advent of new sophisticated technologies
- In order to have a stock listed for trading on an organized exchange, a company must file an application and satisfy certain criteria set by the exchange
- The NYSE encourages only the largest firms to list so that transaction volumes will be high, however many firms list for the prestige deriving from being listed in one of the major exchanges

2. **Over-the-Counter Markets**

- Securities not listed in exchanges trade in the OTC market
- An example of OTC market is the National Association of Securities Dealers Automated Quotation System (NASDAQ), which provides current bid and ask prices on about 3000 actively traded securities
- Dealers “make a market” in these stocks by buying for inventory when investors want to sell and selling from inventory when investors want to buy, thus providing small stocks with the liquidity essential to their acceptance in the market and earning the bid-ask spread

3. **Stock Market Indexes**

- Used to monitor the behavior of a group of stocks
- They are built through the average of the stocks composing the index (every stock has the SAME weight)
- DJIA is an example of price-weighted index, which however has an adjusting divisor (Dow Divisor) that keeps track of stock splits, dividends... to maintain historical continuity
- S&P 500 is an example of value-weighted index, where prices are weighted by their market-cap over a base year → Index value today shows the change wrt the base year

4. **Exchange Traded Funds (ETFs)**

- Formed when a basket of securities is purchased, and a stock is created based on this basket that is traded on an exchange
- Main features:
 - they are listed and traded as individual stocks on an exchange
 - they are indexed rather than actively managed
 - value is based on the underlying net asset value of the stocks held in the index basket. The exact content of the basket is public so that intraday arbitrage keeps the ETF price close to the implied value
- ETF trade like stock but have lower management fees than comparable index mutual funds and they usually have no minimum investment
- Since they trade like stocks, investors have to pay brokerage commissions each time they buy or sell shares (cost disadvantage wrt mutual funds)

Organized VS Over the Counter Trading

➤ Organized exchanges

- Characterized by as auction markets that use floor traders who specialize in particular stocks and oversee and facilitate trading in a group of stocks
- Most orders are filled electronically through the super display book (SDBK), which matches buy and sell orders automatically
- Only complex orders continue to be executed by floor traders on the exchange



➤ Over the counter exchanges

- Stocks are not traded in an auction format but on an electronic network where bid and ask are set by market makers
- Market makers are fundamental because they ensure the liquidity for every stock
- Market makers are compensated with the spread between bid price and ask price

Computing the Price of Common Stock

➤ *One-period valuation model:*

$$P_0 = \frac{D_1}{(1 + k_e)} + \frac{P_1}{(1 + k_e)}$$

➔ k_e is the desired return on the investment (interest rate + risk premium)

➤ *Generalized Dividend Valuation Model:*

$$P_0 = \frac{D_1}{(1 + k_e)} + \frac{D_2}{(1 + k_e)^2} + \dots + \frac{D_n + P_n}{(1 + k_e)^n}$$

➔ If P_n is far away in the future, it will not affect P_0 , thus we can generalize the formula:

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t}$$

➤ *Gordon Growth Model*

$$P_0 = \frac{D_0 * (1 + g)}{(k_e - g)} = \frac{D_1}{(k_e - g)}$$

➔ *Dividends are assumed to grow at a constant rate forever*, indeed as long as they are expected to grow at a constant rate for an extended period of time, the model should yield reasonable results as errors about distant cash flows become small when discounted to the present

➔ *The growth rate, g , is assumed to be less than the required return on equity, k_e ,*

Because if the growth rate was faster than the rate demanded by holders of the firm's equity, in the long run the firm would grow impossibly large

➤ *Price Earning Valuation Model*

➔ The PE ratio is used to understand how much investors are willing to pay for \$1 of earnings

➔ Firms in the same industry tend to have a similar PE ratio

➔ To find a stock price, it is possible to multiply the average industry PE by the expected earnings per share

$$P = \frac{P}{E} (\text{industry}) * E (\text{firm})$$

➔ High PE has 2 interpretations:

- If the market expects earnings to rise in the future, this will return the PE ratio to a more normal level eventually
- The market feels that the firm's earnings are very low risk, thus is willing to pay a premium for them

How the Market sets Security Prices

➤ The price is set by the buyer willing to pay the highest price



- It is not necessarily the highest price the asset could fetch but it is incrementally greater than what any other buyer is willing to pay
- Market price will be set by the buyer who can take the best advantage of the asset
- Superior information about an asset can increase its value by reducing the risk
 - The buyer who has the best information will discount the future cash flows of an investment by a lower desired return on the investment, k_e , as the risk is perceived to be lower
- Since new information can cause changes in expectations, it is reasonable that the stock prices are constantly changing

Errors in Valuation

- *Problems with Estimating Growth*
 - The constant growth model requires an estimate of the constant growth rate of the firm
 - However, this approach fails to consider any changes in the firm or economy that may affect the growth rate
 - R. Haugen writes that competition will prevent high growth firms from being able to maintain their historical growth rate
 - ➔ Indeed, he demonstrated that stock prices of historically high-growth firms tend to reflect a continuation of the high growth rate, but investors receive lower returns than they would by investing in mature, slower-growing firms
- *Problems with Estimating Risk*
 - The dividend valuation model requires to estimate the required return for the firm's equity, whose estimation is however uncertain, even though the stock prices are highly dependent on it
- *Problems with Forecasting Dividends*
 - Many factors may influence the dividend payout ratio, such as future growth opportunities and management's concerns over future cash flows
 - ➔ Because of these 3 main issues, stock analysis is seldom certain and accurate and stock prices fluctuate continuously in the short term. In the long term, the stock price will adjust to reflect the true earnings of the firm

2007-2009 Financial Crisis

- According to Gordon's model, what contributes in the fall in asset prices is:
 - Downward revision of the dividend growth rate, g
 - Upward revision of the required capital gain, k^e , due to higher uncertainty

Buying Foreign Stocks

- Diversifying a portfolio and holding securities from around the world reduces risk:
 - If one country is suffering from a recession, others may be booming
 - If inflation concerns the US and causes the stock prices to drop, falling inflation in Japan may cause Japanese stocks to rise
- The problem with buying foreign stocks is that most foreign companies are not listed on any US stock exchange
 - ➔ Intermediaries have found a way to solve the problem by selling American Depository Receipts (ADRs)
 - US bank buys the shares of a foreign company and places them in its vault



- The bank then issues receipts against these shares, and these receipts can be publicly traded, usually on the NASDAQ
- An advantage of ADRs is that it allows foreign firms to publicly trade on the US stock market without necessarily meeting the disclosure rules required by the SEC
- The higher degree of economic interconnectivity among nations means that risk remains anyway

Regulation of the Stock Market

- In the absence of trust, markets may collapse, thus compromising the economic health of a country
- 1933-1934 → The Congress passed two Securities Acts
 - ➔ The purposes of these regulations were:
 - Requiring firms to tell the public the truth about their businesses
 - Requiring brokers, dealers, and exchanges to treat investors fairly
 - Establishing the Securities and Exchange Commission (SEC) to enforce these laws
- The Security and Exchange Commission
 - The primary mission is to protect investors and maintain the integrity of the securities markets
 - The SEC accomplishes its obligations by ensuring constant, timely and accurate flows of information to investors, who can judge by themselves if the company's securities are a good investment
 - ➔ Main objective is reducing asymmetric information between firms and investors
- The SEC has 5 divisions:
 1. *Division of Corporate Finance*, which is responsible for collecting the documents that public companies are required to file
 2. *Division of Trading and Markets*, which establishes and maintains standards for an orderly and efficient market by regulating the major securities market participants
 3. *Division of Investment Management*, which oversees and regulates the investment management industry
 4. *Division of Enforcement*, which investigates the violation of any of the rules and regulations established by the other divisions
 5. *Division of Economic Risk and Analysis*, which provides analysis and data to all of the divisions as needed



HEDGING WITH FINANCIAL DERIVATIVES

Hedging

- Hedging refers to the ability of financial institution to engage in a financial transaction that reduces or eliminates risk
- Hedging risk involves engaging in a financial transaction that offset a long position by taking an additional short position, or offsets a short position by taking an additional long position
 - ➔ If a financial institution has bought a security, it hedges risk by contracting to sell that security at some future date
- **Long Position** → profit comes from an appreciation of the asset
- **Short Position** → profit comes from the fall in the asset price

Forward Markets

- Forward contracts are agreements between two parties to engage in a financial transaction at a future point in time

Interest Rate Forward Contracts

- Interest rate forward contracts involve the future sale or purchase of a debt instrument and have several dimensions:
 - Specification of the actual debt instrument that will be delivered at a future date
 - Amount of the debt instrument to be delivered
 - Price on the debt instrument when it is delivered
 - Date on which the exchange will take place
- Buying a long-term bond exposes the buyer to interest-rate risk:
 - The risk can be offset by taking a short position with a forward contract and selling the bond at a future date for its par value
 - In the meanwhile, the buyer will earn the interest rate on the period and will be able to sell in the future without any loss in case of an increase in the interest rates

Profitability

- F → Agreed forward price
- S_T → Spot market price on the day of maturity

$$\pi_{LONG} = S_T - F$$
$$\pi_{SHORT} = F - S_T$$

- The main advantage of Forward Contracts is that they allow for great flexibility
- Disadvantages:
 - It may be very hard to find a counterparty to make the contract with, even though there are brokers that facilitate the matching up
 - Even if the bondholder finds a counterparty, it may not get as high a price as it wants because there maybe not be anyone else to make the deal with
 - The market suffers from a lack of liquidity because it is difficult to make the financial transaction, or it will have to be made at a disadvantageous price
 - Forward contracts are subject to default risk:
 - The counterparty may want to default on the contract because now it can buy the same bond at a better price



- The counterparty may default because it is not financially solid, and so is unavailable to complete the transaction

→The presence of default risk means that parties must check out if the counterparty is financially fine and honest to live up its contractual obligations. This is a costly problem because adverse selection and moral hazard issues apply, thus making default risk a major barrier to entry. Moreover, if combined with the lack of liquidity, these contracts are of limited usefulness.

- Forward contracts are a zero-sum game because there is always a winner and a loser

Financial Futures Markets

➤ Future Contracts are similar to Interest Rate Forward Contracts:

- It specifies the future date at which a financial instrument must be delivered by one party to another
- If I sell a \$100,000 face value Treasury Bond contract at a price of \$115,000:
 - I profit from an increase in the interest rates, which lowers the price of the asset and allows me to buy the bond at a lower price and deliver it for \$115,000
 - I lose from a fall in the interest rates, which increase the price of the asset and forces me to buy the contract at a price higher than \$115,000 and deliver it for \$115,000
- *Long position* → Parties that have bought a futures contract and agreed to buy the bonds
- *Short Position* → Parties that have sold a futures contract and thereby agreed to deliver the bonds

➤ Future Contracts differ from Forward Contracts in several ways in order to overcome some of the liquidity and default problems of forward markets

➤ At expiration date, the price of the contract converges to the price of the underlying asset to be delivered:

- If a contract sells for less than the face value, everyone will want to buy it and resell it for its face value, making as profit the difference of the face value minus the purchase price
- If a contract sells for more than the face value, everyone will want to sell it and make as profit the difference between the selling price and the face value
 - ➔ In both the situation, the price of the contract will eventually converge to the face value
 - ➔ The elimination of riskless profit opportunities in the futures market is known as *arbitrage*, and it guarantees that the price of a futures contract at expiration equals the price of the underlying asset to be delivered
- *Micro Hedge* → financial institution is hedging risk for a specific asset it owns
- *Macro Hedge* → financial institution is hedging risk for its whole portfolio

Organization of Trading in Financial Futures Market

➤ Financial futures are traded on highly competitive exchanges, as each organization tries to design contracts and set rules that will increase the trading volume of its exchange



- The futures exchanges are regulated in the US by the Commodity Futures Trading Commission (CFTC)

Globalization of Financial Futures Market

- American futures exchanges were the first ones to develop financial futures and dominated the futures trading market by 1980s
- The rapid growth of the market and the huge profits made by US Exchanges incentivized foreign exchanges to join the business
- By 1990s Eurodollar contracts became among the most widely traded future contracts in the world
- Foreign competitors imitated the most popular financial futures developed in the US
- Nowadays, financial futures market is completely internationalized, and competition is high between the US and foreign exchanges

Success of the Futures Markets

- Several features were introduced in order to resolve liquidity problems of forwards contracts
 1. *Quantity delivered and delivery dates are standardized*
 - This allows different parties to be matched more easily, thereby increasing the liquidity of the market
 2. *Futures contracts can be traded again at any time until delivery date*
 - Forwards contracts, on the other hand, cannot be traded again before maturity
 3. *Not just one specific Treasury Bond is deliverable on the delivery date*
 - Any Treasury Bond that matures in more than 15 years and is not callable for at least 15 years is eligible for delivery
 - The feature allows higher liquidity of the market, but also limits the possibility that someone might corner the market and squeeze traders who have sold the contracts
 - Cornering the market means buying all the deliverable securities so that investors with a short position cannot obtain from anyone else the securities that they contractually must deliver by maturity date
 4. *Most futures contracts do not result in delivery of the underlying asset at maturity*
 - A trader who sold a futures contract is allowed to avoid delivery on the expiration date by making an offsetting purchase of a futures contracts
 - By simultaneously holding a short and long position, the trader can cancel out both contracts, as he would be delivering the asset to himself
 - The feature significantly reduces costs of physical delivery
- Several features were also introduced in order to overcome the default risk behind forward contracts
 - In both forwards and futures there must be a buyer with a long position and a seller with a short position
 - However, in futures the buyer and the seller do not make the contract with each other, but with the **clearinghouse** associated with the futures exchange
 - The buyer of the future does not care anymore of the financial health of the seller, and vice versa
 - ➔ As long as the clearinghouse is financially solid, buyers and sellers do not have to worry about default risk
 - To make sure that the clearinghouse is financially sound, buyers and seller must put an initial deposit (**margin requirement**)



