# Chapter 1: Overview of Financial Markets and Institutions

| Capital Movements in the Financial System | **Direct finance**: borrowers issue securities to **borrow funds directly from the lenders**: bond market, stock market, money market, foreign exchange market,…  **Indirect finance**: financial **intermediaries channel funds** from lenders to borrowers: commercial banks, insurance companies, finance companies, mutual funds, pension funds,…  **Function**: Channels and allocates funds efficiently from savers to spenders, across economic sectors and geographical areas. |
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| Financial markets | Financial markets facilitate financing and investing by households, firms, and government agencies → The primary market  A **financial market** is a market in which financial assets (securities) can be purchased or sold → The secondary market |
| Financial markets are factor markets (capital).  **Function**   * Channel funds from saving to investment **→ The most important role** * Determine prices of financial instruments. * Reduce information cost, search cost. * Create liquidity.   \* Liquidity: The ability to transform an asset to cash  How to measure: 1) Proceeds that we sold the asset vs. fair value (true value) and 2) Time needed to sell. But this is the definition, so in practice?  → Based on the trading volume (access freely). Amihud illiquidity: use trading volume  \* Current ratio; Cash ratio; Maturity: The ability to meet short-term obligation or the liquidity of firm or a bank, not a security   * Government implements its economic policy. |
| Some Facts | \* Bank loans (Private debt)   * Go through the indirect finance * Bank have to screen the borrowers & monitor the lending   \* Bonds (Public debt)   * Go through the direct finance * Traded by many investors   \* In Vietnam, there is problem with public debt  1. **Indirect finance** is more important than direct finance.  2. **Banks are the most important** source of external funds  3. **Stocks are not the most important** source of external financing. → The Pecking Order Theory (Equity is the last resort for the corporation to raise fund)  4. Marketable securities are not the primary source of finance.  → Why is public debt smaller than private debt?   * Liên quan đến vấn đề về asymmetric information * Đối với các công ty lớn, họ có thể thuê rating agencies để đánh giá tín dụng của công ty → Từ đó có thể gọi vốn, đặc biệt là Issuing bond (public debt), và sau thông tư 155 * Đối với các công ty nhỏ, chỉ có cách là được screening - điều này banks làm được → Lý do vì sao bank loans (private debt) lại thịnh hành   → Interest rates for trade credit are higher than bank loans, why does it still exist? (Câu trả lời ở phần sau) |
| Types of financial market | 1. Monetary markets and Capital markets.  2. Debt markets and Equity markets.  3. Primary markets and Secondary markets.  4. Exchanges and Over-the-counter markets.  5. Derivatives Markets |
| **Money Markets**: instruments traded mature in one year or less  **Capital Markets**: includes instruments with maturities greater than one year |
| **Organized exchange**: A **visible marketplace** for secondary market transactions  **Over-the-counter (OTC) market**: Some transactions occur in the OTC market (a telecommunications network) |
| **Debt Markets**: treasury, corporate, mortgage-backed, money market, municipal,...  **Equity Markets**: stock markets |
| **Primary**: corporations raise funds by issuing new securities  **Secondary**: securities are traded among investors after they have been issued |
| Derivatives markets | Options, futures and swaps are securities whose value is **determined**, or **derived directly** from other assets  These can be used to **manage risk** or to **speculate** |
| Types of Stock Market Transactions | **Secondary market**: trading existing stocks  **Primary market**: existing firm issues additional shares  **Initial Public Offering (IPO):**  + privately held company offers stock to the public for the first time  + called “going public” |
| Securities Traded in Financial Markets | Money market securities:   * Money market securities are **debt securities** with a maturity of one year or less   Characteristics:   * Liquid * Low expected return * Low degree of risk |
| Capital market securities:   * Capital market securities are those with a maturity of more than one year * Bonds and mortgages * Stocks   Characteristics:   * Higher expected return * More risk than money market securities |
| Bonds and mortgages:   * **Bonds**: long-term debt obligations issued by corporations and government agencies * **Mortgages**: long-term debt obligations created to **finance the purchase of real estate** * Bonds and mortgages specify the **amount** and **timing** of **interest** and **principal** payments |
| Stocks (equity):   * Certificates representing partial ownership in corporations * Investors may earn a return by receiving **dividends** and **capital** **gains** * Stocks have a higher expected return and higher risk than long-term debt securities |
| Derivative securities:   * **Speculating** with derivatives allow investors to benefit from increases or decreases in the underlying asset * **Risk management** with derivatives generates gains **if the value of the underlying security declines** |
| The importance of financial intermediaries to securities markets | **Obstacles to Matching Savers and Borrowers**  **Transactions costs**: costs of **buying** and **selling** a **financial instrument**.  ⇒ Financial intermediaries reduce transaction costs by exploiting **economies of scale**.  **Information** **costs**: costs to determine the **creditworthiness** and **monitor** the **use of funds.** |
| **Information Problems**  **Asymmetric information**: one party has **better information** than the other.  **Adverse selection**: lender’s problem of **sorting good risks from bad risks**.  **Moral hazard**: (hidden action) is the risk (hazard) that the borrower will **engage in activities that are undesirable** (immoral) for the **lender**. |
| **Adverse Selection**  **Lemon problem**: asymmetric information in a market leads to adverse selection.   * **Raises lending costs**. * In the bond markets lead to **credit rationing**.     \* Buyer: who don’t know which one is lemon, which one is peach → he will propose the expected price → Make the seller A to leave the market  \* Buyer is so smart: Knows that who pick the expected price will be the lemon → The buyer will also leave the market  **How to solve the problems arising from adverse selection?**   * Private production and sale of information * Free-rider problem * Many countries set information disclosure requirements if a firm sells securities. * Financial intermediation * Collateral and net worth   → Credit rationing xảy ra khi nào?   * In crisis * SMEs & Startups: Require collateral, hard to access the bank loans, rely on the trade credit (non-bank loans). Điều này cũng chứng minh vì sao lãi suất của trade credit cao hơn bank loans nhưng mà vẫn tồn tại hình thức này, các công ty này còn tệ đến nỗi không access được bank loans   → Đối với trade credit, tại sao banks không tận dụng luôn khoản này cho vay?   * Vì supplier thì hiểu biết thị trường đang kinh doanh hơn bank * Vì nếu không thể thu hồi được credit, người ta có thể lấy hàng về bán, bank thì không thể |
| **Moral Hazard**  Regulations on reporting by firms reduce the chance of fraud in **equity financing**.  **Principal-agent problem**: managers have different goals than the firm’s owners.  **Moral hazard in debt financing** is reduced with the use of **restrictive covenants.**  → Moral hazard thì chủ yếu là ở equity financing, trong debt financing thì có thể dùng debt contract (debt covenant) để cover  **Principal-Agent Problem: Solutions**   * Monitoring * Government regulation to increase information * Financial Intermediation * Debt Contracts |
|  | **Information Costs and Financial Intermediaries**   * Financial intermediaries **reduce adverse selection** by specializing in **gathering default risk information.** * Banks’ information advantage largely accounts for their role in **providing external financing**   *→ Nhờ khả năng này mà vì sao external lending từ bank lại được ưa chuộng nhiều nhất.*   * Financial intermediaries **deal with moral hazard** through **monitoring**   **Financial Intermediaries and Moral Hazard**   * **Large investors** often have more success in reducing the **free-rider problem**: they have an incentive to closely monitor how agents use their funds * When venture capital firms acquires equity in a new firm, the shares are not marketable to other investors, and the firm avoids the free-rider problem and can profit from its monitoring activities * Private equity or corporate restructuring firms acquire large blocks of equity in mature firms * Financial Intermediaries, like banks, earn a profit by acting as delegated monitors for individual savers |

# Chapter 2: Interest rates

| Chapter preview | 1. Measuring interest rates  2. The behavior of interest rates  3. Risk structure of interest rates  4. Term structure of interest rates |
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| Measuring interest rates | 1. How is YTM measured on credit market instruments?  2. A bond’s interest rate does not necessarily indicate how good an investment a bond is.  3. The distinction between interest rates and returns  4. The distinction between real and nominal interest rates. |
| Interpretation of Interest Rate | Current consumption is preferred to future consumption. A dollar on hand is preferred to a dollar received in the future. → Hiện tại có giá trị hơn tương lai  To induce people to invest their money, investments must offer additional benefits (i.e., risk free rate) → Muốn người ta đầu tư thì phải có thêm lợi ích  Investments are risky. Minor additional benefit is not enough. There must be a **risk premium**. |
| Interest Rate [or (Required) Rate of Return]  = Risk Free Rate  + Risk Premium  + Inflation Premium    Risk free rate: Preference of individuals for cash on hand vs. future income. |
| Each individual requires a different rate of returns on the same assets, based on their level of **risk tolerance**. Highly risk-averse investors require higher returns.  However, many financial assets are traded in the markets. Their prices (and rates of return) are set at the equilibrium of demands and supplies or at arbitrage-free prices.  The rates of return set by the market is called the market rates of return. |
| Interpretation of Present Value | Different debt instruments have very different streams of cash payments to the holder known as **cash flows (CF)**.  All else being equal, debt instruments are evaluated against one another based on the **amount** of each cash flow and the **timing** of each cash flow.  This evaluation, where the analysis of the amount and timing of a debt instrument’s cash flows lead to its yield to maturity or interest rate, is called **present value analysis** |
| Present Value Concept:  Simple Loan Terms | Loan Principal: the amount of funds the lender provides to the borrower.  Maturity Date: the date the loan must be repaid; the Loan Term is from initiation to maturity date.  Interest Payment: the cash amount that the borrower must pay the lender for the use of the loan principal.  Simple Interest Rate: the interest payment divided by the loan principal; the percentage of principal that must be paid as interest to the lender. **Convention is to express on an annual basis, irrespective of the loan term.** |
| Interest rate and time value of money | The future value of PV after n years:   * Interest is paid once per year   \* n: number of years   * Interest is paid **m times** per year      * Interest is paid **continuously**: |
| Yield to Maturity: Loans | Yield to maturity = interest rate that equates today's value with present value of all future payments.  Financial economists consider **YTM the most accurate** measure of interest rate. |
| For a simple loan: PV = FV/(1+i) |
| For a fixed payment loan |
| For a **coupon bond**: |
| For a semi-annual coupon bond: |
| Effective annual rate | Interest rates on loans and saving accounts are usually stated in the **form of an annual percentage rate (APR) with a certain frequency of compounding.**  Ex: A bank quotes an interest of 8% per annum (called simple annual rate) with quarterly compounding. What is the effective annual rate (equivalent annual interest rate)?    \* YTM and interest rates: the frequency of interest payment  \* EAR: equivalent YTM with frequency of interest payment is 1 |
