

# FINN2300

## تلخيص من إعداد موقع

# BZU-HUB



### محتويات التلخيص:

**Chapter 8:** Risk and Return

**Chapter 6:** Interest Rates and Bond Valuation

**Chapter 7:** Stock Valuation

**Chapter 9:** The Cost of Capital

**Chapter 10:** Capital Budgeting Techniques

### ملاحظات:

١. التلخيص لا يشمل جميع النقاط المهمة، فقط الأساسيات، يعني ادرسوا من الكتاب واعتبروا التلخيص مراجعة.

٢. الشبائر غير متسلسلة بس مرتبة حسب تسلسل شرح الدكتورة

# Chapter 8: Risk and Return

## 8.1: Risk and Return Fundamentals

### portfolio

A collection or group of assets.

### risk

A measure of the uncertainty surrounding the return that an investment will earn or, more formally, the *variability of returns associated with a given asset*.

### total rate of return

The total gain or loss experienced on an investment over a given period of time; calculated by dividing the asset's cash distributions during the period, plus change in value, by its beginning-of-period investment value.

## Risk Preferences

### risk averse

The attitude toward risk in which investors require an increased return as compensation for an increase in risk.

### risk neutral

The attitude toward risk in which investors choose the investment with the higher return regardless of its risk.

### risk seeking

The attitude toward risk in which investors prefer investments with greater risk even if they have lower expected returns.

$$r_t = \frac{CF + P_t - P_{t-1}}{P_{t-1}} \quad (\text{Expected rate of return})$$

## 8.2: Risk of a Single Asset

### scenario analysis

An approach for assessing risk that uses several possible alternative outcomes (scenarios) to obtain a sense of the variability among returns.

### range

A measure of an asset's risk, which is found by subtracting the return associated with the pessimistic (worst) outcome from the return associated with the optimistic (best) outcome.

### standard deviation ( $\sigma_r$ )

The most common statistical indicator of an asset's risk; it measures the dispersion around the *expected value*.

### expected value of a return ( $\bar{r}$ )

The average return that an investment is expected to produce over time.

$$\sigma_r = \sqrt{\sum (r_i - \bar{r})^2 \times P_i}$$

Higher  $\sigma_r$ , greater risk

$$\sigma_r = \sqrt{\frac{\sum (r_i - \bar{r})^2}{n-1}}$$

$$\bar{r} = \sum r_i \times P_i \quad \text{المتوسط المرجح}$$

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$$\bar{r} = \frac{\sum r_i}{n} \quad \text{المتوسط الحسابي}$$

### coefficient of variation (CV)

A measure of relative dispersion that is useful in comparing the risks of assets with differing expected returns.

$$CV = \frac{\sigma_r}{\bar{r}}$$



## 8.3: Risk of a Portfolio

• Portfolio Return ( $r_p$ ) =  $(w_1 * r_1) + (w_2 * r_2) + \dots + (w_n * r_n)$   
 $= \sum w_i * r_i$

•  $\sum w = 1$

### correlation

A statistical measure of the relationship between any two series of numbers.

### positively correlated

Describes two series that move in the same direction.

### negatively correlated

Describes two series that move in opposite directions.

### correlation coefficient

A measure of the degree of correlation between two series.

### perfectly positively correlated

Describes two *positively correlated* series that have a correlation coefficient of +1.

### perfectly negatively correlated

Describes two *negatively correlated* series that have a correlation coefficient of -1.

### uncorrelated

Describes two series that lack any interaction and therefore have a correlation coefficient close to zero.

•  $\sigma_{rp} = \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2 \rho_{12} w_1 w_2 \sigma_1 \sigma_2}$

• Variance =  $\sigma^2$

• Covariance ( $\sigma_{12}$ ) =  $\frac{\sum (r - \bar{r})_1 \cdot (r - \bar{r})_2}{n-1}$

• Covariance ( $\sigma_{12}$ ) =  $\sum (r - \bar{r})_1 \cdot (r - \bar{r})_2 \cdot P$

• Correlation Coefficient ( $r_{12}$ ) =  $\frac{\sigma_{12}}{\sigma_1 \cdot \sigma_2}$

## 8.4: Risk and Return: The Capital Asset Pricing Model (CAPM)

### capital asset pricing model (CAPM)

The basic theory that links risk and return for all assets.