- Futures are then **marked to market** every day
 - At the end of the trading day the change in the value of futures contracts is added or subtracted from the margin account
 - If the amount of the margin account falls below the maintenance margin requirement, the trader is required to add money to his account (**margin call**)
 - If the margin account has insufficient funds after the holder has received a margin call, the position will be closed
- **Margin Requirements** and **Marking to Market** make it far less likely that a trader will default on its contract, thus protecting the futures exchanges from losses

Profitability

- F_t → price of the future when selling
- F_0 → price initially paid on the future

$$\pi_{LONG} = F_t - F_0$$

$$\pi_{SHORT} = F_0 - F_t$$

Stock Index Futures

- Future that has as underlying asset a stock market index
- It is useful to hedge stock market risk
- Delivers cash → The cash amount delivered is equal to the stock market index price * multiplier
 - For the S&P 500, the multiplier is \$250 and is multiplied at expiration by the index
- Stock Index Futures are the most widely traded future contracts because of their liquidity, due to the delivery of cash at the expiration of the contract
- Profitability on Stock Index Futures

$$\pi_{LONG} = \text{multiplier} * (F_t - F_0)$$

$$\pi_{SHORT} = \text{multiplier} * (F_0 - F_t)$$

	Forward Contract	Futures Contract
<i>Traded</i>	over-the-counter	on exchange
<i>Standardization</i>	none	standardized
<i>Customizability</i>	arbitrary	none
<i>Delivery</i>	usually takes place	rarely held until delivery
<i>Settlement</i>	at end of contract	daily (marked-to-market)
<i>Credit risk</i>	some	virtually none
<i>Liquidity</i>	low	very high

Options

- Options are contracts that allow hedging interest rates and stock market risks:
 - The buyer of an option has the right to buy or sell the underlying asset at a strike price, within a specific term to expiration
 - The seller of an option is obligated to buy or sell the instrument if the owner of the option exercises its rights to sell or buy
- The owner of an option pays a premium, because the right to exercise the option has value
- 2 types of option contracts:
 - *American Options* → can be exercised at any time up to the expiration date
 - *European Options* → can be exercised only on the expiration date
 - *Exotic Options* → payoff structure is determined in a non-standard way, for instance, Asian Option's payoff depends on the average price of the underlying asset in a certain period of time



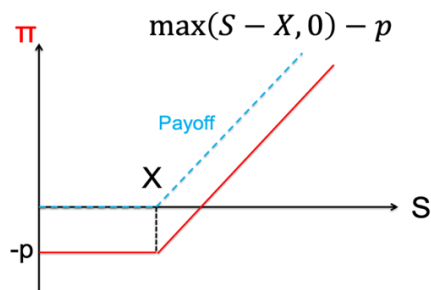
- Option contracts are written on a large number of financial instruments:
 - *Stock Options* → Options on individual stocks
 - *Financial Futures Options* → Options on financial futures contracts, which are the most widely traded contracts of option
- Options are mainly written on financial futures because these instruments are more liquid than their underlying assets, and at maturity their price will converge to the price of the underlying asset. Therefore, investors prefer to write a contract of option on the most liquid asset.
- **Call Option** → contract that gives the holder the right to buy a financial instrument at a strike price within a specified period of time
- **Put Option** → contract that gives the holder the right to sell a financial instrument at a strike price within a specified period of time
- *Option Payoff* (value) is the amount that the option pays at expiration
 - ➔ The *Option profit* is:
 - Payoff + Premium on the short side
 - Payoff – Premium on the long-side

Profits and Losses on Options and Future Contracts

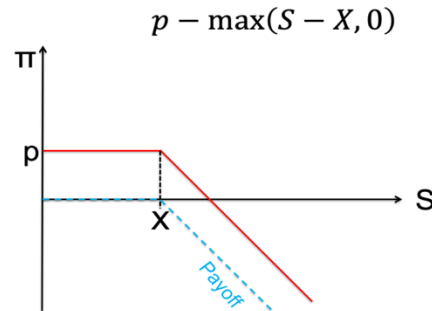
1. Call Options

- If at expiration date the price of the underlying financial instrument is **BELOW** the exercise price, a call option is said to be **“out of the money”**
 - ➔ When an option is “out of the money”, the holder will not exercise his right to buy and will suffer as loss only the premium paid for the option
- If at expiration date the price of the underlying asset is **EQUAL** to the exercise price, a call option is said to be **“at the money”**
 - ➔ When a call option is “at the money”, the holder is indifferent between exercising his right to buy or not. Either way, he will suffer a net loss equal to the premium
- If at expiration date, the price of the underlying asset is **ABOVE** the exercise price, a call option is said to be **“in the money”**
 - ➔ The holder benefits from exercising the option because he will purchase the underlying asset at a strike price lower than the market price

Profit from Holding (Long) a Call



Profit from Writing (Short) a Call



→ The profit of one party equals the loss of the other

- Profit for the **writer** of a call option (**short position**)

$$\pi_{short}^{call} = p - \max(S - X, 0)$$

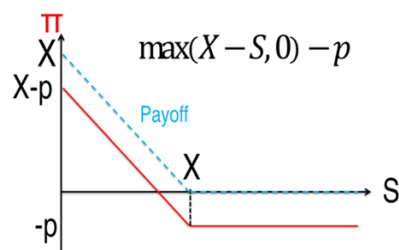
- Profit for the **holder** of a call option (**long position**)

$$\pi_{long}^{call} = \max(S - X, 0) - p$$

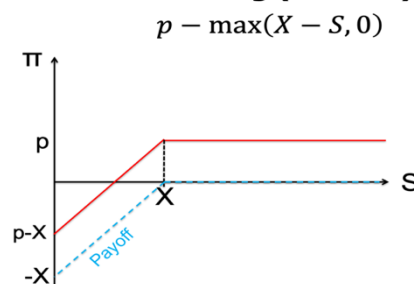
2. Put Options

- If at expiration date the price of the underlying financial instrument is ABOVE the exercise price, the put option is said to be “**out of the money**”
 - The holder will not exercise his right to sell and will lose only the premium paid for the option
- If at expiration date the price of the underlying asset is EQUAL to the exercise price, a call option is said to be “**at the money**”
 - The holder is indifferent between exercising or not the option. He will incur as net loss only the premium paid
- If at expiration date, the price of the underlying asset is BELOW the exercise price, a call option is said to be “**in the money**”
 - The holder will exercise his right to sell because he will now sell at a price higher than the market price

Profit from Holding (Long) a Put



Profit from Writing (Short in) a Put



- Profit for the **writer** of a put option (**short position**)

$$\pi_{short}^{put} = p - \max(X - S, 0)$$

- Profit for the **holder** of a put option (**long position**)

$$\pi_{long}^{put} = \max(X - S, 0) - p$$



PROFIT	CALL	PUT
HOLDER (LONG)	$\pi_{long}^{call} = \max(S - X, 0) - p$	$\pi_{long}^{put} = \max(X - S, 0) - p$
WRITER (SHORT)	$\pi_{short}^{call} = p - \max(S - X, 0)$	$\pi_{short}^{put} = p - \max(X - S, 0)$

	Put Option	Call Option
Buy	Have the right to sell stock, want markets to fall	Have the right to buy stock, want markets to rise
Sell	Have the obligation to buy stock, want markets to rise	Have the obligation to sell stock, want markets to fall

3. Difference between Futures and Options Contracts

- Futures contracts:
 - Have a linear profit function, as profits grow by an equal dollar amount for every point increase in the value of the underlying financial asset
 - Require as initial investment the margin requirement in a margin account
 - Require money to change hands daily when the contract is marked to market
- Options:
 - Have a non-linear profit function as the profit function is kinked, which means that profits do not always grow by the same amount for a given change in the price of the underlying financial instrument
 - ➔ Indeed, options protect the holder from having losses that are greater than the amount of the premium
 - The only initial investment is the premium paid
 - Requires money to change hands only when they are exercised

4. Factors affecting the price of Option Premiums

- Volatility (and hence Time to Expiration), can only have a positive effect on the price of option because you can always decide NOT to exercise the option
- Options are asymmetric bets
 - ➔ The buyer of the option will experience large gains if his bet is correct, and will face limited losses if his bet is wrong
 - ➔ The seller of the option will always experience limited gains and potentially large losses

Increase in variable	Call option value (premium)	Put option value (premium)
Spot price	↑	↓
Strike price	↓	↑
Volatility	↑	↑
Time to expiration	↑	↑



ARE FINANCIAL MARKETS EFFICIENT?

Efficient Market Hypothesis

- The efficient market hypothesis states that prices of securities in financial markets fully reflect the available information
 - *Weak Efficiency* → all past stock prices are reflected in today's price
 - *Strong Efficiency* → All information, whether public or private, is priced-in. Hence, prices reflect the true fundamental value of securities

- The expected rate of return of a security depends on its future expected price

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

- Expectations are optimal forecasts using all available information, but this does not mean that they are perfectly accurate:

$$P_{t+1}^e = P_{t+1}^{Optimal Forecast}$$

$$R^e = R^{Optimal Forecast}$$

- Since both R^e and P_{t+1}^e cannot be observed, the supply-and-demand analysis of the bond market shows us that the expected return on a security will have a tendency to head towards the equilibrium return that equates quantity demanded and supplied

$$\rightarrow R^{Of} = R^*$$

- Current prices in the 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

- Arbitrage is the elimination of all the riskless profit
 - In an efficient market all the riskless profit opportunities are eliminated because, between the many participants, it suffices that a few of them recognize the riskless profit opportunities to exploit and eliminate them

Evidence in favor of the theory

- *Performance of Investment Analysts and Mutual Funds*
 - Studies analyzed whether Investment Analysts and Mutual funds are able to beat permanently the market
 - Evidence shows that having performed well in the past does not indicate that an investment adviser or a mutual fund will perform well in the future
- *Stock prices reflect all publicly available information*
 - Efficient market hypothesis predicts that stock prices reflect all available information
 - If an information is already known by the market, a positive announcement about a company will not raise the stock price because the information is already available
 - Early empirical evidence suggests the theory
- *Random-Walk behavior of Stock Prices*
 - Unpredictable movements of a variable, because it is as likely to raise as it is to fall
 - Stock prices should follow a random-walk behavior because future changes in the stock price should be unpredictable
 - If people could predict that the price of a stock would fall, the predicted rate of return would be negative and less than the equilibrium. Therefore, individuals would start to sell the security until the equilibrium condition would hold again



- *Technical Analysis*
 - Rules for when to buy and sell stocks based on patterns that emerge
 - The efficient market hypothesis suggests that it is useless, since past stock price data cannot help predicting changes
 - Empirical evidence suggests that, on average, it does not outperform the market

Evidence against the theory

- *Small Firm Effect*
 - Small firms have earned abnormally high returns over long periods of time, even when the greater risk for these firms has been considered
- *January Effect*
 - Over a long period, stock prices have experienced price fall in December and abnormal price rises in January
 - The effect is due to tax issues because investors have incentive to sell their stock before the end of the year because they can take capital losses on their tax returns and reduce their tax liability. Then when the new year starts, they repurchase stocks, driving up their prices
- *Market Overreaction (overshooting)*
 - Stock Prices may overreact to news announcements and pricing errors are corrected only slowly
 - This violates the model because allows investors to earn abnormally high returns
 - *Momentum* refers to the continued increase in the stock price after the release of good news
- *Excessive Volatility*
 - Phenomenon closely related to market overreaction
 - Fluctuations in the stock price may be much greater than is warranted by fluctuations in their fundamental value
- *Mean Reversion*
 - Stock with low returns today tend to have higher returns in the future, and vice versa
 - This evidence suggests that stock prices do not random walk
- *Late in discounting new information*
 - Evidence suggests that stock prices do not instantaneously adjust to profit announcements
 - They continue to rise for some time after the unexpected announcement of high profit and they continue to fall after the unexpected announcement of low profit

Efficient Market Hypothesis does NOT imply that Financial Markets are Efficient

- Many financial economists believe that expectations are rational and that the stock prices reflect market fundamentals, and so financial markets are efficient
 - ➔ This **stronger view** of market efficiency has implications:
 - One investment is as good as another because the securities' prices are correct
 - Securities' prices reflect all the available information
 - Security prices can be used by managers of both financial and non-financial firms to assess their cost of capital
- The efficient market hypothesis does NOT imply the stronger view of market efficiency, but rather that prices in markets are unpredictable
- **Weak efficiency** theory assumes that all the past stock prices are reflected in the present price



Behavioral Finance

- Applies concepts from other social sciences to understand the behavior of securities prices
- Efficient market hypothesis suggests that smart investors short-sell when they believe that a stock price has gone up irrationally:
 - Psychologists, however, suggest that individuals' *loss aversion* can explain why very little short-selling actually takes place
 - Since short selling exposes to higher losses, individuals less frequently engage in it, thus leading to frequent overvaluation of securities
- Psychologists suggest that people tend to be overconfident in their judgements and trade according to their beliefs:
 - This explains why, contrary to the efficient market hypothesis, securities markets have so much trading volume
 - Overconfidence and social contagion provide explanation to market bubbles



WHY DO FINANCIAL INSTITUTIONS EXIST?