| Continuous compounding rate | Ex: A bank quotes an interest of 8% per annum (called simple annual rate) with quarterly compounding. What is the equivalent rate with continuous compounding? |
| Global perspective- Negative T-bill Rates | In November 1998, rates on Japanese 6-month Treasury bills were negative! Investors were willing to pay more than they would receive in the future.  Why?   1. Real interest rate = Nominal interest rate - Inflation  * When inflation < 0 (Deflation) → Real interest rate will increase  1. No investing:  * No investment opportunity, probability of bankruptcy * Deflation * Custom in Japan, not store money at home due to natural disaster |
| Distinction Between Real and Nominal Interest Rates | **Real interest rate**   * Interest rate that is **adjusted for expected changes in the price level**      * Real interest rate more accurately reflects **true cost of borrowing** * When the real rate is low, there are **greater incentives to borrow** and **less to lend** |
| Distinction Between Interest Rates  and Returns | Rate of Return: we can decompose returns into 2 pieces:    where  = **current yield**, and = **capital gains**. |
| Maturity and the Volatility  of Bond Returns | 1. Only bond whose **return = yield** is one with maturity = holding period  2. For bonds with maturity > holding period, i ↑ P ↓ implying capital loss  → Maturity càng lớn thì interest rate risk càng lớn (Duration)  3. Longer is maturity, greater is price change associated with interest rate change  4. Longer is maturity, more return changes with change in interest rate  5. Bond with high initial interest rate can still have negative return if i ↑ |
| Some conclusions | 1. Prices and returns more volatile for long-term bonds because have higher interest-rate risk  2. No interest-rate risk for only bond whose maturity equals holding period |
| Current Yield | Current yield (CY) is just an approximation for YTM – easier to calculate.  However, we should be aware of its properties:  1. If a bond’s price is **near par** and has a **long maturity**, then CY is a **good approximation**.  2. A change in the current yield always **signals change in same direction** as yield to maturity |
| Yield on a Discount Basis | One-Year Bill (P = $900, F = $1000)    Two characteristics:  1. Understates yield to maturity; longer the maturity, greater is understatement  2. Change in discount yield always signals change in same direction as yield to maturity |
| 2. The behavior of interest rates | Determinants of Asset Demand  Supply and Demand in the Bond Market  Changes in Equilibrium Interest Rates |
| Determinants of Asset Demand | An **asset** is a piece of property that is a store of value. Facing the question of whether to buy and hold an asset or whether to buy one asset rather than another, an individual must consider the following factors:   1. **Wealth**, the total resources owned by the individual, including   all assets   1. **Expected return** (the return expected over the next period) on one asset relative to alternative assets 2. **Risk** (the degree of uncertainty associated with the return) on one asset relative to alternative assets 3. **Liquidity** (the ease and speed with which an asset can be turned into cash) relative to alternative assets |
| Expected Return | The **average of historical returns**: a measure of expected return:    \* Expected return sẽ khác với Realized return    Expected return based on a specific asset pricing model, such as **CAPM**    \* β: Level of risk. β = Cov (Ri; Rm) / Var (Rm)  \* β[E(Rm) - Rf]: Risk premium |
| Standard Deviation | **Standard deviation- general equation**    It’s rarely feasible to specify the full distribution of possible returns and expected variance.   * Must know all possible outcomes & associated probabilities   Instead, analysts usually gather historical data and use these to generate expected return and variance  **Uncorrected sample standard deviation/ standard deviation of the sample**    → Use for sample, population  **Corrected sample standard deviation**    → Use for unbiased  → Total risk: Áp dụng cho đo lường rủi ro, áp dụng cho mọi thứ    → Không lộn giữa systematic risk và total risk |
| Determinants of Asset Demand (2) | The quantity demanded of an asset differs by factor:   1. **Wealth**: Holding everything else constant, an increase in wealth raises the quantity demanded of an asset 2. **Expected** **return**: An increase in an asset’s expected return relative to that of an alternative asset, holding everything else unchanged, raises the quantity demanded of the asset 3. **Risk**: Holding everything else constant, if an asset’s risk rises relative to that of alternative assets, its quantity demanded will fall 4. **Liquidity**: The more liquid an asset is relative to alternative assets, holding everything else unchanged, the more desirable it is, and the greater will be the quantity demanded   mishkin_04t01 |
| Loanable Funds Framework | Let’s consider a one-year discount bond with a face value of $1,000. The return is, then, the bond’s yield to maturity.  Interest rate is determined by bond supply and demand equilibrium. |
| How Factors Shift the Demand Curve  1. Wealth/Saving | - Economy ↑, wealth ↑  - Bd ↑, Bd shifts out to right  OR  - Economy ↓, wealth ↓  - Bd shifts out to left |
| 2. Expected Returns on bonds | - i ↓ in future, Re for long-term bonds ↑  - Bd shifts out to right  OR  - πe ↓, relative Re ↑  - Bd shifts out to right  …and Expected Returns on other assets  - ER on other asset (stock) ↑  - Re for long-term bonds ↓  - Bd shifts out to left  These are closely tied to expected interest rate and expected inflation  \* A change in expected inflation is likely to alter expected returns on physical assets (also called real assets) such as automobiles and houses, which affect the demand for bonds. An increase in expected inflation, say, from 5% to 10%, will lead to higher prices on cars and houses in the future and hence higher nominal capital gains. The resulting rise in the expected returns today on these real assets will lead to a fall in the expected return on bonds relative to the expected return on real assets today and thus cause the demand for bonds to fall.  \* Alternatively, we can think of the rise in expected inflation as lowering the real interest rate on bonds, and the resulting decline in the relative expected return on bonds will cause the demand for bonds to fall. An increase in the expected rate of inflation lowers the expected return for bonds, causing their demand to decline and the demand curve to shift to the left. |
| 3. Risk | - Risk of bonds ↓, Bd ↑  - Bd shifts out to right  OR  - Risk of other assets ↑, Bd ↑  - Bd shifts out to right |
| 4. Liquidity | - Liquidity of bonds ↑, Bd ↑  - Bd shifts out to right  OR  - Liquidity of other assets ↓, Bd ↑  - Bd shifts out to right |
| Summary of Shifts  in the Demand for Bonds | **1. Wealth**: in a business cycle expansion with growing wealth, the demand for bonds rises, conversely, in a recession, when income and wealth are falling, the demand for bonds falls  **2. Expected returns**: higher expected interest rates in the future decrease the demand for long-term bonds, conversely, lower expected interest rates in the future increase the demand for long-term bonds  **3. Risk**: an increase in the riskiness of bonds causes the demand for bonds to fall, conversely, an increase in the riskiness of alternative assets (like stocks) causes the demand for bonds to rise  **4. Liquidity**: increased liquidity of the bond market results in an increased demand for bonds, conversely, increased liquidity of alternative asset markets (like the stock market) lowers the demand for bonds |
| Factors That Shift Supply Curve | mishkin_04t03 |
| 1. Profitability of Investment Opportunities | - Business cycle expansion,  - Investment opportunities ↑, Bs ↑  - Bs shifts out to right |
| 2. Expected Inflation | - πe ↑, Bs ↑  - Bs shifts out to right  \* The real cost of borrowing is more accurately measured by the real interest rate, which equals the (nominal) interest rate minus the expected inflation rate. For a given interest rate (and bond price), when expected inflation increases, the real cost of borrowing falls; hence the quantity of bonds supplied increases at any given bond price.  → Match với cái ở trên là real rate is low, there are greater incentives to borrow |
| 3.Government Activities | - Deficits ↑, Bs ↑  - Bs shifts out to right |
| Summary of Shifts  in the Supply of Bonds | **1. Expected Profitability of Investment Opportunities**: in a business cycle expansion, the supply of bonds increases, conversely, in a recession, when there are far fewer expected profitable investment opportunities, the supply of bonds falls  **2. Expected Inflation**: an increase in expected inflation causes the supply of bonds to increase  **3. Government Activities**: higher government deficits increase the supply of bonds, conversely, government surpluses decrease the supply of bonds |
| **Case: Fisher Effect** | Recall that rates are composed of several components: a real rate, an inflation premium, and various risk premiums.  **Changes in πe: The Fisher Effect**  **- If πe ↑:**  - Relative Re ↓, Bd shifts in to left (do expected return của real asset ↑)  - Bs ↑, Bs shifts out to right (do cost of borrowing ↓)  **- P ↓, i ↑**  mishkin_04F04  **Summary of the Fisher Effect**   * If expected inflation rises from 5% to 10%, the expected return on bonds relative to real assets falls and, as a result, the demand for bonds falls * The rise in expected inflation also means that the real cost of borrowing has declined, causing the quantity of bonds supplied to increase * When the demand for bonds falls and the quantity of bonds supplied increases, the equilibrium bond price falls * Since the bond price is negatively related to the interest rate, this means that the interest rate will rise |
| **Case: Business Cycle Expansion** | Another good thing to examine is an expansionary business cycle. Here, the amount of goods and services for the country is increasing, so national income is increasing.  What is the expected effect on interest rates?   1. Wealth ↑, Bd ↑, Bd shifts out to right 2. Investment ↑, Bs ↑, Bs shifts right 3. If Bs shifts more than Bd   **⇒ P ↓, i ↑**  mishkin_04F06 |
| Case: Low Japanese Interest Rates | In November 1998, Japanese interest rates on six-month Treasury bills turned slightly negative. How can we explain that within the framework discussed so far?   1. Negative inflation lead to Bd ↑ (Do other real assets’ expected return ↓ → Expected return của bond tăng)  * Bd shifts out to right  1. Negative inflation lead to ↓ in real rates (Do real cost of borrowing ↑ → Ít ai muốn đi vay)  * Bs shifts out to left   ⇒ Net effect was an increase in bond prices (falling interest rates).  **⇒ P ↑, i ↓**   1. Business cycle contraction lead to ↓ in interest rates  * Bs shifts out to left * Bd shifts out to left   ⇒ But the shift in **Bd is less** significant than the shift in Bs, so the net effect was also an increase in bond prices.  **⇒ P ↑, i ↓** |
| 3. Risk structure of interest rate | Factors Affecting Risk Structure of Interest Rates.  Credit ratings  Risk Structure of Interest Rate |
| Risk Structure  of Long Bonds in the U.S. | Two important features:   * **Rates** on different bond categories change from one year to the next. * **Spreads** on different bond categories change from one year to the next (The spread between the interest rate on Baa corporate bonds and U.S. government bonds is very large during the Great Depression) |
| Factors Affecting Risk Structure  of Interest Rates | To further examine these features, we will look at 3 specific risk factors.   * **Default Risk** * **Liquidity** * **Income Tax Considerations** |
| Default Risk Factor | * **Default risk**: the issuer of the bond is **unable or unwilling to make interest payments when promised.** * U.S. Treasury bonds have usually been considered to have no default risk because the federal government can always **increase taxes to pay off its obligations** (or just **print money**) **⇒ Default-free bonds.** * The spread between the interest rates on bonds with default risk and default-free bonds, called the **risk premium.** * A bond with default risk will always have a positive risk premium, and **an increase in its default risk will raise the risk premium.** |