• Total Risk = Diversifiable Risk + nondiversifiable Risk

### total risk

The combination of a security's *nondiversifiable risk* and *diversifiable risk*.

### diversifiable risk

The portion of an asset's risk that is attributable to firm-specific, random causes; can be eliminated through diversification. Also called *unsystematic risk*.

Controllable Risk

Firm specific Risk (Micro)

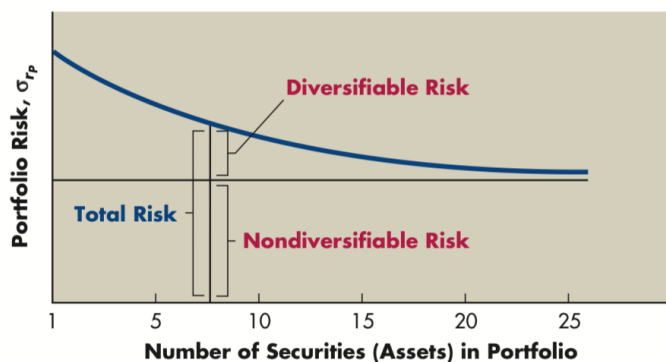
### nondiversifiable risk

The relevant portion of an asset's risk attributable to market factors that affect all firms; cannot be eliminated through diversification. Also called *systematic risk*. **Beta**

Uncontrollable Risk

Market Risk (Macro)





### beta coefficient ( $\beta$ )

A relative measure of nondiversifiable risk. An index of the degree of movement of an asset's return in response to a change in the market return.

$$\beta = \frac{\text{COV}}{\text{Var}}$$

$$\beta_p = \sum \beta_i \cdot W_i$$

### market return

The return on the market portfolio of all traded securities.

### risk-free rate of return ( $R_f$ )

The required return on a risk-free asset, typically a 3-month U.S. Treasury bill.

### U.S. Treasury bills (T-bills)

Short-term IOUs issued by the U.S. Treasury; considered the risk-free asset.

### security market line (SML)

The depiction of the capital asset pricing model (CAPM) as a graph that reflects the required return in the marketplace for each level of nondiversifiable risk (beta).

### • CAPM:

$$r_i = R_f + \beta(R_m - R_f)$$

Security Return  $\leftarrow$  Risk Free  $\leftarrow$  market Risk  $\rightarrow$  Risk Premium

$$r_{\text{real}} = R_f + IP$$

Statcal rate  $\leftarrow$  Benchmark  $\leftarrow$  inflation Premium

$$r_n = R_r + R_p$$

$$\beta_{R_f} = 0 \quad \beta_{\text{market}} = 1 \quad -2 \leq \beta \leq 2$$





# Chapter (6): Interest Rates and Bond Valuation

## 6.1: Interest Rates and Required Returns

### interest rate

Usually applied to debt instruments such as bank loans or bonds; the compensation paid by the borrower of funds to the lender; from the borrower's point of view, the cost of borrowing funds.

### required return

Usually applied to equity instruments such as common stock; the cost of funds obtained by selling an ownership interest.

### inflation

A rising trend in the prices of most goods and services.

### liquidity preference

A general tendency for investors to prefer short-term (that is, more liquid) securities.

### term structure of interest rates

The relationship between the maturity and rate of return for bonds with similar levels of risk

### yield curve

A graphic depiction of the term structure of interest rates.

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### yield to maturity (YTM)

Compound annual rate of return earned on a debt security purchased on a given day and held to maturity.

### real rate of interest

The rate that creates equilibrium between the supply of savings and the demand for investment funds in a perfect world, without inflation, where suppliers and demanders of funds have no liquidity preferences and there is no risk.

### nominal rate of interest

The actual rate of interest charged by the supplier of funds and paid by the demander.

$$r_{\text{nominal}} = R_F + R_P$$

$$R_F = r_{\text{real}} + IP$$

### inverted yield curve

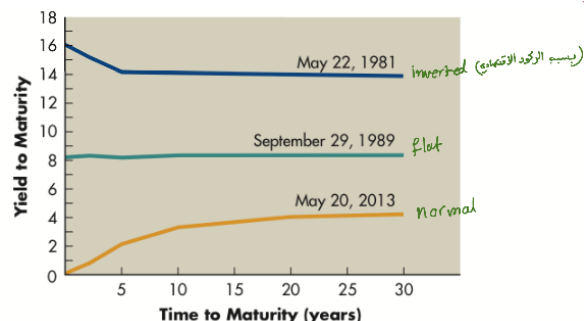
A downward-sloping yield curve indicates that short-term interest rates are generally higher than long-term interest rates.