- 1. *Stocks are not the most important forms of external financing for businesses***
 - Stock market accounts for a small part of the external financing of American businesses
- 2. *Issuing marketable debt and equity securities is not the primary way in which businesses finance their operations***
 - In the US, bonds are far more important source of financing than stocks in the US
 - Nonetheless, Stocks and Bonds supplied provide less than one-half of the external funds that corporations need to finance their activities
- 3. *Indirect finance, which involves financial intermediaries, is way more important than direct finance, in which businesses raise funds directly from the financial market***
 - Direct finance involves the direct sales of marketable securities to households
 - The majority of marketable securities are bought by financial intermediaries like mutual funds, pension funds and insurance company on behalf of individual households, rather than directly by households
- 4. *Financial intermediaries are the most important source of external funds used to finance businesses***
 - The primary source of finance for businesses is provided by bank loans and loans made by non-bank intermediaries
 - In developing countries, banks play even a more important role than in industrialized ones
- 5. *The financial system is among the most regulated sectors in the economy***
- 6. *Only large, well-established corporations have easy access to securities markets to finance their activities***
- 7. *Collateral is a prevalent feature of debt contracts for both households and businesses***
 - Collateral is a property pledged to a lender to guarantee payment in the event that the borrower is unable to repay his debt
 - Collateralized debt is the predominant form of household debt and is widely used in business borrowing as well
- 8. *Debt contracts are complicated legal documents that place substantial restrictions on the behavior of the borrower***
 - Bond or loan contracts are legal documents with provisions (restrictive covenants) that restrict and specify certain activities that the borrower can engage in

Transaction Costs

- Due to limited budget, households can only afford to directly invest in small number of shares:
 - They are unable to diversify risk
 - Brokerage commission will be a high percentage of the purchase price of shares



- Often, they are unable to subscribe bonds because the smallest denomination is \$10,000
- Financial intermediaries are fundamental because they reduce transaction costs and allow small savers and borrowers to benefit from the existence of financial markets
- *Economies of Scope*
 - Average cost decreases as the number of services provided increases, since services may be bundled together, thus reducing costs
- *Economies of scale*
 - Bundling investors' funds together reduces transaction costs for the individual investors, because the total cost of carrying out a transaction in the financial markets increases only a little as the size of the transaction grows
 - Economies of Scale are possible because fixed costs are spread between more clients
 - Mutual Funds allow both cost reduction and portfolio diversification
- *Expertise*
 - Financial intermediaries are better able to develop expertise to lower transaction costs

Asymmetric Information

- Together with *transaction costs*, *asymmetric information* is fundamental to explain the presence of financial intermediaries in financial markets
 - *Adverse Selection* is an asymmetric information problem that occurs before the transaction
 - Since potentially bad credit risk are the ones most actively seeking out loans, lenders may decide to stop lending, even though good credit risk may be found in the economy
 - *Moral Hazard* is an asymmetric information problem that occurs after the transaction
 - lenders run the risk that borrowers engage in activities that are undesirable from the lender's point of view, because they make it less likely that the loan will be paid back
- Agency Theory is the analysis of how asymmetric information problem affect economic behavior

Adverse Selection

- If investors cannot distinguish between good and bad firms, he will be willing to pay a price that reflects the average quality of firms issuing securities
 - Owners of good firms will not sell their securities because they will think that they are undervalued
 - Owners of bad firms are the only ones willing to pay
 - ➔ Since investors do not want to hold securities of bad firms, they will not purchase securities in the market, thus making the market inefficient



- ➔ These are the reasons why marketable securities are not the primary source of financing for businesses and stocks are not the most important source of financing for American businesses, but also why financial markets are among the most heavily regulated sectors in the economy
- Adverse selection problems may be eliminated in the absence of asymmetric information
 - *Private Production and Sale of Information*
 - Private firms may provide information about the quality of a firm to individuals willing to pay
 - The system of private production and sale of information may not work because of the free-rider problem, that occurs when people do not want to pay for information and to take advantage of information other people have paid for
 - If an investor buys information and then invest in the stock of a good firm, other investors will invest in the same stock, pushing up the price and limiting the possibility to buy securities at less than their true value. Hence, the purchase of information is not worthwhile since it does not allow to purchase securities for less than their true value
 - *Government Regulation to Increase Information*
 - The free-riding problem prevents the private market from producing enough information to eliminate the asymmetric information
 - Governments can produce information for investors to distinguish between good and bad firms, but releasing negative information at the same time
 - Governments can regulate securities markets in a way that encourages firms to reveal honest information about themselves
 - The SEC requires public firms to have independent audits in which an accounting firm certifies that the firms is adhering to standard accounting principles and releasing accurate information
 - *Financial Intermediation (screening)*
 - Intermediaries become expert in producing information about firms, so that they can sort out good credit risks from bad ones, so that they can collect funds from depositors and lend them to good firms
 - By lending to good firms, the bank is able to earn a higher return on its loans than on its interest it has to pay to depositors
 - The resulting profit gives incentive to engage in information production activities
 - By making private loans, which are not publicly traded, banks do not incur in free-riding problems
 - In developing countries, information about firms is harder to obtain than in developed countries, thus the role of banks is more important
 - Larger and better-known corporations release more information on the marketplace, thus having greater access to funds from securities markets (pecking order hypothesis)
 - *Collateral and Net Worth*
 - Adverse selection interferes with the well-functioning of the financial market only when the lender suffers a loss



- *Collateral*, is a property promised to the lender if the borrower defaults
- *Net worth* is the difference between assets and liabilities. It performs a similar role as the collateral

Moral Hazard in Equity Contracts

- Equity contracts are a claim on shares of profit and assets of a firm
- Equity contracts are subject to principal-agent problems
 - ➔ The separation of ownership and control involves moral hazard, since the managers in control may act in their own interest rather than in the interest of the owners
- Managers may pursue personal benefits and corporate strategies to increase their personal power, without increasing the corporate profitability
- The problems arise because the manager has more information than the shareholders
- Principal-agent problem may be solved with different tools:
 - *Monitoring*
 - Monitoring the firm's activity through frequent auditing may be a good way of reducing principal-agent problems
 - However, the monitoring process is expensive in terms of time and money (costly state verification)
 - Costly state verification makes equity contracts less desirable and explains why equity is not a very important element in financing
 - Free-rider problem decreases the amount of information production undertaken to reduce the moral hazard problems
 - *Government Regulation*
 - Governments enforce laws to force firms to adhere to standard accounting principles that make profit verification easier
 - This explains why financial markets are heavily regulated
 - *Financial Intermediation*
 - Venture Capital firms pool together funds from investors to help start new businesses
 - In exchange for capital, they receive shares in the company and have their own people as members of the board of directors, in order to closely control the firm's activities
 - *Debt Contracts*
 - Equity contracts entitle their holders to a claim in the profit of a firm
 - Debt contracts are structured so that moral hazard can occur only in certain situations and the borrower has to periodically pay the lender a fixed amount, regardless of its profit
 - Lower cost of state verification helps explain why debt contracts are more diffused than equity contracts to raise capital

Moral Hazard in Debt Contracts

- Debt contracts are subject to moral hazard because borrowers may have incentive to take on investment opportunities riskier than the lenders would like
- Moral Hazard in debt contracts can be solved with different tools:
 - *Net worth and collateral*



- When borrowers have more at stake because of high Net Worth, or the collateral they have pledged is valuable, the risk of moral hazard is heavily reduced
- They make the contract incentive compatible, as they align the incentives of the lender and those of the borrower
- *Restrictive covenants*
 - Are directed at reducing moral hazard by ruling out undesirable behavior and encouraging desirable behavior
 - 4 main types
 1. **Covenants to Discourage Undesirable Behavior**
Keep the borrower from engaging in risky investment projects
 2. **Covenants to Encourage Desirable Behavior**
Encourage the borrower to engage in desirable activities that make it more likely that the investment will be paid off. Focus mainly on keeping the firm's net worth high
 3. **Covenants to Keep Collateral Valuable**
Encourage the borrower to keep the collateral in good conditions and make sure that it stays in possession of the borrower
 4. **Covenants to Provide Information**
Require the firm to periodically provide information about its activities in the form of quarterly accounting and income reports
- *Financial Intermediation*
 - Since it is impossible to rule out every risky activity, covenants do not eliminate the problem of moral hazard
 - Moreover, covenants must be monitored and enforced, thus leading to high costs and free-riding problems
 - Financial Intermediaries can rule out free-riding as long as they make private loans

Conflicts of Interest

- By providing clients with many services, financial intermediaries may benefit from economies of scope
- Even though economies of scope provide substantial benefit to financial institutions, they may cause conflicts of interest
 - ➔ Type of moral hazard that occurs when an institution has multiple objectives and has conflicts among those objectives
- Three types of financial activities usually led to conflicts-of-interest problems:
 1. **Underwriting and Research in Investment Banking**
 - Investment Banks research companies issuing securities and underwrite these securities by selling them to the public on behalf of issuing corporations
 - Conflicts of interest emerge because banks are attempting to simultaneously serve two clients, security-issuing firms and security-buying investors
 - Security-Issuing firms benefit from optimistic research, while Security-buyers want unbiased information



- Since the potential revenues deriving from altering information to investors are greater than brokerage commissions from selling, banks will have incentive to do so, also to avoid the risk of losing the client to a competing investment bank
- Spinning consists in allocating hot, underpriced, IPOs to executives of other companies in return for their companies' future business with the investment bank.

2. Auditing and Consulting in Accounting Firms

- Auditors check the books of companies and monitor the quality of information produced by firms to reduce the inevitable information asymmetry between management and shareholders
- Since accounting firms provide companies with both auditing services and non-auditing consulting services
 - they may be willing to skew their judgements and opinions to win consulting businesses from these companies
 - they may have to audit information systems or tax and financial plans put in place by their non-audit counterparts, thus being reluctant to criticize the systems or advices
 - They may provide overly favorable audit to solicit or retain audit business

3. Credit Assessment and Consulting in Credit-Rating Agencies

- Credit Ratings reflect the probability of default to determine the creditworthiness of a borrower
- Conflicts of interest may arise when multiple users with divergent interests depend on the credit ratings:
 - Investors and regulators are seeking and impartial assessment of credit quality
 - Issuers need favorable credit ratings
 - ➔ Since the issuer of a security pays the rating agency, investors and regulators worry that the agency may bias its ratings upward to attract more business from the issuer
- Another conflict of interest arises because credit rating agencies provide also consulting services to firms on how to structure their debt issues, in order to secure a favorable rating
 - ➔ Therefore, rating agencies would audit their own work

Sarbanes-Oxley Act

- Increased supervisory oversight to monitor and prevent conflicts of interest
 - Reduced conflicts of interest by making illegal for an accounting firm to provide both audit and non-audit services to the same corporation
 - Discouraged Investment Banks from exploiting conflicts of interest
 - Introduced measures to improve the quality of information in the financial market
- ➔ The most controversial feature is that, by reducing conflicts of interest, the Act may also reduce economies of scope, thus potentially leading to a reduction of information in the financial markets



COMMERCIAL BANKS

Bank Balance Sheet

- Commercial banks are institutions that accept deposits (LIABILITIES) and make loans (ASSETS)
 - Traditionally, they are the largest financial intermediaries by asset size
 - A bank's balance sheet lists all the sources of bank funds (Liabilities) and uses to which they are put (Assets)
 - Book Values → value stated on the Balance Sheet
 - Market Values → value as evaluated by the market
- Book Values and Market Values differ

Commercial Banks Liabilities

1. Deposits (71%)
 - Generally coming from households and firms
 - *Checking Deposits* → allow to withdraw at any time
 - *Non-transaction deposits* → savings accounts and time deposits (Certificates of Deposits). Both have limited withdrawals
2. Other short-term borrowing (18%)
 - Fed Funds (overnight from other banks)
 - Interbank offshore dollar deposits (Eurodollars)
 - Repurchase agreements
 - Funds borrowed from corporations
3. Bank Capital (11%)
 - It is the difference between assets and liabilities
 - It can be raised by selling equity or from retained earnings

Commercial Banks Assets

1. Reserves and Cash (16%)
 - Accounts held at the FED plus physical cash in bank's vault
2. Securities (22%)
 - Only debt securities because commercial banks are not allowed to hold stocks
 - Mostly US government debt and Mortgage-Backed Securities
3. Loans (53%)
 - Mostly in Real Estate and business loans to firms
4. Other assets (9%)
 - Buildings, IT infrastructure...