| Credit Ratings  → Solution for Adverse selection | - Credit ratings are aimed at reducing information asymmetries by providing information on the rated security  - “A firm’s credit rating reflects a rating agency’s **opinion** of an entity’s overall **creditworthiness** and its **capacity** to satisfy its financial obligations” (Standard & Poor’s, 2002).  - The rating does not provide guidance on other aspects essential for investment decisions, such as market liquidity or price volatility ⇒ bonds with the same rating may have very different market prices.  - Ratings are opinions and not recommendations to purchase, sell, or hold any security. |
| Risk Structure of Interest Rate | Interest rate = Risk Free Rate  + (Inflation Premium)  + Default Risk Premium  + Liquidity Risk Premium  + (Maturity Risk Premium)  + (Tax Discrepancy Premium) |
| 4. Term structure of interest rate | Yield curve  Spot rates and forward rates  Three Facts of the Term Structure of Interest Rates |
| Term structure of interest rate | The **term structure** of interest rates is the **relation between different interest rates for different term-to-maturity loans.**  If we observe r1 = 8%, r2 = 9%, r3 = 9.5%, r4 = 9.75% and r5 = 9.875% then the current term structure of interest rates is represented by plotting these “**spot rates**” against their terms-to-maturity.    The curve plotted through the above points is also called the “yield curve” |
| Spot Rates | - The n-period **current spot rate** of interest denoted rn is the current interest rate (fixed today) for a loan (where the cash is borrowed now) to be repaid in n periods.  - Spot rates are **only determined** from the prices **of zero-coupon bonds** and are thus applicable **for discounting cash flows that occur in a single time period.**  **-** This **differs** from the more broad concept of **yield to maturity**, that is, in effect, an **average rate** used to **discount all the cash flows** of a level coupon bond. |
| Spot rate and YTM | - Yield to maturity is just **a complex, nonlinear “average” of spot rates of interest.**  - Because most of the bond’s cash flow arrives at maturity (the principal), **the T-year spot rate gets the most weight in the yield-to-maturity calculation.**  - High coupon bonds pay a larger percentage of their face value as coupons than low coupon bonds; thus, their yields-to-maturity give **more weight to earlier spot rates**. |
| Forward Rates | The **one-period forward rate** of interest denoted fn is the interest rate (fixed today) for a one period loan to be repaid at some future time period, n.  Eg: the money is borrowed in period n-1 and repaid in period n. Investing $1,000 in the two year zero-coupon bond at r2=9% gives $1,188.10 in 2 years. This is equivalent to investing in the one year bond at 8%, giving $1,080 after 1 year, and then investing in another 1 year bond at X% for the second year to get $1,188.10. Solve for X → The forward rate.  To calculate a forward rate, the following equation is useful:  **1 + fn = (1+rn)n / (1+rn-1)n-1**  where fn is the one period forward rate for a loan repaid in period n  (i.e., borrowed in period n-1 and repaid in period n)   * Calculate f2 given r1=8% and r2=9% * Calculate f3 given r3=9.5% |
|  | * Bonds with identical risk, liquidity, and tax characteristics may have different interest rates because the **time remaining to maturity is different** * Yield curve: a plot of the **yield on bonds (spot rates) with differing terms to maturity but the same risk, liquidity and tax considerations** * Upward-sloping : long-term rates are above short-term rates * Flat: short- and long-term rates are the same * Inverted: long-term rates are below short-term rates |
| Facts Theory of the Term Structure  of Interest Rates Must Explain | 1. Interest rates on bonds of different maturities move together over time  2. When short-term interest rates are low, yield curves are more likely to have an upward slope; when short-term rates are high, yield curves are more likely to slope downward and be inverted  3. Yield curves almost always slope upward |
| Three Theories  to Explain the Three Facts | 1. **Expectations theory** explains the first two facts but not the third  2. **Segmented markets theory** explains fact three but not the first two  3. **Liquidity premium theory** combines the two theories to explain all three facts |
| Expectations Theory | - The interest rate on a long-term bond will equal an average of the short-term interest rates that people expect to occur over the life of the long-term bond    - Buyers of bonds do not prefer bonds of one maturity over another; they will not hold any quantity of a bond if its expected return  is less than that of another bond with a different maturity    - Bonds like these are said to be **perfect substitutes**  Expectations Theory—Example  Let the current rate on a one-year bond be 6%.  You expect the interest rate on a one-year bond to be 8% next year.  Then the expected return for buying two one-year bonds averages  (6% + 8%)/2 = 7%.  The interest rate on a two-year bond must be 7% for you to be willing to purchase it. |
| Expectations Theory | - Explains why the term structure of interest rates changes at different times  - Explains why interest rates on bonds with different maturities move together over time (fact 1)    - Explains why yield curves tend to slope up when short-term rates are low and slope down when short-term rates are high (fact 2)    - Cannot explain why yield curves usually slope upward (fact 3) |
| Segmented Markets Theory | - Bonds of different maturities are **not substitutes at all**  - The **interest rate** for each bond with a different maturity is determined by the **demand** for and **supply** of that bond  - Investors have preferences for bonds of one maturity over another  - If investors have short desired holding periods and generally prefer bonds with shorter maturities that have less interest-rate risk, then this explains why yield curves usually slope upward (fact 3)  → Người ta chuộng mấy cái bond short-term hơn (và less risky hơn) → Demand của short-term bond tăng, supply như cũ → **P ↑, i (short-term bond) ↓** |
| Liquidity Premium &  Preferred Habitat Theories | - The interest rate on a long-term bond will equal an average of short-term interest rates expected to occur over the life of the long-term bond plus a liquidity premium that responds to supply and demand conditions for that bond  - Bonds of different maturities **are substitutes but not perfect substitutes** |
| Preferred Habitat Theory | - Investors have a **preference** for bonds of one maturity over another  - They will be willing to buy bonds of different maturities only if they earn a somewhat higher expected return  - Investors are likely to prefer short-term bonds over longer-term bonds  Mishkin_c06F05 |
| Liquidity Premium and Preferred Habitat Theories, Explanation of the Facts | - Interest rates on different maturity bonds move together over time; explained by the first term in the equation  - Yield curves tend to slope upward when short-term rates are low and to be inverted when short-term rates are high; explained by the liquidity premium term in the first case and by a low expected average in the second case  - Yield curves typically slope upward; explained by a larger liquidity premium as the term to maturity lengthens  (Do cái liquidity premium là compensation cho holding long-term bonds instead of short-term bond → Muốn holding long-term thì lnt phải càng lớn → ilt sẽ tăng → upward)  Mishkin_c06F06 |
| A Closer Look at the Term Structure  *Uses of the term structure* | **Forecast interest rates**   * Pure expectations and liquidity premium theories can be used   **Forecast recessions**   * A flat or inverted yield curve may indicate a recession in the near future since lower interest rates are expected   **Investment decisions**   * Riding the yield curve involves investment in higher-yielding long-term securities with short-term funds (liên quan đến commercial bank) * Financial institutions whose liability maturities are different from their asset maturities monitor the yield curve (mismatch duration)   **Financing decisions**   * Assessing prevailing rates on securities for various maturities allows firms to estimate the rates to be paid on bonds with different maturities (trả lãi suất phù hợp để cấu trúc nợ ổn định cho công ty mà cũng được dân chúng ủng hộ) |
| *Impact of debt management on term structure* | - If the Treasury uses a relatively large proportion of long-term debt, this places upward pressure on long-term yields  - If the Treasury uses short-term debt, long-term interest rates may be relatively low |
| *Historical review of the term structure* | - Early 1980s: downward sloping yield curve  - 1982 to 2001: an upward sloping yield curve generally persisted  - September 11, 2001: investors shifted funds into short-term securities and the Fed provided funds to the banking system, causing the yield curve to become steeper |
|  | 1. Michael D. Bauer and Thomas M. Mertens (2018); “Information in the Yield Curve about Future Recessions”, Working paper 2. De Backer, B., Deroose, M., & Nieuwenhuyze, C. V. (2019). Is a recession imminent? The signal of the yield curve. Economic Review, (i), 69-93.   - Inverted yield curve signal for the recession, not cause the recession   1. Michael: 2. De Backer:   2.1 Monetary policy:   * The tightening monetary policy makes the short-term interest rate ↑ (by reducing the Money Supply) * The objective of tightening monetary policy is to control the inflation * The expected inflation πe ↓ → ER for real assets ↓ → ER for long-term bonds ↑ → Bd↑ * The expected inflation πe ↓ → real cost of borrowing ↓ → Bs ↑ * P ↑ i (long-term bonds) ↓ * Short-term interest ↑ + Long-term interest ↓ ⇒ Inverted yield curve   2.2 Recession:   * The investors will save more → Buy long-term bonds (Saving ↑ → Bd ↑ ) → i long-term ↓ * To finance for the purchase, investors sell short-term bonds → i short-term ↑ * Short-term interest ↑ + Long-term interest ↓ ⇒ Inverted yield curve * Recession expectations dampen the expectation component   The markets expect the central bank can do some policy rate of some time in the future (which is reducing the interest rates) → i short-term will reduce in the future → i long-term will follow and reduce   * And possibly also compress the term premium, “Investors prefer short-term bonds rather than long-term bonds”   Term premium lnt is the compensation for risk-aversion. Rise when recession happen, the large the risk averse = the larger term premium  In the recession, prefer the long-term bonds rather than short-term bonds → lnt ↓  2.3 Can the yield curve cause a recession? Bank profits & self-fulfilling   * The yield curve and bank profit:   Commercial bank industry: Raising short-term funds + Lending long-term assets. But in upward yield curve   * Assets: mortgages, loans → long-term * Liabilities: interest expense → short-term   But for inverted yield curve, the income lower → hurt profitability → banks stop lending (net interest margin ↓) → Tightening the credit → Firms don’t have money to invest → Downturn (Interest rate risk, liquidity risk)   * Self-fulfilling prophecy: Inverted yield curve: early signal → bank tightening the credit standard for lending → lending ↓ → status become worse than before |
| Negative interest rates | Chart, line chart  Description automatically generated |
| How does raising interest rates control inflation? | https://www.youtube.com/watch?v=R8VBRCs2jTU |

# Chapter 3: Money Markets

| Chapter Preview | 1. The Money Markets Defined  2. The Purpose of Money Markets  3. Who Participates in Money Markets?  4. Money Market Instruments  5. Comparing Money Market Securities |
| --- | --- |
| The Money Markets | - Money market securities are usually sold in **large denominations** ($1,000,000 or more)  - They have **low default risk**  - They mature in one year or less from their issue date  Money (currency) is not actually traded in the money markets. The securities in the money market are short term with high liquidity; therefore, they are close to being money. |
| Why Do We Need Money Markets? | - The banking industry should handle the needs for short-term loans and accept short-term deposits. Banks also have an information advantage on the creditworthiness of participants.  - Banks do mediate between savers and borrowers; however, they are heavily regulated. **This creates a distinct cost advantage for money markets over banks.** |
| The Money Markets Defined:  Cost Advantages | - Reserve requirements create additional expense for banks that money markets do not have  - Regulations on the level of interest banks could offer depositors lead to a significant growth in money markets, especially in the 1970s and 1980s. When interest rates rose, depositors moved their money from banks to money markets to earn a higher interest rate. |