### normal yield curve

An upward-sloping yield curve indicates that long-term interest rates are generally higher than short-term interest rates.

### flat yield curve (fixed)

A yield curve that indicates that interest rates do not vary much at different maturities.



Sources: Data from U.S. Department of the Treasury, Office of Domestic Finance, Office of Debt Management.



TABLE 6.1 Debt-Specific Risk Premium Components

Component	Description
Default risk	The possibility that the <sup>borrower</sup> issuer of debt will not pay the contractual interest or principal as scheduled. The greater the uncertainty as to the borrower's ability to meet these payments, the greater the risk premium.
Credit Risk	High bond ratings reflect low default risk, and low bond ratings reflect high default risk.
Maturity risk	That the longer the maturity, the more the value of a security will change in response to a given change in interest rates. If interest rates on otherwise similar-risk securities suddenly rise, the prices of long-term bonds will decline by more than the prices of short-term bonds and vice versa. <sup>a</sup>
Contractual provision risk	Conditions that are often included in a debt agreement or a stock issue. Some of these reduce risk, whereas others may increase risk. For example, a provision allowing a bond issuer to retire its bonds prior to their maturity under favorable terms increases the bond's risk.

<sup>a</sup>A detailed discussion of the effects of interest rates on the price or value of bonds and other fixed-income securities is presented later in this chapter.

## 6.2: Corporate Bonds

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### corporate bond

A long-term debt instrument indicating that a corporation has borrowed a certain amount of money and promises to repay it in the future under clearly defined terms.

Coupon interest rate  $\xrightarrow{\text{للمدة}}$  Cost  
 $\xrightarrow{\text{للمدة}}$  Revenue

### coupon interest rate

The percentage of a bond's par value that will be paid annually, typically in two equal semiannual payments, as interest.

Par Value  $\leftarrow$  call price

+ Call Premium

The stated price at which a bond may be repurchased, by use of a *call feature*, prior to maturity.

### call premium

The amount by which a bond's *call price* exceeds its par value.

$$\bullet \text{ call price} = \text{Par Value} + \text{call premium}$$

$$\text{call price} > \text{par value}$$

كفالة / حافز لسراء  
فجاجة / السندات

### stock purchase warrants

Instruments that give their holders the right to purchase a certain number of shares of the issuer's common stock at a specified price over a certain period of time.



## Bond Yields:

### current yield

A measure of a bond's cash return for the year; calculated by dividing the bond's annual interest payment by its current price.

TABLE 6.4 Characteristics and Priority of Lender's Claim of Traditional Types of Bonds

Bond type	Characteristics	Priority of lender's claim
<b>Unsecured bonds</b>		
Debentures سندات غير مضمونة لهم الادوية في توزيع الاربع	Unsecured bonds that only creditworthy firms can issue. Convertible bonds are normally <u>debentures</u> .	Claims are the same as those of any general creditor. May have other unsecured bonds subordinated to them.
Subordinated debentures لهم بعد ال debentures	Claims are not satisfied until those of the creditors holding certain (senior) debts have been fully satisfied.	Claim is that of a general creditor but not as good as a senior debt claim.
Income bonds لهم صبيحة	Payment of interest is required only when earnings are <u>available</u> . Commonly issued in reorganization of a failing firm.	Claim is that of a general creditor. Are not in default when interest payments are missed because they are contingent only on earnings being available.
<b>Secured Bonds</b>		
Mortgage bonds لهم في ضمانات	Secured by <u>real estate or buildings</u> . لهم بنائيات و عقارات	Claim is on proceeds from sale of mortgaged assets; if not fully satisfied, the lender becomes a general creditor. The <i>first-mortgage</i> claim must be fully satisfied before distribution of proceeds to <i>second-mortgage</i> holders and so on. A number of mortgages can be issued against the same collateral.
Collateral trust bonds لهم مضمونة بأصولهم قيمتها أعلى من السندات و 25٪	Secured by stock and (or) bonds that are owned by the issuer. Collateral value is generally 25% to 35% greater than bond value.	Claim is on proceeds from stock and/or bond collateral; if not fully satisfied, the lender becomes a general creditor.
Equipment trust certificates لهم أشياء يستعمل مثل: لهم الطائرات في للطارات	Used to finance " <u>rolling stock</u> ," such as airplanes, trucks, boats, railroad cars. A trustee buys the asset with funds raised through the sale of trust certificates and then leases it to the firm; after making the final scheduled lease payment, the firm receives title to the asset. A type of leasing.	Claim is on proceeds from the sale of the asset; if proceeds do not satisfy outstanding debt, trust certificate lenders become general creditors.