Off-Balance Sheet

- In the past decades banks have greatly expanded their fee income generating off-balance-sheet activities (OBS activities)
- These activities, that do not appear on the Balance Sheet, include:



- *Securitization*, which means selling loans and repackaging them into securities to free up space in the balance sheet
 - *Loan commitments*, through which the bank agrees to provide a loan up to a certain amount upon customer's request, in exchange for a fee
 - *Trading or Hedging*
- Banks have incentive to bring assets onto the balance sheet and conceal liabilities at the same time
- ➔ OBS activities do not show up on the book equity, but are taken into account in market equity, only if the market knows about OBS:
- Market Equity = Market Value of Assets - Market Value of Liab + Net OBS**

Basics of Banking

- Banks engage in Asset Transformation:
- ➔ Banks use deposits to make loans
 - ➔ They tend to "*Borrow Short and Lend Long*" (in terms of maturity)
- When a Bank receives (loses) deposits, reserves increase (decrease) by an equal amount
- If a bank has excess reserves, it is costly to maintain them as they yield little:
- ➔ Banks will transform the excess reserves coming from deposits into loans

General Principles of Bank Management

- The bank has to primary concerns:
1. **Liquidity Management**
 2. **Managing Capital Adequacy**
- 1. Liquidity Management**
- The need for liquidity management arises because the maturity of banks' assets is generally longer than the maturity of their liabilities
- For this reason, a bank may have to pay its creditors before it receives the proceeds from its assets
- Liquidity management ensures that there is enough cash to pay depositors when they wish to withdraw their money
- Furthermore, banks need to have enough reserves to satisfy the minimum reserve requirements
- ➔ If a bank has ample excess reserves, a deposit outflow does not necessitate changes in other parts of the balance sheet:
Deposit and reserves will decrease contemporarily
- If a bank has reserve shortfall, it has 4 options to increase reserves:
1. Borrowing Federal Funds from other banks
 - ➔ The main cost is the interest rate on these borrowings (Federal Funds rate)
 2. Sell securities
 - ➔ The main cost is associated with Transaction Costs arising from selling these securities
 - ➔ Usually, banks use highly liquid government securities, known as "secondary reserves"



3. Borrow from FED
 - ➔ The main cost associated with discount loans is the interest rate that must be paid to the Fed (discount rate)
4. Call In or Sell Off loans
 - ➔ Banks costliest way of acquiring reserves when a deposit outflow occurs
 - ➔ If a Bank has numerous short-term loans renewed at short intervals, it can quickly reduce the total amount of loans outstanding by *calling in* loans
 - ➔ consists in not renewing some short-term loans when they come due, with the drawback of antagonizing those customers whose loans have not been renewed
 - ➔ *Selling Off* loans means selling loans (assets) to other banks
 - ➔ the process is very costly because the other bank does not know the riskiness of these loans

NB

Excess reserves are insurance against the aforementioned costs deriving from deposits outflows. Banks are willing to hold excess reserves in order to avoid these costs. However, large excess reserves holdings substantially reduce the profitability of the bank.

Liquidity management involves the choice of assets:

➔ Liquid short-term assets are easy to convert into cash if liquidity problems occur, but they yield less than long-term illiquid assets

2. Capital Adequacy Management

- Capital is the difference between assets and liabilities
- Shareholders supply funds either directly via purchases of shares, or through retention of retained earnings
- When losses occur, they first get subtracted from the bank's net worth, before the creditors get affected
- If assets drop below the value of liabilities, the bank's net worth becomes negative
 - ➔ This means that the bank is insolvent
- Banks need to manage the amount of capital held for two reasons:
 - A strong capital stock protects from bank failure
 - The capital stock negatively affects the bank's profitability

Bank Performance

- Operating Income = Interest Income + Non-Interest Income
- Operating Expenses = Interest Expense + Non-Interest Expense
 - ➔ Net Operating Income = Operating Income – Operating Expenses
 - ➔ Net Income = Net Operating Income – Taxes, Extraordinary Items, Loan Losses Provisions
- **Return on Assets** = $\frac{\text{Net Profit After Taxes}}{\text{Assets}}$
 - ➔ Gives a broad idea of how well the bank is using its assets to generate profits



➤ **Return on Equity** = $\frac{\text{Net Profit After Taxes}}{\text{Equity}}$

Is what owners ultimately care about, that is the return they get on the capital they provided to the bank

➔ ROE and ROA are linked through the Equity Multiplier (EM)

$$EM = \frac{\text{Assets}}{\text{Equity}} \text{ which is a quantity } > 1$$

➔ **ROE = ROA * EM**

➤ Given the ROA, the lower the bank capital, the higher the return for the owners of the bank, hence, holding everything else equal, equity holders prefer to have less capital (they prefer to be more leveraged)

➤ Net Interest Margin:

$$NIM = \frac{\text{Interest Income} - \text{Interest Expenses}}{\text{Assets}}$$

NIM measures how well the bank generates income from its primary function, that is issuing liabilities and investing in interest-earning assets

NIM is the spread between what the bank earns in interest income and what it has to pay



CONDUCT OF MONETARY POLICY

How Fed Actions Affect Reserves in the Banking System

- Central Banks are government authorities in charge of monetary policy, determining how much currency is in circulation at any given point in time
 - Central Banks also have effect on *bank credit*
 - In fact, most of what Central Banks do affects directly commercial banks
- Fed Balance Sheet
 - **Assets** → Two main asset classes:
 1. **Securities**
Before 2008 mostly short-term T-Bills
Nowadays also long-term treasury and mortgage-backed securities
 2. **Loans to Financial Institution**
Mostly provided to help financial institution in crisis times
 - **Liabilities** → Two main liability classes:
 1. **Currency in circulation**
Physical cash
 2. **Reserves**
Deposits of commercial banks at the Fed
- For *Commercial Banks*, reserves held as deposits on a Fedwire account are just as good as physical vault cash:
 - Fed guarantees that these deposits can be redeemed for physical cash at any point in time
 - Possibility to make transfers between Fedwire accounts enables banks to efficiently make interbank payments:
 - Electronic transfers settle net obligations between financial institutions
- The Fed alone has the power to issue reserves
 - Reserves show up as a liability on the Balance Sheet of the Fed
 - As a part of its *monetary policy*, the Fed controls the amount of reserves that are in circulation.
 - In normal times, it uses 2 *conventional monetary policy instruments* for this purpose:
 1. **Open Market Operations**
 2. **Discount Window Lending**

Open market operations

- The Fed buys securities from banks:
 - it pays for these purchases with newly created securities
 - Historically, the purchased securities were almost exclusively T-Bills
- When the Fed purchases securities from the market:
 - Banking System balance sheet size is constant
 - reserves increase and securities held decrease
 - Fed balance sheet expands
 - Securities held (assets) increase and reserves (liabilities) increase



- Open market operations:
 - Were the most important policy instrument by which the Fed could control interest rates before the financial crisis of 2008
 - Were typically performed for 2 distinct motives:
 1. *Change* the level of reserves → Dynamic Open Market Operations
 2. *Stabilize* the level of inflation and offset movements in other factors that affect reserves → Defensive Open Market Operations
 - Were often implemented as a sequence of temporary transactions:
 - ➔ Fed preferred the repeated use of repos or reverse-repos over the permanent purchase / sale of securities
 - Have been rendered ineffective by the 2007-2009 crisis

- The seller of securities to the Fed does not have to be a bank
 - It could be any member of the general public
 - When a single individual sells a security to the Fed, it expects a credit to his checking account
 - His bank will then receive the same amount in reserves from the Fed when trade is settled
 - ➔ It is the same as if the bank had bought the securities
 - A bank receives more reserves on the asset side of its balance sheet when the Fed performs an open market operation

Discount Lending

- Fed lends reserves to banks:
 - It charges banks high interest for this service
 - ➔ i_d is the **discount rate**, which usually is 1% point above the interbank rate
 - Discount loans expand liquidity in the banking system by increasing reserves that can be lent out
 - In *normal times*, discount loans are not in demand, but are important in financial panics (**Lender of last resort**)
 - Discount loans
 - ➔ **Increase** Fed Assets
 - ➔ **Increase** Banking System Liabilities

Market for Reserves and the Fed Funds Rate

Monetary policy and the Fed Funds market

- To target inflation, the Fed steers the interest rate on federal funds towards a target value
 - ➔ The target value varies over time depending on other parameters in the economy

- The Fed cannot force market participants in the fed funds market to quote a specific interest rate
 - ➔ Fed can however create the right market conditions in order to attain the target rate
 - ➔ indeed, the Fed rate is determined by supply and demand for Fed Funds

- 3 relevant interest rates:
 - i_{OR} ➔ interest rate that banks earn on reserves deposited at the Fed
 - i_{ff} ➔ interest rate that the Fed is targeting for the fed funds market



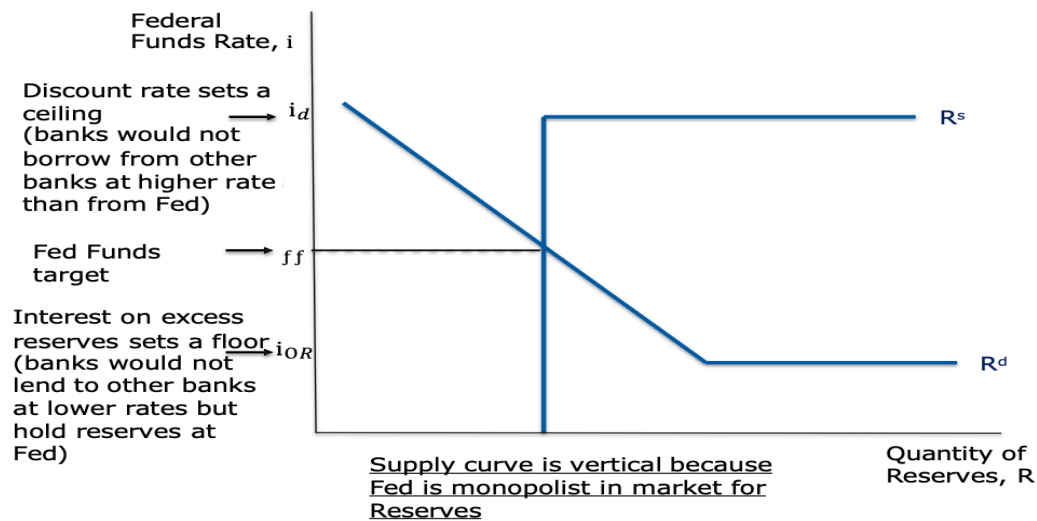
- $i_d \rightarrow$ discount rate at which the Fed lends out unlimited quantities of reserves

Demand Side \rightarrow Commercial Banks

- $i > i_d$
Banks could borrow fed funds more cheaply from the Fed discount window than from other banks, therefore i_d is an upper bound
- $i \in [i_{OR}; i_d]$
Normal downward sloping demand curve \rightarrow The cheaper fed funds are, the more banks want them to insure against deposit shocks
- $i < i_{OR}$
Banks would borrow as much fed funds as they can and earn money on the difference \rightarrow at i_{OR} the demand curve must become flat

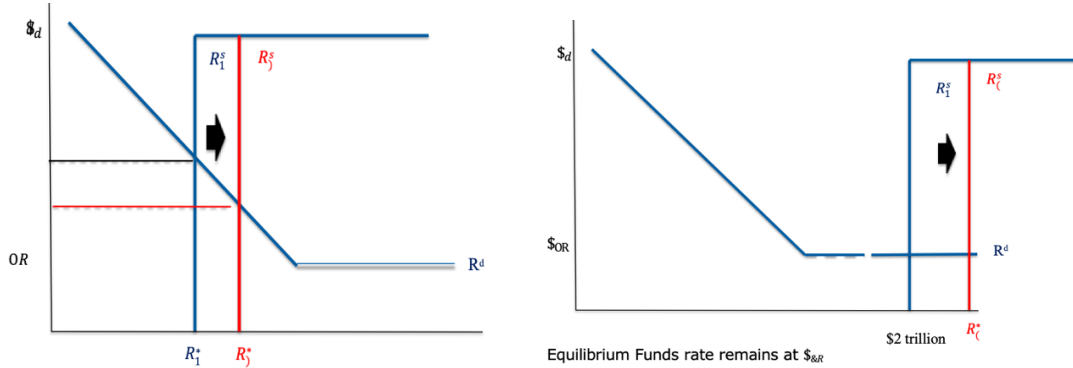
Supply Side \rightarrow FED

- The Fed is the only supplier of reserves
- Supplies fixed amount of reserves in open market operations, plus unlimited reserves at i_d
- Open market operations shift laterally the supply of reserves
- Discount lending shifts vertically the horizontal part of the curve, when the CB varies the discount rate



- In **normal times**, open market operations are effective:
 - As long as we are on the downward-sloping part of the demand curve, changes in quantity of reserves directly change the fed funds rate
 - \rightarrow By choosing the right amount of securities to buy/sell in an open market operation, the Fed can implement its target rate
 - The Fed Funds rate cannot fall below i_{OR} because banks would not be willing to lend funds overnight and will prefer to keep excess reserves
 - \rightarrow The demand for reserves becomes flat and open market operations become ineffective
 - \rightarrow For instance, during the 2008 crisis the Fed Funds rate hit the zero-lower bound and excess reserves of depository institutions exploded because they were not willing anymore to lend funds overnight





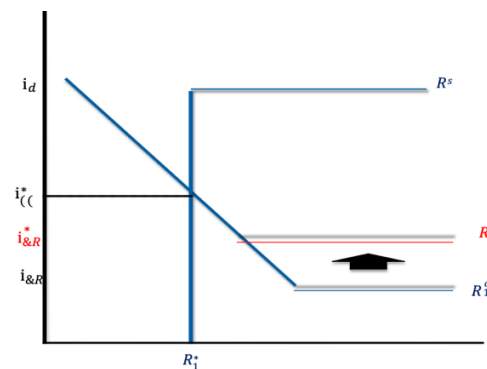
Unconventional monetary policy instruments