| The Purpose of Money Markets | - Investors in Money Market: Provides a place for warehousing surplus funds for short periods of time.  - Borrowers from money market provide low-cost source of temporary funds.  - Corporations and U.S. government use these markets because the timing of cash inflows and outflows are not well synchronized. Money markets provide a way to solve these cash-timing problems. |
| Who Participates  in the Money Markets? | mishkin_09t02 |
| Money Market Instruments | - Treasury Bills  - Federal Funds  - Repurchase Agreements  - Negotiable Certificates of Deposit  - Commercial Paper  - Banker’s Acceptance  - Eurodollars |
| Treasury Bills | T-bills have 28-day maturities through 12- month maturities.  **Discounting**: When an investor pays less for the security than it will be worth when it matures, and the increase in price provides a return.  Treasury Bills Discounting Example    You pay $996.37 for a 28-day T-bill. It is worth $1,000 at maturity. What is its discount rate?      You pay $996.37 for a 28-day T-bill. It is worth $1,000 at maturity. What is its annualized yield? |
| Treasury Bill Auctions | T-bills are auctioned to the dealers every Thursday.  The Treasury may accept both **competitive** and **noncompetitive** bids, and the price everyone pays is the highest yield paid to any accepted bid.  Treasury Bill Auctions Example  The Treasury auctioned $2.5 billion par value 91-day T-bills, the following bids were received:  Bidder Bid Amount Bid Price  1 $500 million $0.9940  2 $750 million $0.9901  3 $1.5 billion $0.9925  4 $1 billion $0.9936  5 $600 million $0.9939  The Treasury also received $750 million in noncompetitive bids. Who will receive T-bills, what quantity, and at what price?  The Treasury accepts the following bids:  Bidder Bid Amount Bid Price  1 $500 million $0.9940  5 $600 million $0.9939  4 $650 million $0.9936  Both the competitive and noncompetitive bidders pay the highest yield – based on the price of 0.9936.  Noncompetitive: Giá nào cũng đồng ý mua → Mua trước → Xếp đầu tiên  Tất cả sẽ mua với giá của highest yield (= lowest price), tức là giá 0.9936  → Giá trúng thầu là giá thấp nhất → Áp dụng cho tất cả |
| Fed Funds | Short-term funds transferred (loaned or borrowed) between financial institutions, usually for a period of one day.  **Used by banks** to **meet short-term needs to meet reserve requirements.** |
| Repurchase Agreements | These work similar to the market for fed funds, but **nonbanks can participate**.  A firm sells Treasury securities **(a safe asset)** but agrees to **buy them back** at a certain date (usually 3–14 days later) for a certain price.  This set-up makes a repo agreement essentially a **short-term collateralized loan**.  This is one market the **Fed** may use to **conduct its monetary policy**, whereby the Fed purchases/sells Treasury securities in the repo market. |
| Negotiable Certificates of Deposit  Chứng chỉ tiền gửi khả nhượng | A **bank-issued security** that **documents a deposit** and specifies the interest rate and the maturity date  Denominations range from $100,000 to $10 million |
| Commercial Paper  Thương phiếu | **Unsecured promissory notes**, **issued by corporations**, that **mature in no more than 270 days.**  The use of commercial paper increased significantly in the early 1980s because of the rising cost of bank loans. |
| Banker’s Acceptances  Chấp phiếu ngân hàng.  Ngân hàng đứng ra trả tiền trong giao dịch quốc tế | An **order to pay** a specified amount to the bearer on a given date if specified **conditions have been met**, usually delivery of promised goods.  These are often used when buyers / sellers of **expensive goods** live in different countries.  **Banker’s Acceptances Advantages**   * Exporter paid immediately → Đáp ứng được điều kiện (=giao hàng xong) thì được nhận tiền ngay * Exporter shielded from foreign exchange risk * Exporter does not have to assess the financial security of the importer * Importer’s bank guarantees payment * Crucial to international trade   As seen, banker’s acceptances avoid the need to establish the creditworthiness of a customer living abroad.  There is also an **active secondary market** for banker’s acceptances until they mature. The terms of note indicate that the bearer, whoever that is, will be paid upon maturity. |
| Eurodollars | Eurodollars represent **Dollar denominated deposits held in foreign banks**.  The market is essential since many foreign contracts call for payment is U.S. dollars due to the stability of the dollar, relative to other currencies.  The Eurodollar market has continued to grow rapidly because **depositors receive a higher rate of return on a dollar deposit** in the Eurodollar market than in the domestic market.  Multinational banks are not subject to the same regulations restricting U.S. banks and because they are willing to accept narrower spreads between the interest paid on deposits and the interest earned on loans. |
| Eurodollars Rates | **London interbank bid rate (LIBID)**   * The rate paid by banks **buying funds**   **London interbank offer rate (LIBOR)**   * The rate **offered for sale** of the funds   **Time deposits with fixed maturities**   * **Largest short-term** security in the world |
| Money Market Securities and Their Depth |  |
| Money Market Mutual Funds | Based on Kacperczyk2013, compare Reserve Primary Fund and Fidelity Institutional Prime Money Market Fund and explain why Reserve Primary Fund collapsed. |

# Chapter 4: Bonds markets

| Chapter outline | 1. Overview of the bond market  2. Key characteristics of bonds  3. Bond valuation  4. Interest rate risk of bonds  5. Other risks of bonds |
| --- | --- |
| Overview of the bond market | Bonds: represent a debt owed by the issuer to the investor; obligate the issuer to pay specified amounts at given dates.  Types: coupon bond, zero-coupon bond, step-up note, floating-rate bond.  **Primary** market trading: uniform-price auction, multi-price auction, competitive auction, non-competitive auction, syndication, underwriting, tap sales, private placement.  **Secondary** market trading: spot trade, repo,… |
| Key Characteristics of Bonds | Par value: face amount; paid at maturity. Normally in denominations of  $1,000.  Coupon interest rate: stated annual interest rate on a bond. Multiply by par value to get the annual interest payment (coupon payment). Most bonds have a fixed coupon rate.  Maturity date: a specified date on which the par value is repaid.  Term to maturity: the length of time until maturity date.  Payment pattern: the frequency of the interest payments. Most bonds in the U.S. pay interest **semiannually**.  Bond ratings: ratings on corporate bonds that provide an indication of  default risk.  Current yield: the ratio of the annual interest payment to the bond’s market price. iCY = Coupon / Price |
| Special Types of Bonds | Zero coupon bond: a bond that pays no annual interest; it provides compensation to investors in the form of **capital appreciation**.  Floating rate bond: a bond whose coupon rate fluctuates with shifts in the general level of interest rates. |
| Yield-to-Maturity | Yield to maturity (YTM): the rate of return earned on a bond held to maturity.  It is the discount rate that **equates the present value of the future cash flows with the current market price of the bond.**  Represents investor’s total return from settlement day until security expiration  **Allows investors to compare bonds with different maturities and coupon rates via internal rate of return calculations**  Bond yields inversely related to bond prices  Common maturities:  + short term: up to five years  + medium term: 5-12 years  + long term: 12 or more years |
| Government Bonds | Low risk, high liquidity, low interest rate.  Treasury notes, bonds.  Municipal bonds.  Treasury Inflation-Indexed bonds.  Strips (Treasury Separate Trading of Registered Interest and Principal Securities). |
| Corporate Bonds: | * Bearer/ Registered Bonds/Indenture * Sinking-Fund Provision. * Restrictive Covenants. * Call Provisions. * Bond Collateral. * Variable Rate Bonds. * Convertibility. * Junk bonds |
| Characteristics of Corporate Bonds | **Bearer bonds**  Payments were made to whoever had **physical possession** of the bonds. Bonds were sold with attached coupons.  The owners of the bonds clipped and mailed the coupons to the firm to receive payment  **Registered Bonds**   * **Replaced “bearer”** bonds. * **Do not have coupons** * The owners register with the firm to receive interest payment. * IRS can track interest income this way   → Hai loại này chỉ khác biệt trong tư cách người sở hữu và nhận coupon payment  **Bond Indenture/ Trust Deed: Văn bản các factors của trái phiếu**  - A **legal contract** that describes the **form** of the bond, the **obligations** of the **issuer** and the **rights** of the **holders**.  → Use to monitor  **Restrictive Covenants**   * Included in bond indenture * Rules and restrictions on managers designed to protect the bondholders’ interest. * May limit dividends, new debt, ratios, financial policies, etc. * Interest rate will be lower for more restrictive conditions because the bonds will be considered safer by buyers. (càng nhiều điều khoản trói buộc thì càng safer, interest rate càng lower)   **Collaterals:**   * Assets or financial guarantees underlying the debt obligations and beyond the issuer’s promise to pay.   **Credit enhancements:**   * A variety of **provisions** that can be used to **reduce the credit risk** of a bond issue. * Internal credit enhancements (ví dụ: sinking fund) * External credit enhancements (ví dụ: L/C; over-collateral,...)   **Call provisions:**   * The issuer has the **right to force the bond holders to sell the bond back** ⇒ Callable bond * Là right đối với issuer nhưng là obligation đối với holder      * **Most** corporate **indentures** include a call provision. * If **interest rates fall** enough, the price will rise above the call price, and the firm will call the bond. * Call provisions **put a limit** on the amount that bondholders can earn from the **appreciation of a bond’s price** ⇒ Investors do not like call provisions.   \* Reasons for why the investors do not like call provisions:   * Reason 1: Control the interest rate risk   + Buy back the callable bonds  + Issue the new bonds   * Reason 2: The restrictive covenants can prevent the firm from participating in investments   → The call provision eliminates the restrictive covenants → More flexible for firm in investing   * Reason 3: The debt-equity structure:   → Reduce the debt the firm’s holding   * Reason 4: With call provision, issuer can gain more   → Lower interest rate → Higher bond price, which is higher than the call price → Call back at the call price and sell later at bond price → More profit   * Reason 5: ROE   + Total assets ↓ → ROE ↑  **Sinking fund:**   * A requirement in the bond indenture that the **firm pay off a portion of the bond issue** each year. * Funds set aside by the issuer to ensure the firm is able to redeem the bond at maturity. * Reduce the probability of default when the issue matures.   **Conversion:**   * The bond can be converted into certain number of common shares at the **discretion of the bondholder** ⇒ Convertible bond * Similar to a stock option, but usually more limited. * Issuing convertible bonds is one way that firms **avoid sending negative signal** to the market (if managers believe that the firm will perform well in the future, they can issue convertible bonds. If the managers are correct and the stock price rises, the bondholders will convert to stocks. Alternatively, bondholders have the option not to convert if managers turn out to be wrong).   \* Considered as back door for stock issuance  \* Bondholder has the right to convert bond into stock (Convert/Not convert)  → When the bondholder decides to change from the debt to the equity? - When the growth of the firm or the stock prices rise.    **Junk Bonds:**   * Debt that is rated **below BBB** * Often, **trusts and insurance companies are not permitted** to invest in junk debt * Michael Milken developed this market in the mid-1980s, although he was convicted of insider trading |
| 3. Bond valuation | 1. Bond valuation  2. Dynamics Behavior of Bond Prices |
| Bond Valuation | The value of a bond is a function of:   * Par value * Term to maturity * Coupon rate * Investor’s required rate of return (discount rate is also known as the bond’s yield to maturity)   **Annual coupon bond:**    **Semiannual coupon bond**    **Zero - coupon bond:** |
| Conventions for Quotes and  Calculations | When investors purchase shares, they pay quoted price.  For bonds, however, there can be a difference between the quoted price and the price paid.  → Giá ghi trên sàn giao dịch là **Flat price**  **Full Price = Flat price + Accrued Interest.**  The flat price is called the quoted or “clean price.  The full price is called the invoice or “dirty” price. |