**TABLE 6.5** Characteristics of Contemporary Types of Bonds

Bond type	Characteristics <sup>a</sup>
Zero- (or low-) coupon bonds - ما عليه أي نوع من الـ Interests - للشراء اليوم وتبنيهم عالية	Issued with no (zero) or a very low coupon (stated interest) rate and sold at a large discount from par. A significant portion (or all) of the investor's return comes from gain in value (that is, par value minus purchase price). Generally callable at par value.
Junk bonds - مسندات غير صافية ، وتكهنيتها سيئة - خاتمة عالية	Debt rated Ba or lower by Moody's or BB or lower by Standard & Poor's. Commonly used by rapidly growing firms to obtain growth capital, most often as a way to finance mergers and takeovers. High-risk bonds with high yields, often yielding 2% to 3% more than the best-quality corporate debt.
Floating-rate bonds - القوائم متغيرة وغير ثابتة	Stated interest rate is adjusted periodically within stated limits in response to changes in specified money market or capital market rates. Popular when future inflation and interest rates are uncertain. Tend to sell at close to par because of the automatic adjustment to changing market conditions. Some issues provide for annual redemption at par at the option of the bondholder.
Extendible notes - مسندات بقدر أزيد فترة استحقاقها	Short maturities, typically 1 to 5 years, that can be renewed for a similar period at the option of holders. Similar to a floating-rate bond. An issue might be a series of 3-year renewable notes over a period of 15 years; every 3 years, the notes could be extended for another 3 years, at a new rate competitive with market interest rates at the time of renewal.
Putable bonds - ليس بياض الـ Par Value	Bonds that can be redeemed at par (typically, \$1,000) at the option of their holder either at specific dates after the date of issue and every 1 to 5 years thereafter or when and if the firm takes specified actions, such as being acquired, acquiring another company, or issuing a large amount of additional debt. In return for its conferring the right to "put the bond" at specified times or when the firm takes certain actions, the bond's yield is lower than that of a non-puttable bond.

<sup>a</sup> The claims of lenders (that is, bondholders) against issuers of each of these types of bonds vary, depending on the bonds' other features. Each of these bonds can be unsecured or secured.

### 6.3: Valuation Fundamentals

Three key Inputs : Cash flows (returns)      timing      measure of Risk

$$V_0 = \sum \frac{CF_n}{(1+r)^n}$$

Time zero ↙



#### discount

The amount by which a bond sells below its par value.

Market Rate > Coupon rate

#### premium

The amount by which a bond sells above its par value.

Market Rate < coupon rate

### 6.4: Bond Valuation

• Payment = Coupon Rate \* Par Value

$$\text{Price} = \frac{PMT \left(1 - \frac{1}{(1+i)^n}\right)}{i} + \frac{\text{Par Value}}{(1+i)^n}$$

interest in the market ← i

Market Price

\*Example: Bond currently selling at \$1,120. Coupon rate is 6% paid semiannually and the bond mature in 5 years, and market rate 4%. Calculate the bond price

\* Semiannually:

①  $PMT = \frac{60}{2} = 30$

②  $2 * n = 10$

③  $\frac{r}{2} = 2\%$

$$\text{Price} = \frac{30 \left(1 - \frac{1}{(1.02)^{10}}\right)}{0.02} + \frac{1,000}{(1.02)^{10}} = \$1,089.8$$

Sell ↙

because market price is more than \$1,089.8

\* **Market Rate** = Interest Rate , effective annual rate , annual percentage rate  
Nominal Rate , Required rate of Return , YTM interest , opportunity cost

• **Current Yield** = **Annual Rate** =  $\text{Coupon Payment} \div \text{Bond Price}$

$$\bullet \text{ YTM} = \frac{\text{PMT} + \frac{\text{Par Value} - \text{Market Price}}{\# \text{ of years till maturity}}}{\frac{\text{Par Value} + \text{Market Price}}{2}}$$

\* **Example**: Bond currently selling at \$980, Coupon Rate 8% paid quarterly, market rate = 12% and 6 years remaining till maturity, Calculate YTM.