➤ After the 2008 crisis:

- Monetary policy hit the **zero-lower-bound** → monetary models estimated that the target fed funds rate should be deeply negative
- Fed cannot target negative rates:
 - With negative rates, banks could keep cash in a vault instead, with the only cost of storage (which can be high)
- In order to stimulate the economy and reduce deflation risks, the Fed took alternative measures
 - ➔ **Quantitative Easing** consisted of large-scale increase of reserves via asset purchase (mainly Mortgage-Backed Securities and Treasuries)
 - ➔ **Central Banking Communication** (“We will do whatever it takes”), which are fundamental to shape expectations and have relevant impact on the economy

➤ Slow Normalization

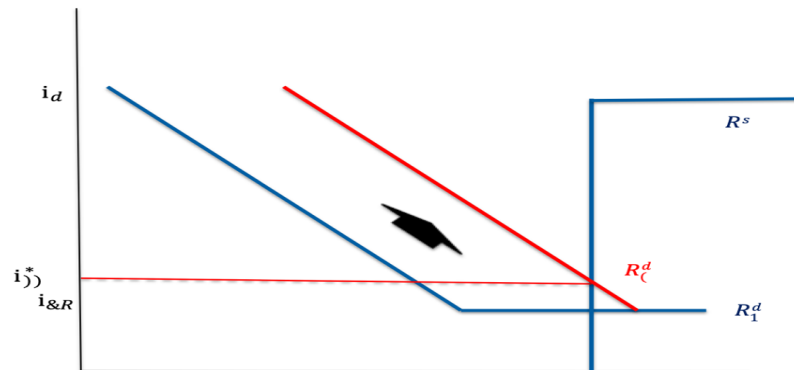
- Fed securities holdings have been declining recently, but it will take time to bring reserves and securities to a pre-crisis level:
 - ➔ The Fed is letting securities mature without rolling-over funds into new securities
- At the same time, the Fed is also raising rates using several tools, even though the supply of reserves is very high:
 - 1. Increase interest on excess reserves**



In the pre-crisis world (with supply intersecting demand in downward sloping part, changing $i_{\&R}$ unlikely to affect i_{CC})



2. Increase reserves requirements



- For any given amount of reserves, an increase in the minimum reserve requirement will increase demand for reserves

The Situation in Europe

- The ECB uses similar monetary instruments to the Fed to implement its policy:
 - **Open market operations**
 - ➔ Main refinancing operations (MROs, similar to repos), via a bid system from its credit institutions
 - ➔ The shift from competitive bids before 2008 to uncompetitive was done in order to grant liquidity to banks needing it
 - **Lending to banks and other liquidity provisions**
 - ➔ Long term refinancing operations (LTROs)
 - ➔ Asset purchases, for instance purchases of government bonds
 - **Reserve requirements**



MUTUAL FUNDS

Growth of Mutual Funds

- Mutual funds are financial institutions that pool investor resources and invest them in diversified portfolios of assets:
 - Mutual funds use funds from investors to purchase assets on financial markets
 - The pooling of resources reduces the transaction cost and brings better diversification to small investors
 - The majority of mutual funds continuously sells new shares to investors and allows redemption of outstanding shares at fair market price

- Birth of mutual funds:
 - compared to banks, mutual funds are a relatively recent invention:
 - the first “modern” mutual fund in the U.S. was started in 1924: the Massachusetts Investors Trust (Boston, Mass.)
 - until the 70s, the number of mutual funds was not very high but their competitive advantages (relative to banks) helped money market mutual funds gain much popularity in the 80s

- Growth of the Mutual Funds market:
 1. Money market mutual funds became very popular in the 1970s and 1980s because of interest rate ceilings on bank accounts
 - Regulation Q imposed interest rate ceilings on bank deposits until 1986
 - Between 1950s and 1960s, the ceilings were far above market interest rates
 - However when market interest rates exceeded the ceilings in the 1970s, money market mutual funds offered substantially higher returns than bank deposits
 2. The equity boom in the 1990s further boosted demand for long term mutual fund investments
 - Mutual funds are the easiest possibility to invest in a diversified portfolio

- Mutual funds have important benefits that attract investors:
 - Liquidity intermediation allows investors to turn shares into cash quickly and at low cost
 - Denomination intermediation allows small investors to get access to securities they would be unable to purchase alone
 - Diversification
 - Cost advantages because of lower transaction costs
 - Managerial expertise, even though the Efficient Market Hypothesis does not provide evidence about its usefulness

➔ The ability of mutual funds to provide better diversification is particularly important for investors, because it allows them to diversify their portfolio without incurring into huge transaction costs

- Different types of mutual funds are classified by:
 1. **redemption:**
 - *Open-end mutual funds*



- *Closed-end mutual funds*
- 2. Investment:**
- *Long-term funds* → Equity funds, Bond funds, Hybrid funds, Index funds
 - *Short-term funds* → Money market mutual funds

Two redemption models

➤ Closed-End

- a closed-end fund is an investment company whose shares are listed on a stock exchange or OTC market
- Shares of the fund are placed in an IPO, but after the IPO the fund cannot raise further funds from investors
- Similarly, investors cannot redeem their shares, but can sell them to other investors
- Closed-End is used by Mutual Funds that invest in less liquid securities, like small firms and municipal bonds

➤ Open-End

- Investors can acquire or redeem shares directly, thus making growth of the fund much easier and keeping the investment more liquid for the shareholders
- However, the fund needs to keep some liquidity to be able to meet redemption requests at all time

Determining the share price of a closed-end mutual fund

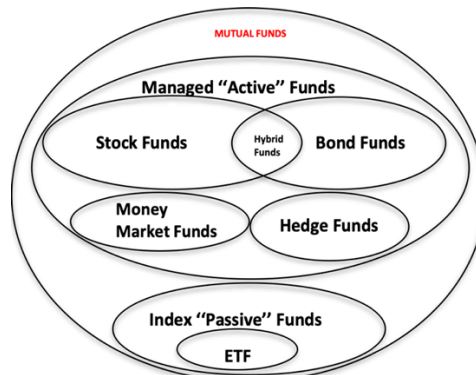
- The price is determined by the demand and supply for the share on the stock market
- Since the composition of the fund is known, investors know the NAV of one share of the funds
- However, market prices differ substantially from NAV for different reasons:
 - New funds appear on the market at a premium and move rapidly to a discount
 - Closed-End funds usually trade at substantial discounts relative to their NAVs
 - Discounts and Premia are subject to wide variation, both over time and across funds
 - When closed-end funds are terminated, either through merger, liquidation, or conversion to an open-end fund, prices converge to reported NAV

Determining the share price of an open-end fund

- The value of a share of the fund is calculated once a day:

$$NAV = \frac{Net\ Worth}{Number\ of\ Shares}$$

Funds by Investment Class



1. Equity Mutual Funds

- These funds invest mainly in stock
- The individual objectives vary from fund to fund, nonetheless we can identify 3 major classes of equity funds
 - Capital Appreciation Funds
Seek rapid increase in share prices, are relatively risky but currently are the most popular class of equity funds
 - Total Return Funds
Seek a combination of current income from dividends and capital appreciation: hence, they invest in a mix of mature companies and growth companies
 - World Equity Funds
Seek international diversification by investing in stocks of foreign companies

2. Bond Mutual Funds

- The most important types are *strategic income bond funds*
 - ➔ They invest in US corporate bonds with high yields to generate high current income
- Diversification is not as crucial in bond investments as it is for stock investments, which may explain why bond funds had less success than equity funds

Hybrid Mutual Funds

- These funds invest in both stocks and bonds
- The idea is that with one single hybrid fund investment one can acquire a broad spectrum of debt and equity
- These funds have modest success (5% of market share)

3. Money Market Mutual Funds

- These funds have been around since the early 1970s, but took off in the late 1970s due to Regulation Q, which set a ceiling on interest rates on bank accounts
- Open-End funds which invest exclusively in Money Market Securities
 - Initial investment ranges between \$500 and \$2000
 - Many funds offer check-writing privileges
 - Money Market Mutual funds are NOT insured, unlike savings accounts

4. Index Funds

- These funds are NOT actively managed because they replicate the composition of a stock index
- Advantages:
 - Low management fees
 - Good diversification
- Due to lower fee structure, in the past index funds outperformed managed funds

Fee structure of investment funds

- There exist different models for charging one-time fees, which are sales commissions usually between 2% and 6%:
 1. **Load funds**
 - Issue Class A shares



- Charge a one-time commission at the time of the purchase of the share
2. **Deferred load funds**
 - Issue Class B shares
 - Charge a one-time commission when the share is redeemed
 3. **No load funds**
 - Issue Class C shares
 - Charge no commission for purchasing or selling a share, but still charge other fees
- Mutual funds also charge other fees:
- Annual Management fee to meet operating costs
 - Extra fee to finance marketing expenses
 - ➔ These two fees are called **12b-1 fees** and have a SEC-imposed cap of 1% per year

Regulation of Mutual Funds

- Since fee schedule used to be very opaque, the SEC started to regulate them:
- Funds must build a prospectus showing a sample account of \$10000 invested for 1,3,5,10 years and showing all the fee to be applied in each case
 - The SEC has also imposed caps to some fees
- Regulation of mutual funds includes also issues like:
- Information disclosure
 - Independence of funds directors
 - Acceptable operating standards
- The SEC also addressed how funds should handle conflicts of interest

Conflicts of Interest

- Most of the conflicts of interested centered on 2 activities
1. *Late Trading*
 - All trades are marked to the NAV as of close of business at 4pm
 - Late trading refers to the practice of allowing trades that are received after 4pm to trade at the 4pm price of that day
 - ➔ If relevant news became public after 4pm, a trader could make a certain gain
 2. *Market Timing*
 - Mutual funds calculate NAV using latest released prices, but due to time zone differences, these may be many hours old and fail to contain relevant information
- In order to solve these issues, the government:
- Hardened the 4pm valuation rule, which forces to trade orders received after 4pm in the next day
 - Increased and enforced redemption fees, which discourage rapid in-and-out trading by enforcing fees for shares sold within 60 or 90 days of purchase



Exchanged Traded Funds (ETF)

➤ *Open-End Mutual Funds*

- Are flexible in size, because they grow or shrink their portfolio according to investor inflows and outflows
- The flexibility is costly because portfolio rebalancing incurs trading fees, ultimately passed on to investors

➤ *Closed-End Mutual Funds*

- Since the shares are traded on the secondary markets, no resources are wasted on liquidation and rebalancing of asset holdings as investors get in and out
- These funds lock the money in → size is fixed and shares typically have low liquidity

➤ ETFs were born in order to provide investors with liquidity of investment, low fees and flexible fund size

1. Liquidity

- ETFs are typically more liquid than comparable mutual fund shares
- Like shares of stock, ETF shares are quoted and traded continuously over the entire trading day in secondary markets
- The liquidity issue is solved because of several reasons:
 - ETF closely track a benchmark (e.g., an index) whose composition and valuation is known in real time
 - typically, there are little information asymmetries and valuation uncertainty
 - Creation and Redemption mechanism allows designated third parties to exchange traded funds for index assets and vice versa
 - this possibility, combined with arbitrage, eliminates any sizeable discounts or premia over net asset value, in sharp contrast to closed-end fund shares

2. Low Fees

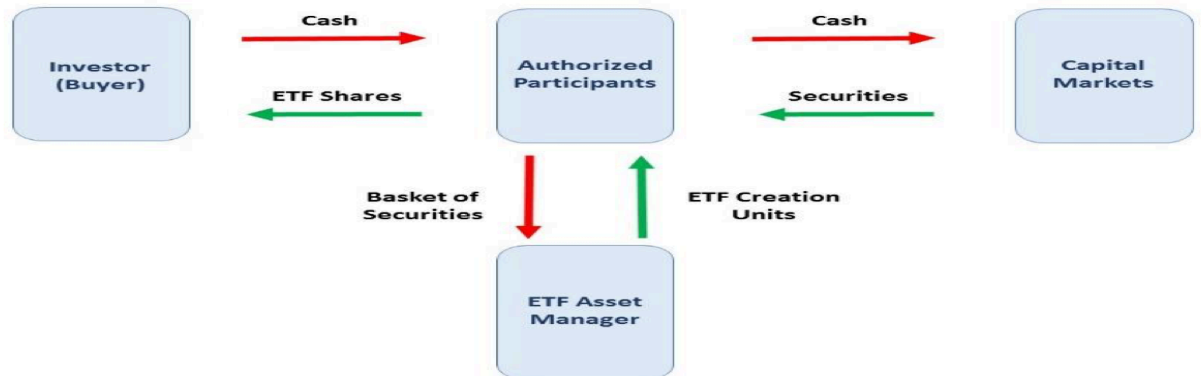
- Unlike actively managed mutual funds, ETFs are passively managed
- Despite low fees, the performance of ETFs is comparable to that of actively managed funds, because markets are quite efficient
 - This means that after fees, the performance of ETFs may be better than that of actively managed funds
- *Creation and Redemption Mechanism* keeps the transaction cost for ETF rebalancing low, which further contributes to low ETF fee structure
- ETFs have short history, which however is rather successful:
 - The first ETF was SPDR, launched by State Street in 1993
 - It tracked the S&P 500 index and as of today remains the largest ETF
 - During the past decade, money has been pouring into ETFs