| Flat price, Accrued Interest and Full Price | The **flat price** is usually quoted by dealers.  If a trade takes place, the accrued interest is added to the flat price to obtain the full price paid by the buyer and received by the seller on the settlement date.  The settlement date is when the bond buyer makes cash payment and the bond seller deliver securities.  To avoid misleading investors about the market price trend for the bond. |
| Accrued Interest | Accrued interest is the **proportional share of the next coupon payment**. Assume that the coupon period has T days between payments dates and that t days have gone by since the last payment.  The accrued interest: **AI= t/T \* PMT.**  The AI part of the full price does not depend on the YTM  → AI tăng theo thời gian, nhưng không bị gây ra bởi lãi suất  The two most common day-count conventions are actual/actual and 30/360.  For example, a semiannual coupon bonds pays interest on 15 May and 15 November. Settlement date= 27 June.  The actual/actual day- count convention t=43, T=184  The 30/360 count convention t= 15+27=42, T=180 |
| Dynamics Behavior of Bond Prices | * Factors Affecting Bond Prices * Time and bond prices * Interest rate changes and bond prices ⇒ Interest rate sensitivity |
| Factors Affecting Bond Prices  & Time and Bond prices | The relationship between the coupon rate and the bond’s yield-to-maturity (YTM) determines if the bond will sell at a premium, at a discount, or at par |
| Some findings | Bond prices are subject to the effects of both the **passage of time** and the **changes in interest rates**.  Bond prices **converge** to the bond’s face value due to the time effect, but simultaneously move up and down due to unpredictable changes in bond yields. |
| Interest rate sensitivity and maturity | Bond prices are sensitive to the market interest rate  If interest rates rise, the market value of bonds fall in order to compete with newly issued bonds with higher coupon rates.  Sensitivity to the interest rate chance becomes more severe for longer term bonds.  **Percentage rise in price is not symmetric with percentage decline** |
| Sensitivity and coupon/YTM | Bonds with identical maturities will respond differently to interest rate changes when the coupons differ **⇒ Sensitivity is inversely related**  **to bond’s coupon rate**  Sensitivity is inversely related to the current level of the yield to maturity   * Explained by analyzing the duration later   ⇒ In summary, the magnitude of the sensitivity or interest rate risk is affected by **the maturity, coupon rate, and yield to maturity of bonds** |
| Interest rate risk | Interest rate risk/sensitivity = **Duration**.   * Longer maturity ~ greater duration. * Lower coupon rate ~ greater duration. * Lower market rate or YTM ~ greater duration. |
| Duration | {Big bracket\*1/P} is called Macaulay Duration: **present-value weighted average maturity of cashflow.**    Modified Duration (more precise).    A security’s duration is computed as:     * Where Ct is the cash flow on date t, PV(Ct ) is its present value (evaluated at the bond’s yield), and P = ΣtPV(Ct ) is the total present value of the cash flows * Therefore, the duration weights each maturity t by the percentage contribution of its cash flow to the total present value, PV(Ct) ∕ P.   %Price change = - MD/(1+y)\*change in y\*100  Modified Duration = MD/(1+y)    %Price change = -MoD \*change in y\*100 |
| Interpretation of duration | The ***duration of a bond is a linear approximation of minus the percent change in its price given a 100 basis point change in*** interest rates.  (100 basis points = 1% = 0.01)  For example, a bond with a duration of 7 will gain about 7% in value if interest rates fall 100 bp. |
| Features of Duration | All else being equal, the longer the term to maturity of a bond, the longer its duration.  All else being equal, when interest rates rise, the duration of a coupon bond falls.  All else being equal, the higher the coupon rate on the bond, the shorter the bond’s duration. |
| A General Formula for Duration | The **Duration** of a **Zero-Coupon Bond equals its time to maturity**  The Duration of a **Consol Bond** (Perpetuities): **MD= 1 + 1/r** |
| Interpretation of duration | Interest Rate Risk Measurement: Duration   * Duration and Interest Rate Sensitivity: ***If r, the APR used to discount a stream of cash flows, increases to r + ε, where ε is a small change, then the present value of the cash flows changes by approximately:***     Where *k* is the number of compounding periods per year of the APR |
| Convexity | → Help to estimate closely to the correct |
| Effective Duration and Convexity | Effective Duration: similar to MoD, but note that for the correct estimate, should be small change    %Price change = -Duration\* \*100.  Effective Convexity    %Price change = -Duration\*  \*100 + C\* |
| Cautions on Using duration | Traditional and Effective Durations (and Convexity) is not very different for straight bond.  **Don’t use traditional duration/convexity for complex structured fixed-income** securities whose cash-flows are not really “fixed” (i.e., bond with call option-embedded option bond, MBS,…).  Only use Duration to estimate price change for one-time immediate parallel shift in the yield curve.  Duration changes when time passes. |
| Duration of a portfolio of bonds | Duration of a portfolio of bonds = **market value weighted average** of duration of all bonds in that portfolio. |
| Duration-Based Hedging | If the market value of a firm’s assets and liabilities are affected by changes in interest rates, the firm’s **equity value will also be affected**.   * The firm’s sensitivity to changes in interest rates can be measured by computing the duration of its assets and liabilities.   Savings and Loans: An Example   * When the durations of a firm’s assets and liabilities are significantly different, the firm has a **duration mismatch**. * This mismatch puts the S&L at risk if interest rates change significantly.   Banks hold short-term deposits (checking and savings accounts, certificates of deposit, etc.) and make long-term loans (car loans, home mortgages, etc.).   * Assets have longer duration (or maturity) than liabilities, and therefore are **less liquid duration mismatch** (thời hạn hoàn trả vốn của KH đi vay cho NH sẽ ngắn hơn thời hạn hoàn trả vốn của NH cho các khoản vay) * For **banks an excessive maturity mismatch is desirable**-especially when the yield curve is positively sloped and longer-term interest rates are well above short-term rates-because it increases profitability.   → Trong trường hợp lãi suất tăng, các khoản vay của NH phải trả trong ngắn hạn sẽ tăng, nhưng tài sản của NH trong dài hạn không tăng tương ứng → giảm lợi nhuận   * For the financial system, maturity transformation is undesirable because it could create a liquidity crisis threatening the existence of the bank and undermine the confidence in the banking system. |
| Savings and Loans: An Example | * The duration of a portfolio of investments is the value-weighted average of the durations of each investment in the portfolio. * A portfolio of securities with market values A and B and durations DA and DB, respectively, has the following duration:     The duration of Acorn’s assets is:    The duration of Acorn’s liabilities is:    The duration of Acorn’s equity is calculated as:     * Therefore, if interest rates rise by 1%, the value of Acorn’s equity will fall by about 40%. * This decline in the value of equity will occur as a result of the value of Acorn’s assets decreasing by approximately $16 million, while the value of its liabilities decrease by only $9.9 million. Acorn’s market value of equity therefore declines by $6.1 million or 40.67%. * 5.33% × $300 million = $16 million * 3.47% × $285 million = $9.9 million   ⇒ ($16 million – $9.9million) ∕ $15 million = 40.67%   * To fully protect its equity from an overall increase or decrease in the level of interest rates, Acorn needs an **equity duration of zero**. * A portfolio with a zero duration is called a **duration-neutral portfolio** or an **immunized portfolio**, which means that for small interest rate fluctuations, the value of equity should remain unchanged. * Adjusting a portfolio to make its duration zero is referred to as **immunizing the portfolio**. * To make its equity duration neutral, Acorn must **reduce the duration of its assets** or **increase the duration of its liabilities**. * The firm can lower the duration of its assets by **selling some of its mortgages in exchange for cash**.      * Acorn would like to reduce the duration of its equity from 40.7 to 0. * Because the duration of the mortgages will change from 8 to 0 if the S&L sells the mortgages for cash, Acorn must sell $76.3 million worth of mortgages.   (40.7 – 0) × 15 ∕ (8 – 0) = $76.3   * If it Acorn does so, the duration of its assets will decline to:      * Thus the equity duration will fall to:     **⇒ Immunizing the portfolio** |
| A Cautionary Note | Duration matching has some important **limitations**.   * **The duration of a portfolio depends on the current interest rate.** * As interest rates change, the duration of the portfolio changes.   ⇒ Maintaining a **duration-neutral portfolio** requires **constant adjusting as interest rates change**. |
| Silicon Valley Bank failure | **A massive expansion of “hot money” deposits and investments in long-term securities**  The year 2021 saw the raising of enormous capital for start-ups through Venture Capital firms.  The deposit growth rate was about **280%**, compared with **30% for all the insured banks**.  **→ SVB was flooded with deposits, primarily from start-up and tech companies concentrating in a unique client/deposit base and mainly uninsured deposits**, and thus exposing itself to **concentration risk**.  SVB invested mainly in **longer-term, higher yielding government** and **government agency mortgage-backed securities**, like Fannie Mae and Freddie Mac.  Investments in securities are typically classified in the balance sheet, for accounting purposes, as a) held-to-maturity and b) available-for-sale.  Interest rate hikes → the fair value went down → The unrealized loss  Typically, the decline in value is not a major issue, unless due to **liquidity problems** **the bank is forced to sell part of the portfolio**. The unrealized loss would have been much lower if SVB had invested in shorter maturities, like into two-year notes or less, since longer-term securities are more sensitive and more exposed to rising interest rate.  *→ Deposit quá lớn, khách hàng thì chỉ một tệp lớn, nhưng lại tập trung đầu tư vào long-term government bond. Khi interest rate tăng thì those long-term bond sẽ chịu interest rate risk nặng*  **The impact of higher interest rates, adverse market conditions and the Bank Run**  Associated with the rise in interest rate was a weakening of the economic environment and as market conditions worsened and firms-**mainly start-ups- required more working capital** (cash), **deposit withdrawals escalated**.  In an attempt to meet depositors’ claims for cash, and improve  the **bank’s liquidity profile**, SVB was forced to sell $21 billion from the $26 billion of its available-for-sale securities portfolio, and, given the inversion of the yield curve, it had to incur a vast loss of $2 billion. Following this sale and **to strengthen its balance sheet**, SVB announced an unsuccessful sale of $2.25 billion worth of stock shares  *→ Improve the bank's liquidity profile, was forced to sell a part of portfolio as a lost*  *→ Bank runs*  \* The failure of SVB:   * **The concentration risk**: KH không phân bổ mà tập trung vào 1 tệp (startup), đặc biệt là giai đoạn Covid-19 * **The interest rate risk**: Lãi suất tăng, giá trị giảm (unrealized loss) → Bán mà phải chịu lỗ * **The liquidity risk**: Người ta lo sợ, kéo nhau đi rút tiền → Bank run   → Cần phân tán tệp KH để reduce risk |
| Other risk of bonds | **Reinvestment Risk**   * Contraction risk. * Extension risk.   Interest rate giảm → Interest rate risk giảm, reinvestment risk tăng: Giá trị tài sản tăng, tuy nhiên không thể tái đầu tư với cùng mức lợi nhuận như trước đó  Interest rate tăng → Interest rate risk tăng, reinvestment risk giảm: Giá trị tài sản giảm, tuy nhiên tái đầu tư tiền lãi với lãi suất cao hơn |
| **Credit Risk**   * Default risk. * Credit spread risk. * Downgrade risk. |