\* quarterly:

①  $\text{PMT} = 80 \div 4 = 20$

②  $6 \times 4 = 24 = n$

③  $r \div 4 = 3\%$

$$\bullet \text{ YTM} = \frac{20 + \frac{1,000 - 980}{24}}{\frac{1,980}{2}} = 2.1\%$$

$$\bullet \text{ Yield to Call} = \frac{\text{PMT} + \frac{\text{Par Value} - \text{Call Price}}{\# \text{ of years till maturity}}}{\frac{\text{Par Value} + \text{Call Price}}{2}}$$

• **Coupon Rate** يسوّه من الشركة



LG 3

LG 4

P6-11

**Current yield and yield to maturity** An annual coupon bond has a \$1,000 face value, coupon rate of 5%, will mature in 10 years, and currently sells for \$810.34.

- What is the *yield to maturity* of the bond?
- What is the *current yield* of the bond?
- Why does the current yield differ from the yield to maturity?
- One year later, the market rates have increased to 8%. Assume that you have just received a coupon payment and you sold the bond. If you sold your bond at its intrinsic value, what would be the rate of return on your investment?

a)  $\text{YTM} = \frac{50 + \frac{18.966}{905.17}}{1} = 0.076 \rightarrow 7.6\%$

b)  $\text{CY} = 50 \div 810.34 = 6.2\%$

c) Because the time.

d)  $\text{price} = \frac{50 (1 - (\frac{1}{1.08})^{10})}{0.08} + \frac{1,000}{(1.08)^{10}} = \$ 798.69$



# Chapter (7): Stock Valuation

## 7.1: Difference between Debt and Equity

### debt

Includes all borrowing incurred by a firm, including bonds, and is repaid according to a fixed schedule of payments.

### equity

Funds provided by the firm's owners (investors or stockholders) that are repaid subject to the firm's performance.

TABLE 7.1 Key Differences between Debt and Equity

Characteristic	Type of capital	
	Debt	Equity
Voice in management <sup>a</sup>	No	Yes
Claims on income and assets	Senior to equity	Subordinate to debt
Maturity	Stated	None
Tax treatment	Interest deduction	No deduction

<sup>a</sup>Debt holders do not have voting rights, but instead they rely on the firm's contractual obligations to them to be their voice.

## 7.2: Common and Preferred Stock

### privately owned (stock)

The common stock of a firm is owned by private investors; this stock is not publicly traded.

### publicly owned (stock)

The common stock of a firm is owned by public investors; this stock is publicly traded.

### initial public offering (IPO)

### closely owned (stock)

The common stock of a firm is owned by an individual or a small group of investors (such as a family); they are usually privately owned companies.

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### authorized shares

Shares of common stock that a firm's corporate charter allows it to issue.

### outstanding shares

Issued shares of common stock held by investors, including both private and public investors.

### treasury stock

Issued shares of common stock held by the firm; often these shares have been repurchased by the firm.

Treasury Stocks = issued shares + out-standing

### issued shares

Shares of common stock that have been put into circulation; the sum of outstanding shares and treasury stock.

### widely owned (stock)

The common stock of a firm is owned by many unrelated individual or institutional investors.

### par-value common stock

An arbitrary value established for legal purposes in the firm's corporate charter and which can be used to find the total number of shares outstanding by dividing it into the book value of common stock.

### preemptive right

Allows common stockholders to maintain their proportionate ownership in the corporation when new shares are issued, thus protecting them from dilution of their ownership.

حصة المساهمين  
ليحافظوا بالنسبة  
تبعثتم

تخفيض من مركز  
الاشتراك

### dilution of ownership

A reduction in each previous shareholder's fractional ownership resulting from the issuance of additional shares of common stock.

### dilution of earnings

A reduction in each previous shareholder's fractional claim on the firm's earnings resulting from the issuance of additional shares of common stock.

### rights

Financial instruments that allow stockholders to purchase additional shares at a price below the market price, in direct proportion to their number of owned shares.