Creation and Redemption Mechanism

- Every ETF designates several Authorized Participants:
 - These are stock dealers who already trade the assets in the relevant index on their own account
 - They also often hold at their own risk some inventory of the shares of the ETF, creating further market liquidity for the ETF



- Authorize Participants have the exclusive right to directly interact with the ETF
 - In an “in-kind” transaction with the ETF, they can deliver a bundle of shares of the relevant proportions (as in the index) to the ETF, and receive ETF shares in turn
 - This process enables Authorized Participants to exploit arbitrage opportunities when the market clearing price for ETF shares deviates from their fundamental value



- The **efficiency** of ETFs derives from the externalization of transaction costs:
 - Open-end mutual funds make all fund holders pay proportionally for accumulated transaction cost from daily trading and rebalancing
 - Conversely, in ETFs the transaction costs are externalized, because buyers and sellers pay them when transacting and not the fund itself
 - Authorized participants are dealers and therefore already have the lowest transaction costs of all the market participants
 - ➔ They also have incentive to keep those costs down as much as possible to benefit from arbitrage
- Some **problematic aspects** of ETFs are:
 - ETF investors may be misled because some ETFs were artificially engineered to reflect indexes that have a good historical performance
 - ETF-managing financial entities have become the biggest stockholders of formerly competing firms.
 - ➔ There is an academic work that links the common ownership of competing firms in the US economy to weakened product price competition, which is detrimental for consumers

Hedge Funds

- A hedge fund is pooled investment vehicle run by professional investment managers
- They do not actually hedge:
 - ➔ They often pursue risky strategies that yield high returns in both falling and rising markets
- Under certain conditions, they are exempt from regulation, and can therefore engage in activities that mutual funds cannot engage in:
 - Short-selling
 - Program trading which is high-frequency trading using computer algorithms
 - Arbitrage
 - Derivatives trading
 - Leveraging



- In the 90s returns often exceeded 40% a year and as of 2010, assets under management by hedge funds are \$1.77 trillion
- Only wealthy individual can invest in hedge funds:
 - By law, each investor must have a minimum net worth or annual income to be eligible to invest in a hedge fund
 - The rationale is that the rich can look out for their own interests
- Criteria from exemption from SEC registration:
 - Less than 99 investors
 - Less than \$100 million under management
- US tax authorities consider any profit made on the leveraged portion of the hedge fund portfolio an Unrelated Business Taxable Income
 - ➔ This affects in particular investors who are otherwise US tax exempt
 - ➔ For this reason, many hedge funds conduct their operations from off-shore tax havens
- Hedge funds usually charge high fees:
 1. *Management fees*
 - General fee for asset management, generally 1.5%-2% annually
 2. *Performance fees*
 - Unique feature of hedge funds
 - Extra fee on positive returns → Ranges from 20% to 50%
 - Some hedge funds do not assess a performance fee unless a minimum annualized performance benchmark (***hurdle rate***) is attained
 - To limit excessive risk-taking from managers, some hedge funds only charge a performance fee when the new net asset value exceeds the maximum net asset value that the fund has attained ever before



INVESTMENT BANKS

History

- Many bankers in the 1890s sold US securities to Europe
- Until 1933, many large US banks were both commercial banks and underwriters of securities
 - ➔ During the Great Depression, more than 40% of banks failed, allegedly because many had given loans for the purchase of securities
- The *Glass-Steagall Act* (1933) made it illegal for commercial banks to buy and sell securities on behalf of their customers
 - ➔ Idea of separation of classic banking from more risky business, thus protecting savers from potential conflicts of interest of the bank

- Investment Banks offer a broad range of services:
 - *Underwriting*, they intermediate funds between the issuers of securities and investors
 - *M&A*, act as intermediaries in private equity and private equity buyouts
 - Offer securities brokerage services to their clients
 - They do NOT take deposits, nor they engage in asset transformation like commercial banks

- The separation between investment banks and commercial banks has nowadays blurred:
 - In 1999, the Glass-Steagall Act was repealed by the *Gramm-Leach-Bliley Act*
 - ➔ Since then, the line between commercial banks and investment banks has become very blurry
 - Before the crisis, the investment banking industry realized high profits, but in 2008 the remaining 5 US investment banks ceased to exist:
 - Lehman Brothers went bankrupt
 - Bear Sterns was acquired by JP Morgan
 - Merrill Lynch was acquired by Bank of America
 - Goldman Sachs and Morgan Stanley applied for commercial bank charter

Underwriting

- When selling securities, firms use the service of an underwriter for different reasons:
 - Investment banks have massive expertise in emitting new securities, whereas many firms lack the necessary knowledge because they rarely access primary markets
 - ➔ Lower Transaction Costs
 - Investment banks have *reputational capital*
 - ➔ Because investment banks depend on their customers returning for future business, they can't afford any improper conduct of due diligence or striking deals that are unfair for investors
 - ➔ The market is more inclined to buy securities that were emitted with the help of underwriters than securities emitted by a firm directly

- Investment banks give advice to firms that are planning new emissions:
 - Timing of the offering
 - Price at which the security should be offered:
 1. **Seasoned Issues**



- If a company has already issued shares earlier and those are already trading in the secondary market, their price can be used to determine the offering price

2. **Initial Public Offering**

- If the company is issuing stock for the first time, the investment bank must determine the most appropriate price through its expertise in valuation
- Investment banks assist in filing documents:
- Since issuers of securities to the general public are required to file a registration statement with the SEC, investment banks can provide assistance
 - The *Prospectus* is a portion of the registration statement that is made available to investors to review
 - The SEC then reviews the registration statement whether it contains all the required disclosures
 - The SEC review does not validate any information in the statement itself and is no endorsement
- Further tasks are:
- For *bonds*, they secure a rating from a rating agency
 - For *stocks*, they arrange for the stock to be listed at an exchange
- Investment banks underwrite new issues of securities:
- This is often done jointly (in *syndicate*) with other investment banks
 - The investment bank buys the entire issue from the issuing firm at a pre-specified price
 - Then, the investment bank will attempt to sell the shares to the general public at a slightly higher pre-specified price
 - By underwriting, the investment bank certifies to the quality of the issue to the public, by showing that it is willing to bear the risk of holding all unsold securities on its own balance sheet
 - Underwriting = ***firm commitment offering***
- Issues for investment banks:
- *Oversubscribed issue*
 - Occurs if the chosen price is too low and there will be more interested buyers than securities
 - The issuing firm may feel uneasy about having received less than its fair value
 - *Undersubscribed issue*
 - Occurs if the chosen price is too high and the bank will not find enough interested buyers
 - The investment bank can lose huge amounts of money
 - *Fully subscribed issue* → goal of the investment bank
- Alternatives to underwriting are *Best Efforts Agreements*:
- Since underwriting is very expensive because of the risk undertaken by investment banks, sometimes firms prefer to use a ***best effort offering*** instead:
 - The investment bank does not guarantee a price to the firm, nor does it guarantee that the issue can be sold entirely
 - All asset sales will be on a best effort basis, and a commission is paid to the investment bank, which merely acts as a broker



- There is no risk of mispricing the security for the bank, but also little incentive for due diligence
 - ➔ Therefore, firms with substantial amount of asymmetric information may therefore fare better if they choose traditional underwriting because if market participants are very uncertain about the *prospectus* of the firm, then the IPO might not be successful, and the firm may not be able to raise enough equity capital

Equity Sales, Mergers and Acquisitions

- Investment banks help selling corporate divisions or companies:
 1. Investment Banks determine the value of a company
 - Most complicated part, because the Investment Bank will attempt to find what the company will be worth to a good buyer
 - Valuation of buyers depends on synergies
 2. Investment Bank makes discreet inquiries to find potential buyers
 3. Prospective buyers will write a *letter of intent* with preliminary terms of the deal
 4. If the terms are accepted by the seller, the *due diligence* period begins:
 - In 20-40 days, the buyer validates that the provided information about the company was correct indeed
 5. At the end, the *definitive agreement* forms the legally binding contract
- Investment banks help at *mergers and acquisitions*:
 - In a *merger*, two firms merge together into a new company
 - ➔ Both firms support the merger
 - ➔ Stockholders turn in their stock for stock of the new firm
 - ➔ Investment banks lend their support in the process
 - In an *acquisition*, one firm buys the stock of another firm with the aim of acquiring ownership:
 - ➔ Often the process if *friendly*, since the acquired firm supports the transaction
 - ➔ *Hostile takeovers* occur when the target firm resists, and the acquiring firm will attempt to purchase enough stock to gain the majority of seats in the board of directors in order to vote in favor of the acquisition
 - ➔ Investment banks provide support with locating attractive takeover targets, soliciting shareholders to sell their shares and raising the necessary capital

Venture Capital Firms

- The role of Venture Capital Firms:
 - Venture capitalists invest in private equity of selected start-up firms
 - Private Equity firms are limited partnerships that raise money from a small number of wealthy investors
 - Early venture capital firms were organized as closed-end mutual funds
 - Today, most VC are organized as *Limited Partnerships*, in which
 - Limited Partners provide funds
 - General Partners decide in which projects to invest
 - VC firms have financed most of today's Silicon Valley giants at their infancy stage



- Since 1979, pension funds are explicitly allowed to invest in VC, and this fostered the industry growth
- Venture Capital reduce Asymmetric information:
- For investors, high-tech start-up firms are full of uncertainty and asymmetric information
 - VC firms purchase equity of such start-ups
 - ➔ Before investing, they collect lots of information about the start-up, also thanks to industry experts in the VC firms
 - ➔ In this way, VC firms reduce adverse selection
 - Once they have invested into a firm, they monitor the progress and provide expertise to the young firm
 - VC firms usually take position in the board of directors of the firm
 - ➔ In this way, VC firms reduce moral hazard and problems of costly state verification
 - Venture capitalists invest for a long-time span (up to 10 years)
- Lifecycle of a Venture Capital Deal:
- 1. Fundraising**
 - Limited partners make funding commitments, and VC firms will “call” these commitments as investing begins
 - 2. Investing**
 - *Seed investing* ➔ firm has no real product yet
 - *Early-stage investing* ➔ firm has started production
 - *Late-stage investing* ➔ firm is already more advanced but needs to grow further for a successful IPO
 - 3. Exiting**
 - IPO, noting that the VC firm is subject to insider trading restrictions
 - Mergers and Acquisitions



RISK MANAGEMENT IN FINANCIAL INSTITUTIONS

- Financial institutions face numerous risks:
 - *Credit risk* → promised cash flow may not be paid in full
 - *Liquidity risk* → large liquidity demand can inflict losses
 - *Interest rate risk* → drop in value of investments
 - *Market risk* → market price fluctuations
 - *Off-balance-sheet risk* → arises from contingent assets and liabilities
 - *Foreign exchange risk* → can affect the value of assets and liabilities
 - *Country risk and Sovereign risk* → embargoes, defaults, nationalizations
 - *Technology risk* → risk that tech investments don't produce anticipated cost savings
 - *Operational risk* → risk of fraud, technological failures, catastrophes...
 - *Insolvency risk* → materializes if sudden losses erode capital
- Not all risks can be or should be hedged:
 - It is impossible to get rid of every possible risk, nor it is desirable
 - Financial institutions must nonetheless be careful not to expose themselves to too much risk
 - Hence, they analyze very well:
 1. Which risks they are exposed to
 2. How the different types of risks may interact with each other
 3. How severe risks that may threaten the existence of the Financial Institution can be hedged➔ This is the central idea behind risk management

Managing Credit Risk

- **Credit Risk** is the risk that promised cash flows from loans and securities may not be paid in full
 - In 2007-2009, commercial banks and investment banks lost billions of dollars due to credit risk on sub-prime mortgages and mortgage-backed securities
 - In the recent crisis we have seen that credit risk can have huge impact on macroeconomic conditions, and vice versa
- Financial institutions protect themselves from credit risk in 2 ways:
 - **Screening** → is essential for identifying high quality borrowers and denying credit to unreliable borrowers
 - **Monitoring** → checks on outstanding loans and enforcement of covenants prevent borrowers from engaging in riskier activities
- The screening activities of Financial Institutions are:
 - Credit Screening → using hard and soft information
 - Credit Scoring → using hard information
 - Credit Rationing → no further supply of credit to borrowers
- Financial Institutions work in a way that is designed to maximize their screening efficiency:
 - Long-term customer relationships
 - Credit lines, which are pre-set borrowing limits
 - Specialization



- Collateral
- Traditional credit screening combines hard and soft information:
 - In the traditional credit screening process, loan officers collect all available information about a prospective borrower
 - This can be *hard information*, which can be encoded in numbers, processed by computers and verified independently by others:
 - Employment history
 - Income
 - Existing obligations of the borrower
 - Value collateral
 - However, loan officers may also use *soft information*, which has subjective aspects and cannot be processed automatically:
 - Appearance of the prospective borrower
 - Information embedded in the local community
 - Non-verifiable information from the business relationship with the prospective borrower
- Credit scoring models use available hard information to compute credit score:
 - Credit scoring is very cost-efficient and has become the dominant method for assessing the creditworthiness of small business loans and residential mortgages
 - First, statisticians find from existing data which parameters appear to influence credit risk
 - This informs which score is given to each property
 - Scoring models look at numerous parameters, all of which are *hard information*:
 - District in which the applicant lives
 - Length of residence
 - Number of major credit cards
- If a borrower has received a low credit score, a bank could:
 - Charge high interest rate:
 - ➔ Changes the composition of the applicant pool towards higher-risk applicant (adverse selection) because borrowers that know they will not repay are more willing to accept high rates
 - ➔ Increase borrowers' incentives to increase the risk of their projects *ex-post* (moral hazard)
 - Stiglitz and Weiss show that in markets with asymmetric information credit rationing may occur
- Long-term customer relationships deliver valuable information that can be used for credit screening:
 - Checking and savings account histories tell a lot about a borrower's creditworthiness
 - In general, a lot of information that is relevant for creditworthiness can be observed over the course of a banking relationship with a client
 - ➔ Therefore, Financial Institutions strive to build long lasting relationships with their clients
 - Long-term lending relationships also benefit the borrower, who has greater access to credit