| Reinvestment Risk | The risk that CFs will have to be **reinvested in the future at lower rates, reducing income.**  Illustration: Suppose you just won $500,000 playing the lottery. You’ll invest the money and live off the interest. You buy a 1-year bond with a YTM of 10%.  Year 1 income = $50,000. At year-end get back $500,000 to reinvest.  If rates fall to 3%, income will drop from $50,000 to $15,000. Had you bought 30-year bonds, income would have remained constant.  Long-term bonds: High interest rate risk, low reinvestment rate risk.  Short-term bonds: Low interest rate risk, high reinvestment rate risk.  Low coupon bonds have less reinvestment rate risk but more price risk than high coupon bonds  → Lower coupon rate thì higher duration = higher interest rate risk (lower price risk) & lower reinvestment risk when compared to high coupon bonds |
| Other risk of bonds | * Inflation Risk * Exchange Rate Risk * Liquidity Risk |

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# Chapter 5: The stock market

| Chapter outline | 1. Overview of equity market  2. Some trading regulations in HOSE  3. Margin Trading  4. Market Efficiency |
| --- | --- |
| Overview of stock market | * Stocks: represent ownership of a firm's net assets. * Common stocks versus preferred stocks. * **Primary market trading:** Public offerings and private placements. * **Secondary market trading:** * Exchanges and over-the-counter markets. * Quote-driven markets and order-driven markets.   \* Phân biệt: Dựa trên cách xác định giá cả và quy trình giao dịch   * Quote-driven market: Dựa trên giá được báo của market makers hoặc brokers, những người này sẵn sàng mua bán dựa trên giá đã báo. Thị trường trái phiếu, ngoại tệ và OTC market * Order-driven market: Dựa trên lệnh mua và bán của các NĐT, khớp lệnh dựa trên nguyên tắc đồng giá và ưu tiên về thời gian. Thị trường chứng khoán truyền thống |
| Trends in Long-Term Financing | Each year, the manager must answer the questions:   * Should we finance this year’s long-term projects with debt or equity? * Should we ration our capital and finance only the most attractive projects with this year’s addition to retained earnings?   After the decision is made, the manager must decide the external funds, if any, it will raise this year.   * Internally generated funds * Short-term and long-term borrowing. * Selling equity * Staying Private * Going public |
| Primary Markets- Issuing Equity | **Staying private**   * Right Offering to Current Shareholders * Private Placement of Equity * Merger or Acquisition   **Going public:**   * IPO (Initial Public Offering) * Seasoned Equity Offerings (Right offerings, Public offerings) * Private Placement of Equity * Merger or Acquisition |
| Private Placement of Equity | A **private placement** raises funds by allowing **outside private investors to purchase shares** in the firm.  This may be difficult because new investors may want to examine the original owner’s motives and question their ability.  To **limit cost** and **ensure the compatibility** of the new owners, current shareholders may seek **possible investors among their friends, relatives, and other contacts.**  Another possibility can be to seek financing from venture capitalists, who invest funds in private companies in return for ownership shares. |
| Merger or Acquisition | Another way to raise money is by selling all or part of the firm to another corporation.  Acquisitions **can be negotiated** to **allow the firm’s managers to retain their current position** or to **receive lucrative consulting contracts**.  Another advantage to a merger or acquisition is when the investor is a large corporation with **deep pockets** and a willingness to help the firm **grow**.  The drawback to a merger or acquisition is a **loss of control**. |
| Rights offering | Rights offering allows the firm’s **current shareholders to purchase additional shares in proportion to their current ownership.**  So that the original shareholders **remain in control** of the firm while raising the needed equity capital.  It was very popular among U.S. public corporations but have become infrequent during the 1980s and 1990s, but remains quite popular in Europe, Asia and Vietnam  The advantage of this method is that the current set of shareholders can remain in control.  However, as a group, the shareholders may not be able to raise the needed funds, leading to a failure of the rights offering. |
| Public offerings | Corporations contract with an investment bank to help them sell securities to the public. |
| Organized Securities Exchanges | The New York Stock Exchange (NYSE)   * Largest stock exchange—over 3,025 companies * Accounts for 90% of stocks traded on exchanges * Specialists make transactions in key stocks * Strictest listing policies   The American Exchange (AMEX)   * Second largest stock exchange—about 800 companies and 4% of stocks traded on exchanges * Major market for Exchange Traded Funds * Typically smaller and younger companies who cannot meet stricter listing requirements for NYSE   Hochiminh Stock Exchange (HOSE)  Hanoi Stock Exchange (HNX)  Regional Stock Exchanges   * Typically lists between 100–500 companies * Most listed stocks also listed on NYSE or AMEX * Best-known: Chicago, Pacific, Philadelphia, Boston, and Cincinnati   Options Exchanges   * Allows trading of options * Best-known: Chicago Board Options Exchange (CBOE)   Futures Exchanges   * Allows trading of financial futures (discussed in Chapter 15) * Best-known: Chicago Board of Trade (CBT) |
| Over-the-Counter (OTC) Market | Nasdaq:   * Electronic network that connects OTC dealers with buyers and sellers * About 7,000 stocks trade on the Nasdaq * Both IPOs and secondary distributions are sold on OTC   **UPCOM**  **Bid Price:** the **highest price offered by market maker to purchase** a given security  **Ask Price:** the **lowest price at which a market maker is willing to sell** a given security |
| 2. Some trading regulations in HOSE | Types of orders  Order matching methods  - **Periodic** order matching  - **Continuous** order matching |
| Limit order | The buy/sell order at a certain price or better.   * Buy 1000 shares of DHG at VND 109.000 → The investors are willing to buy at VND 109.000 or less * Sell 1000 shares of DHG at VND 109.000 → The investors are willing to sell at VND109.000 or more |
| Order which is executed at the opening order matching price (ATO) | ATO is a buy or sell order that is to be **matched at the opening price** → Used for opening session  ATO orders receive **higher priority than limit orders** when comparing to match.  ATO orders are **entered** into the trading system in time for periodic order matching to **determine the opening price** and will be **automatically cancelled at the end of the opening session if they are not executed or partially matched.** |
| Order which is executed at the closing order matching price (ATC) | Similar to the ATO order but applied in time for periodic order matching to determine the **closing price**. |
| Market order (MP) | Is a buy/sell order to be executed at **lowest offer price/ highest bid price**  Once inputting into the trading system, the MP sell order will **be immediately executed** at the lowest offer price and the MP buy order will **be immediately executed** at the highest bid price.  In case the MP order is **not fully matched**, the MP order will be considered as **buy order at a higher price** or **sell order at lower price** and **continue to match**.  The **MP order is valid in continuous order-matching sessions** only.  The MP order will be **automatically cancelled** if there is **no corresponding limit order at the time the MP order is input into the trading system** |
| Stop orders | Stop orders are like limit orders because the trade is not executed unless the stock hits a specific price determined by the investor.  A stop-loss order means the stock should be sold if it **falls below a price that has been designated by the investor**, to prevent greater loss from happening.  Stop-buy orders tell a broker to purchase shares when the price **rises above a given limit.**  Stop-buy orders are often accompanied by **short sales**, which are the sales of securities that are borrowed from a broker. |
| Order matching methods: | Periodic order matching-call markets  Continuous order matching-continuous trading markets |
| Matching principles | **Price Priority:**  - **Buy** orders at a **higher price** will take precedence.  - **Sell** orders at a **lower price** will take precedence.  **Time Priority:**  - In case buy or sell orders at the same price, those which entered into the trading system **earlier** will take precedence in execution. |
| Periodic order matching- call market | The method is made on the basis of comparing buy orders and sell orders of stocks in a specified time. Principles to determine the price as follows:  **- The executed price that reaches largest transaction volume.**  - If more than one price satisfies the above condition, the price which is similar or closest with nearest matching order price will be selected. |
| Continuous order matching | The method is made on the basis of comparing buy orders and sell orders immediately when they are inputted into the trading system. |
| Margin trading | * Using only a portion of the proceeds for an investment * Borrow remaining component * Margin arrangements differ for stocks and futures |
| Stock Margin Trading | Greatest margin   * Currently 30% * Set by the securities companies   Minimum margin   * Minimum level the equity margin can be (called “maintenance” in USA)   Margin call   * Call for more equity funds |
| Margin Trading | Advantages   * Allows use of financial leverage * Magnifies profits   Disadvantages   * Magnifies losses * Interest expense on margin loan * Margin calls |
| Margin Formulas | **Basic Margin Formula**    Example : buy 100 shares of stock at $40 per share, initial margin requirement is 70%. What happens when stock price moves to $65?    **Return on Invested Capital**    Example: buy 100 shares at $50 each, expect the price to rise to $75 in 6 months. Stock pays $2/share annual dividends. You can buy on 50% margin with 10% annual interest rate on the loan. What is the expected return on invested capital? |
| Leverage ratio | **The leverage ratio is the ratio of the value of the position to the value of the equity investment in it.**  The leverage ratio indicates how many times larger a position is than the equity that it supports to.  **Maximum leverage ratio = 1/minimum margin requirement** |
| Short Sales | Purpose: to profit from a decline in the price of a stock or security  **Mechanics**   * Borrow stock through a dealer * Sell it and deposit proceeds and margin in an account * Close out the position: buy the stock and return it to the owner |
| Short Selling | Advantages   * Chance to profit when stock price declines   Disadvantages   * **Limited return opportunities**: stock price cannot go below $0.00 * **Unlimited risks**: stock price can go up an unlimited amount * If stock price goes up, short seller still needs to buy shares to pay back the “borrowed” shares to the broker * Short sellers may not earn dividends |
| Efficient market hypothesis | In this section “efficiency” implies external/ information efficiency.  In an efficient market, securities market prices **incorporate all available information**.  **Market prices reflect intrinsic values**.  As new information comes randomly, estimates of intrinsic value change, securities prices are not predictable. Investors cannot consistently earn returns higher than the average market return.    Notice that the level/degree/form of efficiency in a market depends on two dimensions:  1. The **type of information incorporated into price** (which information is “available”?).  2. The **speed with which new information** is incorporated into price (how fast information is “reflected”?).  → Efficiency of market: xét dựa trên loại thông tin nào phản ánh trong giá và tốc độ mà thông tin được thể hiện qua giá:   * Loại thông tin: * Weak form: past price, past trading volume * Semi-strong form: all public information * Strong form: all public & private information * Thời gian |
| Market reaction to news |  |
| The Different Types of Efficiency | Weak Form → Weak efficient market   * Security prices reflect all information found in past prices and volume.   Semi-Strong Form → Semi-strong efficient market   * Security prices reflect all publicly available information.   Strong Form → Strong efficient market   * Security prices reflect all information—public and private → Insider trading cũng không thể được lợi |