• Common Stocks: The true owners, residual owners

### initial public offering (IPO)

The first public sale of a firm's stock.



## 7.3: Common Stock Valuation

$$P_0 = \frac{D_1}{(1+r)^1} + \dots + \frac{D_{\infty}}{(1+r)^{\infty}}$$

### \* Valuation Models:

1

#### zero-growth model

An approach to dividend valuation that assumes a constant, nongrowing dividend stream.

$$CF_1 = CF_2 = \dots = CF_n$$

$$\text{growth rate} = g = 0$$

$$P = \frac{D_1}{r}$$

2

#### constant-growth model

A widely cited dividend valuation approach that assumes that dividends will grow at a constant rate, but a rate that is less than the required return.

$$g \text{ is constant}$$

$$\text{Gordon Growth Model}$$

$$\text{not applied in Preferred Stocks}$$

$$D_1 = D_0(1+g)^n$$

$$P_0 = \frac{D_1}{r_s - g}$$

3

#### variable-growth model

A dividend valuation approach that allows for a change in the dividend growth rate.

$$P_0 = \sum \frac{D_n}{(1+r)^n} + \frac{D_{n+1}}{(r_s - g_2)} * \frac{1}{(1+r)^n}$$

PV of dividends during initial growth period

PV of price of stock at end of initial growth period

### \* 4 Steps to Calculate by VGM:

Step 1: Dividends at the end of each year

$$D_1 = D_0(1+g)^n$$

Step 2: Discounting:  $PV = \sum \frac{CF}{(1+r)^n}$

Step 3:  $P = \frac{D_{n+1}}{r-g}$ ,  $PV = \frac{P_n}{(1+r)^n}$  عدد السنوات

Step 4: Another Discounting,  $\text{بجمع الجزئين مع بعض}$ : Step 2 + Step 3

### free cash flow valuation model

A model that determines the value of an entire company as the present value of its expected free cash flows discounted at the firm's weighted average cost of capital, which is its expected average future cost of funds over the long run.

$$V_{\text{company}} = \frac{FCF_1}{(1+r)^1} + \frac{FCF_2}{(1+r)^2} + \dots + \frac{FCF_{\infty}}{(1+r)^{\infty}}$$

$$V_s = V_c - V_D - V_P$$

common      company      debt      preferred



## \* Other Approaches

1

### book value per share

The amount per share of common stock that would be received if all of the firm's assets were sold for their exact book (accounting) value and the proceeds remaining after paying all liabilities (including preferred stock) were divided among the common stockholders.

$$BV = \frac{\text{Total Assets} - \text{Total Liabilities}}{\text{\# of Shares}}$$

2

### liquidation value per share

The actual amount per share of common stock that would be received if all of the firm's assets were sold for their market value, liabilities (including preferred stock) were paid, and any remaining money were divided among the common stockholders.

$$= \frac{\text{Total Assets Sold} - \text{Total Liabilities}}{\text{\# of Shares}}$$

3

### price/earnings multiple approach

A popular technique used to estimate the firm's share value; calculated by multiplying the firm's expected earnings per share (EPS) by the average price/earnings (P/E) ratio for the industry.

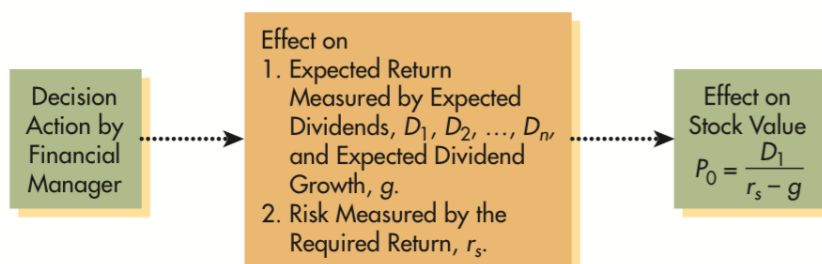
$$= EPS_{\text{firm}} * P/E_{\text{industry}}$$



## \* Preferred Stock Valuation

- Fixed Amount
- Annuity
- There is no maturity
- Perpetuity
- $PV = CF \div r$
- Price =  $D_0 \div r$

## 7.4: Decision Making and Common Stock Value



$$\begin{aligned} \bullet r_s &= r^* + IP + RP \\ \bullet r_s &= R_f + RP \end{aligned}$$



**P7-7 Common stock valuation: Negative growth** Nick is a security analyst in an investment-banking firm. His supervisor asked him to evaluate a preferred stock. The par value of the preferred stock is \$100 and it pays an annual dividend of \$5.30 per share. Answer the following questions on the basis that the market required return is 7%.