- ➔ Repeated business alleviates moral hazard
- Loan commitments are an ideal way to build a strong relationship:
 - In a *loan commitment*, the financial institution provides the firm with loans up to a certain amount at a pre-specified interest rate
 - The firm can demand this loan at any time
 - The majority of commercial and industrial loans from banks are of this type
 - ➔ The **advantage for the firm** is credit available exactly when it is needed
 - ➔ The **advantage for the financial institution** under the loan commitment agreement is that firms agree to continuously provide the financial institution with all relevant information about their state, even if no credit has been demanded yet
- Financial institutions specialize in a certain geographic area or industry:
 - This contradicts the idea of diversification but, if we consider that financial institutions need to collect precise information in order to screen, it does make sense
 - ➔ Having a larger market share in a narrower geographical area allows a financial institution to have a much broader idea of what is happening in the local economy, which can be very valuable
 - ➔ Specialization strategies can complement relationship banking
- Collateral can induce self-selection:
 - If you require borrowers to post high-quality collaterals, the worst borrowers may realize that they will lose the collateral with high probability and may refrain from applying for a loan
 - ➔ This mitigates adverse selection
- Collateral has also many other important roles:
 - It reduces moral hazard, because borrowers have something they might lose
 - It helps banks to reduce losses in case of default
 - ➔ However, research suggests that when collateral is too valuable, banks may screen too little
- However, Credit risk is still a big issue:
 - The main problem for financial institutions is the co-movement in default rates
 - ➔ When times are bad, many people default whereas in good times defaults are rare
 - Credit screening generates much information about an individual, but little information that the bank could use to understand its aggregate credit risk as a function of macroeconomic state
- The recent crisis has raised questions about credit risk, because banks compete fiercely for market share, lending broadly and screening less

Managing Interest Rate Risk

- When interest rate changes:



- **Income changes** because interest income on variable-interest loans, new loans and other securities will adjust
→ **Income gap analysis**
- **Net worth changes** because values of assets and liabilities on the balance sheet will re-adjust, depending on their duration
→ **Duration gap analysis**

➤ **Income gap analysis**

- Distinguish between *rate-sensitive* and *rate-insensitive assets and liabilities*
→ The difference between rate-sensitive and rate-insensitive assets and liabilities will be an indicator by how much income has changed

➤ **Duration gap analysis**

- After calculating the duration for the Financial Institution assets and liabilities, you can use the **duration formula** to calculate the change in value of each side

Interest Rate Risk

➤ Very important source of risk for financial institutions:

- It affects *cash flows* from or to assets and liabilities that are susceptible to interest rate changes
- It affects *values* of assets and liabilities with long maturities

➤ After an increase of 1% in the interest rate

→ **Bank Income:**

- The bank will receive 1% more in interest on variable interest rate loans
- For all fixed interest rate loans that do not mature in the given year, the bank will receive same interest as before
- Loans that mature in this year and need to be renewed will earn 1% more interest
- The income from securities with term to maturity greater than 1 year will not change

→ **Bank Expenditures:**

- The bank will have to pay 1% more interest on borrowings with maturity smaller than 1 year
- The bank will pay the same interest as before for all time deposits that do not mature this year (*rate-insensitive*)
- The bank will have to renew time deposits that mature this year at a higher interest rate (*rate sensitive*)
- The bank will pay higher interest rates on rate-sensitive deposits and saving accounts, while it will pay the same rate on rate insensitive one

→ Rate-Sensitive Assets increase net income of the bank

→ Rate-Sensitive Liabilities reduce net income of the bank

➤ **Income Gap Analysis**

$$GAP = \text{Rate Sensitive Assets} - \text{Rate Sensitive Liabilities}$$

For each dollar by which rate-sensitive assets exceed liabilities, the bank will earn ΔI additional income if interest rates increase by Δi

$$\Delta I = GAP * \Delta i$$



- However, the basic income gap analysis is still relatively imprecise:
 - Assets and liabilities that are classified as rate-insensitive can have very different maturities
 - Those with maturity smaller than 1 year are classified as rate-sensitive, while those with maturity greater than 1.5 years are rate-insensitive
 - ➔ *Maturity Bucket Approach* consists in calculating the GAP for several maturity subintervals assuming a certain scenario, thus having a better picture of the medium-term situation

- Another issue with changes in interest rates is Asset Valuation:
 - When interest rates increase, the asset value of bonds, loans, and securities with long maturities fall
 - Bank shareholders also care about the market value of the bank's asset, rather than its income only
 - Even if financial institutions want to maintain these securities until maturity, they will be affected because of *marked-to-market accounting*
 - ➔ When securities fall in value, they will be written-off, reducing the bank's net worth

- Duration can be used to calculate the change in Asset Value after a change in interest rates:
 - It is an additive property, so the duration of the portfolio of a bank can be calculated as the weighted sum of the durations of individual positions
 - ➔ In this way, we can calculate the joint duration of all assets and liabilities on the balance sheet

- To estimate the change in net worth under an interest rate increase:
 1. Estimate the Duration of all Assets and Liabilities, namely DUR_A and DUR_L
 2. Then, we can calculate the percentage changes of assets values and liabilities values:

$$\% \Delta A = -DUR_A * \frac{\Delta i}{1 + i}$$

$$\% \Delta L = -DUR_L * \frac{\Delta i}{1 + i}$$

3. Taking the absolute changes and subtracting terms from each other gives us the change in net worth

$$Change\ in\ Net\ Worth = \Delta A - \Delta L \approx [A * (-DUR_A) - L * (-DUR_L)] * \frac{\Delta i}{1 + i}$$



→ *Change in Net Worth* $\approx -\left(DUR_A - \frac{L}{A} * DUR_L\right) * \frac{\Delta i}{1+i}$

$$DUR_{gap} = DUR_A - \frac{L}{A} * DUR_L$$

- The Duration Gap quantifies the sensitivity of market net worth to interest rate changes
 - Keeping it under control and relatively low is useful to keep a bank out of trouble in case of changes in interest rates
 - $\% \Delta Net\ Worth = -DUR_{GAP} * \frac{\Delta i}{1+i}$
 - However, the usefulness of the Duration Gap rests on the important simplification that Δi is the same for all assets and liabilities
 - ➔ The presence of various interest rates is known as *term structure* and requires more complex calculations to compute the change in net worth after a change in the interest rates



REGULATION OF FINANCIAL INSTITUTIONS

- The failure of a banks is socially extremely expensive:
 - Depositors lose part of their savings
 - Information about borrowers' creditworthiness is lost
 - The failed bank cannot be easily replaced because operating in an environment of *adverse selection* requires expertise
 - A banks failure can cause *contagion* on other sound banks because:
 - Fire sales of securities can inflict losses on other holders
 - A rumor can be enough to trigger bank runs
 - Every bank can become illiquid if just enough people withdraw
 - During a bank crisis, financial intermediation in the economy may be disrupted
- For these reasons, banks are heavily regulated:
 - The high social cost of bank failures means that governments may want to build a *safety net* to prevent banks from failing
 - However, safety nets create potential moral hazard, because banks may take excessive risks while relying on the government, so that gains are earned by bank owners and losses are on taxpayers
 - Therefore, governments *monitor banks* to ensure their operations are sound
 - ➔ In particular, bank *capital requirements* can play an important role in bringing banks' incentives back in line with social objectives
- There are good reasons to introduce deposit insurance:
 - Reduces the risk of loss in case the bank fails
 - Reduces the risk of bank runs arising in the first place, because depositors will be paid in full in case the bank fails
- In the US, the FDIC insures commercial banks against failure:
 - Since 1934, the FDIC insures deposits up to a certain amount (currently \$250,000) against bank failure
 - Since then, bank runs in the US have been rare, while the number of bank failures has fallen dramatically
 - ➔ Once the bank has failed, the FDIC applies either of the following methods:
 1. **Payoff Method**, in which the FDIC allows the bank to fail and pays off its depositors up to the insurance limit
 2. **Purchase and Assumption Method**, in which the FDIC reorganizes the bank through a merger or a take-over with another bank



- Many countries have followed the US and have introduced deposit insurance:
- ➔ For some countries, there is evidence that this has been harmful
 - Indeed, many studies find that deposit insurance increases on average the incidence of banking crises and delays financial development
 - However, most countries where deposit insurance had detrimental effects, also had weak institutions, which were not able to mitigate *moral hazard*
 - When institutions are weak, deposit insurance tempts banks to take excessive risk
 - ➔ With insurance, depositors will still be happy to earn just the risk-free rate on their deposit, no matter how bad the risks taken by the banks are
- Too-Big-to-Fail
 - For very large banks, bank failure may be unthinkable because the cost would be tremendous
 - Markets may think that governments will always bail out such a bank, at any cost to the taxpayer, so the risk for creditors will be lower than what is implied by bank operations
 - Therefore, a Too-Big-to-Fail bank can borrow cheaply, no matter in how much risk-taking it engages → Moral Hazard
- Too-Connected-to-Fail
 - A similar issue arises if the bank is too tightly connected to others in the financial system, and contagion after a bank failure would have disastrous effects
- The largest portion of financial regulation is designed to prevent Financial Institutions from engaging in moral hazard:
 - *Capital Requirements* discourage shareholders from taking too much risk because they involve personal capital losses (**Basel I, II, III**)
 - *Prompt Corrective Action* dictates banks at risk which steps to take
 - *Financial Supervision* checks the soundness and validity of books and documentation of a bank
 - *Assessment of Risk Management* checks whether risk management techniques are appropriate
 - *Disclosure Requirements* inform creditors about the bank's status which helps enforce discipline via the cost of borrowing
- Other areas of financial regulations include:
 - Consumer protection
 - Transparency
 - Anti-discrimination

Reducing Moral Hazard

- When banks are financed completely by equity funds, they will always choose the investments that yield the higher returns with lower risk if they are risk-averse or risk-neutral
- However, when banks are financed with Deposits (liabilities), and only have a small share of equity, they are tempted to engage in riskier activities for 2 reasons:



- Lower risk for the bank shareholders
- Higher Return on Equity, due to the high leverage

→ This is known as **risk-shifting**, because losses are shared but gains are privatized

1. Capital requirements

- If shareholders have to shoulder more of the losses, and not just the gains, their incentive to risk-shift would diminish quickly
 - Minimum Capital Requirement should be calculated by doing:

$$E(\text{Less Risky Asset}) > E(\text{Riskier Asset})$$
- The benefits of higher capital requirements reduce moral hazard and risk-shifting
 - However, shareholders may be disappointed because the higher capital requirement reduces their ROE for a given ROA
- Through most of the 1980s, regulators used a minimum *leverage ratio*:

$$\text{leverage ratio} = \frac{\text{Capital}}{\text{Assets}}$$
 - Banks were classified according to different thresholds of leverage ratio
 - If bank capital fell short of any of the thresholds, there would be restrictions on the activities of the banks
- However, the leverage rate-based approach had its drawbacks:
 - Capital requirements had not much to do with the actual risk taken by the bank
 - A risky commercial loan would require the same amount of capital as safe treasury bonds
 - At the same time, any off-balance-sheet activities would not incur any capital requirement at all
- To solve these issues, a committee of central bankers of many nations met in Basel at the Bank of International Settlements searching for solutions:
 - Basel I (1988)
 - Basel II (1999)
 - Basel III (2017)

Basel I

- The agreement still applies to all but the largest US banks
- It introduces a capital requirement of 8% of banks' risk weighted assets
- Risk Weighted Assets:
 - Determined according to a simple weight catalog that assigns to different asset classes different weights
- The main limitations of Basel I are:
 - risk weights for each asset are too coarse and *ad hoc*
 - banks engaged in *regulatory arbitrage*, that is looking for the riskiest asset within the same risk weight class
 - In the end, banks ended up engaging in more risk



Basel II

- Attempt to fix the shortcomings of Basel I:
 - capital requirements aim to be more sensitive to “true” riskiness
 - off-balance sheet items can now impact capital requirements
 - credit risk, operational risk and market risk estimations are now based on data and formal techniques

- Capital requirements for *credit* are determined with either of the following three methods:
 - *Standardized Approach*, in which capital charge depends on borrower rating and other risk indicators

 - *Internal Ratings Based Approach*, in which regulators supply the model, the assumptions and the calibration for “loss-given-default” models that determine the capital requirements

 - *Advanced Internal Ratings Based Approach*, in which the “loss-given-default” model is provided by regulators, but banks can adjust calibration

- Basel II had three pillars:
 - Regulatory minimum capital requirements, using standardized or internal ratings-based approach to credit risk, market risk, and operational risk
 - Regulatory supervisory review so to complement and enforce capital requirements
 - Requirement on rules for disclosure of capital structure, risk exposures, and capital adequacy so as to increase transparency and enhance market discipline