| Weak Form Market Efficiency | Security prices reflect all information found in past prices and volume.  Often weak-form efficiency is represented as  **Pt = Pt-1 + Expected return + random error t**  Since stock prices only respond to new information, which by definition arrives randomly, stock prices are said to follow a **random walk.**  Price reflects all information contained in market trading data (past prices, volume, dividends, interest rates, etc.).  **An investor can not use past prices to identify mispriced securities.**  **Technical analysis:**   * Refers to the practice of using past patterns in stock prices (and trades) to identify future patterns in prices. * Is **not profitable** in a market which is at least weak form (i.e., weakly) efficient. |
| Why Technical Analysis Fails | Investor behavior tends to eliminate any profit opportunity associated with stock price patterns.  If it were possible to make big money simply by finding “the pattern” in the stock price movements, everyone would do it and the profits would be competed away. |
| Semi-Strong Form Market Efficiency | Security Prices reflect all **publicly available** information.  Publicly available information includes:   * Historical price and volume information * Published accounting statements. * Information found in annual reports. |
| Semi-Strong Form Market Efficiency  “Events” Reflected Immediately | Price reflects all publicly available information.  An investor **can not use publicly available** information to identify mispriced securities.  **Fundamental analysis:**   * Refers to the practice of using financial statements, announcements, and other publicly available information about firms to pick stocks. * Is **not profitable** in a market which is at least semi-strong form (i.e., semi-strongly) efficient.   If a market is **semi-strong form** efficient, then it is **also weak form efficient** since past prices and other past trading data are publicly available. |
| Strong Form Market Efficiency  All Private Information is Reflected | Security Prices reflect all information - public and private.  Strong form efficiency incorporates weak and semi-strong form efficiency.  Strong form efficiency says that ***anything*** pertinent to the stock and known to at least one investor is already incorporated into the security’s price. |
| Relationship among Three Different Information Sets |  |
| Why are we Interested in Market Efficiency? | If market prices reflect at a given date only information of a particular type, then one can profit by trading based on information relevant for pricing but not yet reflected in prices → Anomaly/Abnormal return occurs!  To assess the level of market efficiency: need to know the security’s value; which requires knowing how assets are priced.  Joint-Test Problem in Empirical Tests of the EMH: It is always a joint test of market efficiency and the used pricing model.  Despite the joint-test problem, tests of market efficiency, i.e., scientific search for inefficiencies, improves our understanding of the behavior of returns across time and securities. It helps to improve existing asset pricing models and the view and practices of financial-markets professionals. |
| The evidence | The record on the EMH is extensive, and in large measure it is reassuring to advocates of the efficiency of markets.  Studies fall into three broad categories:   * Are changes in stock prices random? Are there profitable “trading rules”? * Event studies: does the market quickly and accurately respond to new information? * The record of professionally managed investment firms. |
| Are Changes in Stock Prices Random? | Can we really tell?   * Many psychologists and statisticians believe that most people want to see patterns even when faced with pure randomness. * People claiming to see patterns in stock price movements are probably seeing optical illusions.   A matter of degree   * Even if we can spot patterns, we need to have returns that beat our transactions costs.   **Random stock price changes support weak-form efficiency.** |
| Event Studies: How Tests Are Structured | Event Studies are one type of test of the **semi-strong form** of market efficiency.  → This form of the EMH implies that prices should reflect all publicly available information.  To test this, event studies examine prices and returns **over time** - particularly around the arrival of new information.  Test for evidence of under reaction, overreaction, early reaction, delayed reaction around the event.  → Test for pricing reflection + time for reaction  Returns are adjusted to determine if they are **abnormal** by taking into account what the rest of the market did that day.  The Abnormal Return on a given stock for a particular day can be calculated by subtracting the market’s return on the same day (RM) from the actual return (R) on the stock for that day:  **AR = R – RM**  The abnormal return can be calculated using the Market Model approach:  **AR= R – (α + βRM)** |
| Event Study Results | Over the years, event study methodology has been applied to a large number of events including:   * Dividend increases and decreases * Earnings announcements * Mergers * Capital Spending * New Issues of Stock   The studies generally support the view that the market is semi strong-form efficient.  In fact, the studies suggest that markets may even have some foresight into the future - in other words, news tends to leak out in advance of public announcements. |
| Issues in Examining the Results | * Magnitude Issue * Selection Bias Issue * Lucky Event Issue * Possible Model Misspecification |
| The Record of Mutual Funds | If the market is semi-strong form efficient, then no matter what publicly available information mutual-fund managers rely on to pick stocks, their average returns should be the same as those of the average investor in the market as a whole.  We can test efficiency by comparing the performance of professionally managed mutual funds with the performance of a market index. |
| The Strong Form of the EMH | One group of studies of strong-form market efficiency investigates insider trading.  A number of studies support the view that insider trading is abnormally profitable.  Thus, strong-form efficiency does not seem to be substantiated by the evidence. |
| Views Contrary to Market Efficiency | Stock Market Crash of 1987   * The market dropped between 20 percent and 25 percent on a Monday following a weekend during which little surprising information was released.   Temporal Anomalies   * Turn of the year, —month, —week.   Speculative Bubbles   * Sometimes a crowd of investors can behave as a single squirrel. |
| Implications for Corporate Finance | Because information is reflected in security prices quickly, investors should only expect to obtain a normal rate of return.   * Awareness of information when it is released does an investor little good. The price adjusts before the investor has time to act on it.   Firms should expect to receive the fair value for securities that they sell.   * Fair means that the price they receive for the securities they issue is the present value. * Thus, valuable financing opportunities that arise from fooling investors are unavailable in efficient markets.   The EMH has three implications for corporate finance:   1. The **price of a company’s stock cannot be affected by a change in accounting**. 2. Financial managers **cannot “time” issues of stocks and bonds using publicly available information.** 3. A firm can **sell as many shares of stocks or bonds as it desires without depressing prices.**   There is conflicting empirical evidence on all three points. |
| Behavioral Finance | The lack of short selling (causing over-priced stocks) may be explained by loss aversion  The large trading volume may be explained by investor overconfidence  Stock market bubbles may be explained by overconfidence and social contagion |

# Chapter 6: Mortgage markets

| Chapter Preview | What Are Mortgages?  Characteristics of Residential Mortgages  Types of Mortgage Loans  Mortgage-Lending Institutions  Loan Servicing  Secondary Mortgage Market  Securitization of Mortgages  The Impact of Securitized Mortgages on the Mortgage Market |
| --- | --- |
| What Are Mortgages? | A long-term loan **secured by real estate**  A **fixed payment pays both principal and interest** each month. |
| Characteristics of the Residential Mortgage | Mortgages can be roughly classified along the following 3 dimensions:   * Mortgage Interest Rates * Loan Terms * Mortgage Loan Amortization |
| Characteristics of the Residential Mortgage: Mortgage Interest rates | The stated rate on a mortgage loan is determined by 3 rates:   * **Market Rates**: general rates on **Treasury bonds** * **Term**: longer-term mortgages have higher rates * **Discount Points**: a lower rates negotiated for **cash upfront** |
| Characteristics of the Residential Mortgage: Mortgage Interest Rates & Points | Example |
| Characteristics of the Residential Mortgage:  Loan Terms | Mortgage loan contracts contain many legal terms that need to be understood. Most protect the lender from financial loss.   * **Collateral**: usually the **real estate** being finance * **Down payment**: a portion of the purchase price paid by the borrower   → Down payment # Sinking fund:   * Sinking fund: fund set aside to make sure that the firm redeem the bond at maturity, the firm pay off a portion of the bond issue each year * Down payment: a portion of the purchase price paid by the borrower * **PMI**: **insurance against default** by the borrower * **Qualifications**: includes credit history, employment history, etc., to **determine the borrowers ability to repay** the mortgage as specified in the contact   Lenders will also order a credit report from one of the credit reporting agencies.   * The score reported is called the FICO. * The range is 300 to 850, with 660 to 720 being average. * Payment history, debt, and even credit card applications can affect your credit score. |
| Characteristics of the Residential Mortgage:  Loan Amortization | **Mortgage loans are amortized loans.**  This means that a **fixed, level payment** will **pay interest due plus a portion of the principal** each month.  It is designed so that the balance on the mortgage will be zero when the last payment is made.  The next table shows a typical amortization table for a 30-year mortgage at 8.5%. |
| Types of Mortgage Loans | Insured vs. Conventional Mortgages: if the **down payment is less than 20%, insurance is usually required**  \* Insurance fee decreases as time passes  \* The insurance fee amount depends on the value of the assets  Fixed-Rate Mortgages: the interest rate is fixed for the life of the mortgage  Adjustable-Rate Mortgages: the interest rate can fluctuate within certain parameters  Other Types:   * Graduated-Payment Mortgages (GPMs) * Growing Equity Mortgages (GEMs) * Shared-Appreciation Mortgages (SAMs) * Equity Participation Mortgages * Second Mortgages * Reverse Annuity Mortgages (RAMs)   The following table lists additional characteristics on all the loans. |
| Loan Servicing | **3 distinct elements** in mortgage loans:   * The originator packages the loan for an investor * The investor holds the loan * The servicing agent handles the paperwork |
| Many of the institutions making mortgage loans do not want to hold large portfolios of long-term securities. Commercial banks, for example, obtain their funds from short-term sources. Investing in long-term loans would subject them to unacceptably high interest-rate risk.  Most loan originators do make money through the fees that they earn by packaging loans for other investors to hold. Loan origination fees are typically 1% of the loan amount, though this varies with the market.  **Someone has to collect the monthly payments and keep records.** This is known as loan servicing, and servicers usually keep a portion of the payments received to cover their costs. |
| Secondary Mortgage Market | The secondary mortgage market was originally established by the federal government after WWII when it created Fannie Mae to buy  mortgages from thrifts.  The market experienced tremendous growth in the early to mid-1980, and has continued to remain a strong market in the U.S. |