- a. What is the market value of the preferred stock?
- b. Suppose an investor purchased the preferred stock today, held it for one year, and sold it upon receiving the dividend. If the market required return is 8% when he sold the preferred stock, what is the investor's total rate of return?

a)  $PV = CF \div r = 5.3 \div 0.07 = \$75.71$

b)  $P = D \div r = 5.3 \div 0.08 = \$66.25$   
rate of Return =  $\frac{66.25 - 75.71}{71} = -5.5\%$



# Chapter (9): The Cost of Capital

## 9.1: Overview of the Cost of Capital

### cost of capital

Represents the firm's cost of financing and is the minimum rate of return that a project must earn to increase firm value.

## 9.2: Cost of Long-Term Debt

### cost of long-term debt

The financing cost associated with new funds raised through long-term borrowing.

$$\bullet \text{ Return of Debt } (r_d) = \frac{1 + \frac{1,000 - NP}{n}}{\frac{1,000 + NP}{2}} \text{ Before Taxes}$$

### net proceeds

Funds actually received by the firm from the sale of a security.

$$\bullet \text{ Return after taxes} = r_d (1 - T)$$

### flotation costs

The total costs of issuing and selling a security.

$$\bullet NP = MV - \text{Flotation Cost}$$

↳ Face Value ~~rate~~

\*Example: Face Value = 1,000 , discount = 30% , Flotation = \$15  
maturity = 5 years , Coupon payment = 10% , Tax = 40%.

$$\begin{aligned} r_d &= \frac{100 + \frac{1,000 - 685}{5}}{\frac{1,685}{2}} = 19.3\% \quad \text{Before Taxes} \\ r_d &= 19.3 (1 - 0.4) = 11.6\% \quad \text{after Taxes} \\ NP &= MV - 15 \\ &= 1000 - 300 - 15 \\ &= 685 \end{aligned}$$

## 9.3: Cost of Preferred Stock

### cost of preferred stock, $r_p$

The ratio of the preferred stock dividend to the firm's net proceeds from the sale of preferred stock.

$$\bullet r_p = \frac{D_p}{NP}$$

$$\bullet NP = \frac{D}{k} \rightarrow r$$



## 9.4: Cost of Common Stock

### cost of common stock equity, $r_s$

The rate at which investors discount the expected dividends of the firm to determine its share value.

### • Constant growth method

$$P_0 = \frac{D}{r_s - g}$$

$$r_s = \frac{D_1}{NP} + g$$



### • CAPM:

$$r_s = R_F + \beta(r_m - R_F)$$

### • Cost of retained earnings ( $r_r$ ) = $r_s$

## 9.5: Weighted Average Cost of Capital

### weighted average cost of capital (WACC), $r_a$

Reflects the expected average future cost of capital over the long run; found by weighting the cost of each specific type of capital by its proportion in the firm's capital structure.

$$r_a = (w_d * r_d) + (w_p * r_p) + (w_e * r_{r \text{ or } n})$$

### P9-19

**Calculation of individual costs and WACC** Lang Enterprises is interested in measuring its overall cost of capital. Current investigation has gathered the following data. The firm is in the 40% tax bracket.

**Debt** The firm can raise debt by selling \$1,000-par-value, 8% coupon interest rate, 20-year bonds on which *annual interest* payments will be made. To sell the issue, an average discount of \$30 per bond would have to be given. The firm also must pay flotation costs of \$30 per bond.

**Preferred stock** The firm can sell 8% preferred stock at its \$95-per-share par value. The cost of issuing and selling the preferred stock is expected to be \$5 per share. Preferred stock can be sold under these terms.

**Common stock** The firm's common stock is currently selling for \$90 per share. The firm expects to pay cash dividends of \$7 per share next year. The firm's dividends have been growing at an annual rate of 6%, and this growth is expected to continue into the future. The stock must be underpriced by \$7 per share, and flotation costs are expected to amount to \$5 per share. The firm can sell new common stock under these terms.