- Even though Basel II reduce regulatory arbitrage, it was not a clear success either:
 - It appears to have reduced the extent to which banks use regulatory arbitrage
 - However, capital requirements became *strongly procyclical*
→ Low in quiet boom times, but high during crises, because when firms struggle their ratings go down, thus forcing lending banks to hold more equity
 - Since banks were already losing capital due to write-offs, the tightening of capital requirements due to Basel II became a severe issue

Basel III

The convention added new regulations on:

- *Capital*
 - More emphasis on the quality of capital
 - Less procyclical capital requirements with the activation of counter-cyclical buffers on the discretion of the Central Bank
 - Additional non-risk-based leverage ratio constraint, including off-balance-sheet exposures

- *Liquidity*
 - Liquidity Coverage Ratio → sufficient liquidity to survive 30 days of funding stress
 - Net Stable Funding Ratio → incentive to use stable sources of funding

- *Others*
 - Risk Coverage → Revisions to standardized approach, limits to internal approach



2. Restrictions on Asset Holdings

- Moral Hazard (risk-shifting) can be reduced by restricting or prohibiting the holding of certain risky assets by financial institutions
- The rationale is that if most risky assets are outside of reach of banks, moral hazard can be suppressed with more adequate capital requirements than if banks can just hold any risk
- Restrictions on Asset Holdings also strengthens the position of depositors and creditors of the bank

3. Prompt Corrective Action

- Risk-shifting can also be reduced by actively intervening on banks that are undercapitalized and. Therefore, at risk of engaging in moral hazard
- The FDIC in the US carries out this task and imposes restrictions if the leverage ratio is < 5%
 - If sound operations of the bank are not restored, it will be forced to close

4. Financial Supervision

- Regulators carry out frequent on-site examination to monitor a bank's compliance with regulation, assigning a CAMELS score:
 - Capital Adequacy
 - Asset Quality
 - Management
 - Earnings
 - Liquidity
 - Sensitivity to Market Risk
- Regulators can also actively enforce regulations with *cease-and.-desist* orders, for instance getting rid of loans and securities considered too risky
- Bank examiners can also write-off loans

5. Assessment of Risk Management

- Examining only the books of a bank is not enough since banks are today able to engage in enormous risks so balance sheet positions can deteriorate quickly
- The risk management framework of the bank must set strict limitations to risk exposure
- Bank examiners will screen the quality of the bank's risk management framework as part of their regular CAMELS activities

6. Disclosure Requirements

- Creditors will demand higher compensation of risk if they learn about risky operations of a bank
 - ➔ This puts additional discipline on bank risk-taking behavior
- In the US, some disclosure was already required for all publicly traded companies due to 1934 SEC regulation
- Banks have to deliver quarterly call reports revealing assets, liabilities, income and dividends, ownership, Forex Operations and other details



Other Regulatory Issues

1. *Redlining and Discrimination*

- Credit denials based on sex, race, or ethnicity:
 - Banks used to have secret internal maps where districts were redlined (excluded from credit)
- The *Community Reinvestment Act* (1977) and the *Home Mortgage Disclosure Act* (1974) addressed these issues:
 - The *Community Reinvestment Act* banned redlining
 - The *Home Mortgage Disclosure Act* banned discrimination based on race and ethnicity
 - Banks need to show that they lend in all areas in which they take deposits

2. *Consumer Protection*

- In subprime lending markets, many people did not understand the loans they signed, and banks did not contribute to make it easier for them:
 - Mortgage brokers earned fortunes from commissions for originating NINJA loans (No income, No Job, No Assets)
 - There was insufficient disclosure of what people were signing up for
 - Many of those loans were made in bad faith and were designated to fail
- *Truth in Lending Act* (2008) regulated this situation:
 - Ban on no-docs loans
 - Ban on disregarding consumer's ability to repay
 - Ban on prepayment penalties if interest can change in the first 4 years
 - Prohibition of misstated appraisals of home values
 - Good faith estimate of loan costs must be given within 3 days after application
 - Ban of misleading advertising campaigns



THEORIES OF FINANCIAL CRISES

- Financial crises are not a new phenomenon:
 - They have occurred ever since banks are around
 - Between 1793 and 1893, the US alone had 13 banking panics
 - On average, in the past 120 years banking crises have lasted on average 2-3 years and costed 5-10% of GDP

- Most financial crises in advanced economies follow a relatively similar pattern:
 - The seed of most crises are sown in good times
 - ➔ **Credit booms**, often due to financial liberalization or technological innovation, lets credit in the economy grow rapidly, thus creating asset price bubbles

- Some adverse shock lets the economy enter a period of crisis, which unravels in several stages
 1. **Initiation**
 - Asset prices decline, or bubbles burst
 - The balance sheet of banks deteriorates

 2. **Banking Crisis**
 - Economic activity declines
 - Financial institutions suffer losses, liquidity evaporates, “fire-selling” let banks fail

 3. **Debt Inflation**
 - Substantial and unanticipated decline in price levels
 - As prices fall and consumption stalls, firms do not generate enough revenues to service their debt
 - Falling wages further depress consumption and accelerate the deflationary spiral

The Seed of Financial Crises

- The booms preceding severe crises are often booms in credit:
 - *Credit boom* is a period in which the aggregate amount of credit in the economy shows a substantial and positive deviation from its long-run trend
 - The newly available additional credit often spurs demand for certain assets in the economy, which appreciate substantially in price

- Often, credit booms follow events related to financial liberalization:
 - Changes in regulation allow more competition between banks
 - Country liberalizes capital flows in and out of the country
 - Country joins a monetary union...

- Often, credit booms are simple expansions of credit with no follow-up problems, and improve economic development:
 - However, there appears to be a link between the speed of credit growth and the probability of subsequent crises
 - A study has found that, out of 135 credit booms, 104 had a “good” outcome, while 31 of them were followed by banking distress and 23 of them by a systematic banking crisis



Hypotheses on credit booms

1. **Deregulation** of the banking sector seems to play a major role because in strictly regulated banking industries lending is more cautious, but often too little and too expensive
2. **“Cheap Fuel”** often leads to large credit booms growth:
 - Banks can fund their lending cheaply because they can borrow abroad
 - Banks fund their lending cheaply because the country has joined a monetary union
 - The central bank keeps the interest rates low for a prolonged time, and can do so because no inflationary pressure is in sight
3. **Asset Price Bubble** on collateral assets tend to boost lending significantly
 - ➔ Asset price bubbles increase economic activity, net worth and are unsustainable
 - ➔ Trouble starts when credit or banking stability depends on the value of a bubbly asset

Financial Crises on Industrialized Countries

Stage I: Initiation of Crisis

- At some point, the lending boom or asset bubble ends:
 - When this happens, some loans start going bad, thus loan values fall, and bank capital erodes
 - Banks start to **deleverage**, which means reducing their liabilities by cutting back on lending
 - As bank capital melts away, banks become riskier and some of their creditors pull out their funds
 - This again prompts banks to cut lending
 - ➔ The economy experiences a **credit freeze**
- As more and more loans go bad, banks need to worry about adverse selection problems much more:
 - Money market investors will pull their funds out of banks or demand higher interest rates as a compensation for risk
 - Since bank funding costs rise, banks also need to charge higher interest rates on loans
 - However, increasing interest rates will deter borrowers and leave the bank with the borrowers that present worse risks
 - Therefore, the banks may decide not to lend to anyone anymore
- Furthermore, higher interest rates reduce the cash flows of firms:
 - Often, firms fund a large part of their investments from cash flow
 - However, if interest rates increase, cash flows drop in value because they are discounted by a higher factor
 - Therefore, firms must seek external funding from a bank
 - ➔ Since many “unknown” new customers will require financing from a bank, many loans will be denied, and economic activity will fall sharply



Stage II: Banking Crisis

- When the bank balance sheets deteriorate, some banks fail:
 - Since deposit insurance is not designated to insure against simultaneous default of many banks, many individuals rationally do “bank-runs”
 - Asymmetric information about the assets held by banks makes things worse, because depositors become suspicious since they do not know which banks hold bad loans
- If multiple banks fail, we may see a **banking panic** where everyone attempts to take his money out of the banking system:
 - Still-solvent banks need to liquidate large amounts of illiquid assets to meet financial outflows
 - This results in **fire-sale asset prices**, which expand losses and contagion
 - Since information about creditworthy firms is lost when banks fail, access to credit may remain low for a long time

Stage III: Debt Deflation

- Deflation can exacerbate the crisis heavily:
 - Deep financial crisis can produce deflationary forces
 - *Consumers* postpone purchases as things become cheaper every day
 - *Borrowers* see their debt increasing and becoming harder to service
- Deflation creates also trouble to *firms*:
 - Less revenue and more expenditure on debt leads to a fall in their net worth
 - The loss of net worth increases further adverse selection and moral hazard problems in lending
 - ➔ This leads to a fall in wages, household incomes, and a further decline in prices (vicious circle)

The Japanese Experience

- In the early 1980s, Japan was experiencing a strong economic growth since the post-war period:
 - **Keiretsu** were few large associations of companies organized around a bank that characterized the Japanese economic structure
 - In 1985, *deregulation* of interest rates on deposit began
 - ➔ Banks started to pay higher interest on deposits but did not increase interest charges on loans because of competition
 - Basel rules allowed Japanese banks to count unrealized stock gains to 45% for equity, which left bank capital exposed to stock price fluctuations
 - Furthermore, Japanese borrowed massively on Euro-Dollar markets
- Unfortunately, much of bank lending went into real estate, where collateral was increasingly valuable because a **bubble** in real estate took off:
 - Real estate prices took off
 - The Bank of Japan kept for a long time interest rate low, due to problem of exchange rate with the USD
 - ➔ In 1990, the bubble reached its peak and burst:
In some extreme cases, current real estate values fell to 1% of their previous levels



- Falling asset prices eroded bank capital, even though banks were initially good in hiding their losses using unrealized gains
 - Most banks were bankrupt, but were kept alive by the government
 - Japan fell into a severe recession from which it still has not recovered
 - Despite the very expansive monetary policy, the country has always remained at the tipping point to deflation, and Government debt has reached 230%

Financial Crises in Emerging Market Economies

Stage I: Seeds of Financial Crises

- The factors that create financial fragility in emerging market economies are different from those in industrialized economies:
 - Emerging economies typically suffer from weak institutions
 - ➔ Weak supervision of financial institutions
 - ➔ Little independence of the central bank from the government
 - ➔ Lack of information on investment opportunities and poor expertise of banks
 - Many countries *peg* their currency, often to the US dollar
 - ➔ This can help make foreign investment easier as long as the peg stays in place
 - ➔ However, this creates sudden fragility if the currency peg breaks down

1. Crisis which have their roots in a previous boom

- When capital inflows are liberalized, funds from abroad flow into Emerging Markets Countries, even more so if yields in industrialized countries are low
- Credit Boom occurs:
 - many projects may get financed, including poorly screened ones
 - ➔ *weak credit culture*
 - many loans are denominated in foreign currencies, usually the USD
- Fiscal policy may look very solid in these periods
 - ➔ However, the crisis can start for different reasons:
 - Boom burst by itself or because of some adverse event
 - Increase in foreign interest rates make the Emerging Market economy look less attractive, and capital flows start to reverse
 - Banks cut loans, loan quality decreases, and asymmetric information gets worse

2. Severe Fiscal Imbalances

- When an Emerging Market country is running large fiscal imbalances, if there are no more volunteers to buy government debt, the government may peek *volunteers* by forcing banks of the country to purchase the newly emitted debt
- As market confidence in those bonds plummets, their price falls and banks' net worth is eroded
 - ➔ Banks will therefore start cutting their lending, worsening asymmetric information problems



- This will eventually cause **bank panic**

Stage II: Currency crisis

- When speculators realize that something is wrong, the Emerging Market currency comes under attack
 - If one short sells the currency and the Emerging Market central bank is forced to abandon its peg, he earns a big gain
 - At some point, the currency collapses and a currency crisis ensue
 - *Deterioration of the bank balance sheet severe and fiscal imbalances* are contributing factors that make the attack likely to be more successful
 - ➔ This is because, in such circumstances, a government or central bank would commit economic suicide if it were to increase interest rates, which would be required to defend the currency peg
 - ➔ Therefore, they will decide in favor of devaluation

Stage III: Full-Fledged Financial Crisis

- The currency devaluation hits borrowers in the economy because Emerging Markets countries borrow abroad almost exclusively in foreign currency (*original sin*)
 - If Emerging Markets countries tried to borrow in domestic currency, their cost of defaulting on foreign lenders by generating inflation is rather low
 - However, borrowing in another currency poses major problems if exchange rates cannot be stabilized
 - ➔ In case of a devaluation of the domestic currency, debt can greatly increase overnight
- Devaluation has relevant consequences:
 - Increasing debt load erodes firms' net worth
 - Moral hazard and adverse selection pose increasing problems
 - Investment and economic activity decline sharply
 - Inflation may also rise, because import prices shoot up and the central bank may have limited credibility in inflation targeting
 - Banks are distressed because:
 - Assets lose value as default frequency increases
 - Liabilities skyrocket because of the currency crisis
 - ➔ In this situation, the whole banking system may collapse
- Research has shown that the *twin crisis* combination of currency crisis and banking crisis have particularly long-lasting and severe impact on the economy