| Securitization of Mortgages | Intermediaries still faced several problems when trying to sell mortgages:   * Mortgages are usually **too small to be wholesale instruments**. * Mortgages in the secondary market **are not standardized**: different times to maturity, interest rates, and contract terms. It is difficult to bundle a large number of mortgages together. * Mortgage loans are relatively **costly to service**. The lender must collect monthly payments, often pay property taxes and insurance premiums, and service reserve accounts. None of this is required if a bond is purchased.      * Mortgages have **unknown default risk**. Investors in mortgages do not want to expend energy evaluating the credit of borrowers. * These problems inspired the creation of the **mortgage-backed security**, also known as a **securitized mortgage**.   An alternative to selling mortgages directly to investors is to create a new security backed by (secured by) a large number of mortgages assembled into what is called a mortgage pool. A trustee, such as  a bank or a government agency, holds the mortgage pool, which serves as collateral for the new security. This process is called **securitization**.  **Mortgage pass-through**, a security that has the borrower’s **mortgage payments pass through the trustee before being disbursed to the investors** in the mortgage pass-through.  → Mortgage pass-through securities cho phép các nhà đầu tư mua các phần tử trong quỹ khoản vay thế chấp, nhưng không phải là toàn bộ quỹ. Các khoản lãi và tiền gốc từ các khoản vay trong quỹ được chuyển tiếp (pass-through) đến các nhà đầu tư theo tỷ lệ sở hữu của họ trong pass-through security.  This design did eliminate some risk, but investors still face **prepayment risk.** |
| Securitization of Mortgages: CMOs  Collateralized mortgage obligation | Definition: A CMO is a structured MBS where investor pools have different rights to different sets of cash flows. (They are offered in different maturity groups)  This design **structured the prepayment risk**. Some classes had little, while others had a lot.  \* Even when an investor purchases a CMO, there are no guarantees about how long the investment will last  \* If interest rates fall significantly, many borrowers will pay off their mortgages early by refinancing at lower rates |
| The Impact of Securitization  on the Mortgage Market | Benefits:   * Reduces the problems caused by regional lending institution’s **sensitivity to local economic fluctuations** * Borrowers have **access to a national capital market** * Investors have **low-risk and long-term investments** in mortgages **without having to service the loan**   However, this is not without its costs. Because of securitization, mortgage rates have become more national in nature, and this has led to **increased volatility in mortgage rates**. |
| The Subprime Mortgage Market | In 2000, only 2% of mortgages were subprime. This climbed to 17% by 2006.  The average FICO score was 624 for subprime borrowers. Prime mortgage borrowers were 742.  Mortgage products became more complicated, and income requirements for these mortgages became very lax.  Subprime mortgages have become quite controversial. Although predatory advertising and “bait and switch” tactics were  all-too-common, home ownership did increase because of subprime lending. |

# Chapter 7: Derivative markets

| Chapter preview | 1. The Nature of Derivatives  2. Ways Derivatives are Used |
| --- | --- |
| The Nature of Derivatives | A derivative is an instrument whose value depends on the values of other more basic underlying variables   * Futures Contracts * Forward Contracts * Swaps * Options |
| Forward Contracts | An agreement to buy or sell an asset at a certain time in the future for a certain price.  Traded in the **OTC market, between 2 parties**  Popular on currencies and interest rates.  **No daily settlement** (but **collateral may have to be posted**). At the end of the life of the contract one party buys the asset for the agreed price from the other party.  By contrast in a **spot contract** there is an agreement to buy or sell the asset immediately (or within a very short period of time).  **Credit risk** |
| Futures Contracts | An agreement to buy or sell an asset at a certain time in the future for a certain price  Available on a wide range of underlying assets  Traded in **futures exchanges, between 3 parties (seller, buyer and exchange)**  A **range of delivery dates → Delivery month**  Futures contracts are **standardized** by the exchange  **Settled daily**  **Can be traded on secondary market** |
| Delivery | Delivery or final cash settlement **rarely takes place with futures contracts** ⇒ They are normally closed out before maturity.  If **a futures contract is not closed out before maturity, it is usually settled by delivering the assets underlying the contract.** When there are alternatives about what is delivered, where it is delivered, and when it is delivered, **the party with the short position chooses**.  A few contracts (for example, those on stock indices and Eurodollars) are settled in cash  When there is cash settlement contracts are traded until a predetermined time. All are then declared to be closed out. |
| Margins | A margin is cash or marketable securities deposited by an investor with his or her broker  At the end of trading day, **the margin account is adjusted to reflect the investor’s gain or loss.** This practice is referred to as **marking to market** the account.  Margins minimize the possibility of a loss through a default on a contract  Investors can withdraw any balance in the margin account in excess of the initial margin.  If the balance in the margin account falls below the maintenance margin, the investor receives a **margin call** and has to deposit extra funds to raise the margin account to the initial margin level. |
| Profit from a Long Forward or Futures Position |  |
| Profit from a Short Forward or Futures Position |  |
| Forward Contracts vs Futures Contracts |  |
| Options | A call option is an option to buy a certain asset (**underlying** asset) by a certain date (expiration date or maturity) for a certain price (the strike price or exercise price)  A put option is an option to sell a certain asset (**underlying** asset) by a certain date (expiration date or maturity) for a certain price (the strike price or exercise price) |
| Options vs Futures/Forwards | A futures/forward contract gives the holder **the obligation** to buy or sell at a certain price  An option gives the holder **the right** to buy or sell at a certain price |
| American vs European Options | An **American** option can be **exercised at any time during its life**  A **European** option can be **exercised only at maturity** |
| Option Positions | * Long call * Long put * Short call * Short put |
| European Call option-example (a) | A European call option with a strike price of $100 to purchase 100 shares of a certain stock. The current stock price is $98, the expiration date of the option is in 4 months, and the price of an option to purchase one share is $5 (**call premium/call price**).  On the expiration date,  - If ST (stock price = $115) is above $100  ⇒ The investor will choose to exercise  ⇒ Makes a gain of $15 per share or $1500  ⇒ A net profit of $1000.  - If ST is less than $100  ⇒ The investor will choose not to exercise  ⇒ Losses $5 per share of $500. |
| Long Call | Profit from buying one European call option: option price = $5, strike price = $100. |
| Short Call | Profit from writing one European call option: option price = $5, strike price = $100 |
| European put option-example (a) | A European put option with a strike price of $70 to sell 100 shares of a certain stock. The current stock price is $65, the expiration date of the option is in 3 months, and the price of an option to sell one share is $7.  On the expiration date,  - If ST (stock price) is below $70 (let’s say $55)  ⇒ The investor will choose to exercise  ⇒ Makes a gain of $15 per share or $1500  ⇒ A net profit of $800.  - If ST is above $70  ⇒ The investor will choose not to exercise  ⇒ Losses $7 per share of $700. |
| Long Put | Profit from buying a European put option: option price = $7,  strike price = $70 |
| Short Put | Profit from writing a European put option: option price = $7, strike price = $70 |
|  | Payoff of the four positions on the date of maturity T |
| Alternative terminologies | You write one AT&T February 50 put for a premium of $5.  You purchase one IBM 70 call option for a premium of $6. |
| 2. Ways Derivatives are Used | * To **hedge risks** * To **speculate** (take a view on the **future direction** of the market) * To **lock in an arbitrage profit** * To change the **nature of a liability → Swap** * To change the **nature of an investment without incurring the costs of selling on portfolio and buying another** |
| Hedging Examples | An investor owns 1,000 Microsoft shares currently worth $28 per share. A two-month put with a strike price of $27.50 costs $1. The investor decides to hedge by buying 1000 put options.  Value of Microsoft Shares with and without Hedging    **USE LONG PUT TO HEDGE LONG STOCK**  **USE LONG CALL TO HEDGE SHORT STOCK** |
| Long & Short Hedges | A **long futures hedge** is appropriate when you know you will **purchase an asset in the future** & want to **lock in the price**  A **short futures hedge** is appropriate when you know you **will sell an asset in the future** & want to **lock in the price** |
| Short Hedges- Example | It is May 15 today and an oil producer has just negotiated a contract to sell 1 million barrels of crude oil. It has been agreed that the price that will apply in the contract is the market price on August 15. How does the firm hedge its exposure?  Suppose that on May 15, the spot price is $60 per barrel and the crude oil futures price on the NYMEX for August delivery is $59 per barrel. Each futures contract on NYMEX is for the delivery of 1,000 barrels.  Short hedge: the company can hedge its exposure by shorting 1,000 futures contracts for August delivery and close its position on August 15.  On August 15  (1) Suppose the spot price is $55 per barrel:   * The firm realizes $55 million for the oil under its sales contract. * August is the delivery month for the futures contract ⇒ The futures price on August 15 should be very close to the spot price of $55 on that date ⇒ The firm gains approximately 59 - 55= $4 per barrel or $4 million in total from the short futures position. * Total amount realized from both the futures position and the sales contract is approximately $59 per barrel or $59 million in total.   On August 15  (2) Suppose the spot price is $65 per barrel:   * The firm realizes $65 million for the oil under its sales contract. * August is the delivery month for the futures contract ⇒ The futures price on August 15 should be very close to the spot price of $65 on that date ⇒ The firm losses approximately 65 - 59= $6 per barrel or $6 million in total from the short futures position. * Total amount realized from both the futures position and the sales contract is approximately $59 per barrel or $59 million in total. |
| Long Hedges- Example | It is now January 15. A copper fabricator knows it will require 100,000 pounds of copper on May 15 to meet a certain contract. How does the firm hedge its exposure?  Suppose that the spot price of copper is 340 cents per pound, and the futures price for May delivery is 320 cents per pound.  Long hedge: the firm can hedge its exposure by taking a long position in four futures contract on COMEX division of NYMEX and closing its position on May 15.  On May 15:  (1) Suppose the spot price is 325 cents per pound.   * The firm pays: 100,000 x$3.25= $325,000 for the copper in the spot market. * May is the delivery month for the futures contract ⇒ The futures price on May 15 should be very close to the spot price of 325 cents on that date ⇒ The firm gains approximately 325 - 320= 5 cents per pound or $5000 on the futures contract. * It net cost is approximately $320,000 or 320 cents per pound.   On May 15:  (2) Suppose the spot price is 305 cents per pound.   * The firm pays: 100,000 x$3.05= $305,000 for the copper in the spot market. * May is the delivery month for the futures contract ⇒ The futures price on May 15 should be very close to the spot price of 305 cents on that date ⇒ The firm losses approximately 320- 305= 15 cents per pound or $15000 on the futures contract. * It net cost is approximately $320,000 or 320 cents per pound. |
| Speculation Example | An investor with $2,000 to invest feels that a stock price will increase over the next 2 months. The current stock price is $20 and the price of a 2-month call option with a strike of $22.50 is $1  What are the alternative strategies? What are their returns? |
| Arbitrage Example | A stock price is quoted as £100 in London and $162 in New York  The current exchange rate is 1.6500  What is the arbitrage opportunity? |
| The Law of One Price and Arbitrage | In a competitive market, if two assets are equivalent, they will tend to have the same market price.  **The Law of One Price is enforced by a process called arbitrage.**  Ex: if the price of gold in Tokyo is $1200 per ounce, what is its price in Seoul? |