**Retained earnings** When measuring this cost, the firm does not concern itself \$100,000 of retained earnings in the coming year; once these retained earnings are exhausted, the firm will use new common stock as the form of common stock equity financing.

- Calculate the after-tax cost of debt.
- Calculate the cost of preferred stock.
- Calculate the cost of common stock.
- Calculate the firm's weighted average cost of capital using the capital structure weights shown in the following table. (Round answer to the nearest 0.1%.)

Source of capital	Weight
Long-term debt	30%
Preferred stock	20
Common stock equity	50
Total	100%

$$a) \quad r_d = \frac{80 + \frac{1,000 - 940}{20}}{\frac{1,940}{2}} = 0.0855$$

$$r_d \text{ after Taxes} = 8.55 (1 - 0.4) = 5.13\%$$

$$b) \quad r_p = D \div NP = 87.4 \div 90 = 0.97$$

$$c) \quad r_c = (D \div NP) + g = (7 \div (90 - 12)) + 0.06 = 0.15$$

$$d) \quad WACC = (5.13\% * 0.3) + (97\% * 0.2) + (15\% * 0.5) \\ = 28.439\%$$



## Chapter (10): Capital Budgeting Techniques

### 10.1: Overview of Capital Budgeting

#### capital budgeting

The process of evaluating and selecting long-term investments that are consistent with the firm's goal of maximizing owners' wealth.

#### capital expenditure

An outlay of funds by the firm that is expected to produce benefits over a period of time greater than 1 year.

#### operating expenditure

An outlay of funds by the firm resulting in benefits received within 1 year.

#### capital rationing

The financial situation in which a firm has only a fixed number of dollars available for capital expenditures and numerous projects compete for these dollars.

#### accept-reject approach

The evaluation of capital expenditure proposals to determine whether they meet the firm's minimum acceptance criterion.

#### ranking approach

The ranking of capital expenditure projects on the basis of some predetermined measure, such as the rate of return.

#### capital budgeting process

Five distinct but interrelated steps: *proposal generation, review and analysis, decision making, implementation, and follow-up.*

#### \*Steps in the process:

- 1 Proposal generation
- 2 Review and analysis
- 3 Decision making
- 4 Implementation
- 5 Follow-up

#### independent projects

Projects whose cash flows are unrelated to (or independent of) one another; the acceptance of one does not eliminate the others from further consideration.

#### mutually exclusive projects

Projects that compete with one another so that the acceptance of one eliminates from further consideration all other projects that serve a similar function.

#### unlimited funds

The financial situation in which a firm is able to accept all independent projects that provide an acceptable return.

#### \*Discounted Payback Period:

$$\text{DPP} = \text{Year before the discounted payback period occurs} + \frac{\text{Cumulative CF in Year before Recovery}}{\text{Discounted CF in Year after Recovery}}$$

#### \*Steps:

- 1 Calculate PV for all CF's
- 2 Calculate Cumulative Discounted CF's
- 3 Formula

### 10.2: Payback Period

#### payback period

The amount of time required for a firm to recover its initial investment in a project as calculated from cash inflows.

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### 10.3: Net Present Value

#### net present value (NPV)

A sophisticated capital budgeting technique; found by subtracting a project's initial investment from the present value of its cash inflows discounted at a rate equal to the firm's cost of capital.

$$\bullet \text{ NPV} = \sum \frac{CF_t}{(1+rr)^t} - CF_0 \quad (-) \text{ مبداء يكون سالب}$$

- If  $NPV > 0$  ✓
- If  $NPV < 0$  ✗

$$\bullet \text{ Profitability Index (PI)} = \frac{\sum \frac{CF_t}{(1+rr)^t}}{CF_0} \rightarrow (-) \text{ مبداء يكون سالب}$$

- If  $PI > 1$  ✓
- If  $PI < 1$  ✗

### 10.4: Internal Rate of Return (IRR)

#### internal rate of return (IRR)

The discount rate that equates the NPV of an investment opportunity with \$0 (because the present value of cash inflows equals the initial investment); it is the rate of return that the firm will earn if it invests in the project and receives the given cash inflows.

- $NPV = 0$
- Accept if  $IRR > \text{Cost of Capital}$
- Reject if  $IRR < \text{Cost of Capital}$

