MSC. Accounting and Finance
CF : Session 6

Optimization of a firm's capital structure

Session three summary

- Introduction to capital structure
- Irrelevancy Versus Classical Schools of thought
- Optimal Cost of Capital
- WACC
- Capital Asset Pricing Model
- Cost of Debt Versus Cost of Hire Purchase Versus Cost of Leasing as a Source of Financing

Introduction on capital structure

- **Capital structure** refers to the way a company or corporation finances its assets through some combination of equity or long-term debt. A firm's capital structure is then the composition or 'structure' of its liabilities. For example, a firm that sells SHS.20 billion in equity and SHS.80 billion in debt is said to be 20% equity-financed and 80% debt-financed. The firm's ratio of debt to total financing, 80% in this example is referred to as the firm's **leverage or gearing.**
- The capital structure may be highly complex and include several sources of finance. Gearing Ratio is the proportion of the capital employed by the firm which comes from outside of the business finance, e.g. by taking a short term loan etc.

Introduction on capital structure

- **Gearing** focuses on the capital structure of the business – that means the proportion of finance that is provided by debt relative to the finance provided by equity (or shareholders).
- The **gearing ratio**, a measure of the proportion of finance provided by debt and equity, is also concerned with liquidity. However, it focuses on the long-term financial stability of a business.
- Gearing (otherwise known as “leverage”) measures the proportion of assets invested in a business that are financed by long-term borrowing.

Introduction on capital structure

- The term capital structure is used to represent the proportionate relationship between debt and equity.
- The basic concern, is whether there exists an "ideal" capital structure for a company. In other words, is it possible to have the lowest cost of capital where the value of the firm is maximum?
- **Gearing =** $\frac{\text{Market value of debt (incl. pref shares)}}{\text{Market value of equity}}$

  = D/E

Introduction on capital structure

- A company's gearing ratio could have a bearing on its WACC.
- If a project is viable when it is discounted at the current WACC , then it would be worthwhile provided the new funds which are raised to finance it leave the company's WACC unchanged.
- The value of equity is related not only to the size of dividends and the cost of equity, but also to WACC
- The assumption is that a shareholder would be prepared to accept a change in gearing of a company and therefore, change the required rate of return for equity, provided that the effect of this change in gearing would be to increase, the value of his shares, or at the very least to leave them un changed.

Theory of capital structure

- **Capital structure** can also be defined as the firm's proportion of long-term sources of capital. This in essence is different from the **financial structure** which considers both long term and short term source of funds.
- The capital structure theory created a lot of debate amongst academicians, their arguments centered on whether capital structure affects the valuation of a firm or not and whether there is an optimal capital structure where cost of capital is minimum or not ? It is that point of optimal capital structure that the share holders wealth / Value of the firm is maximum.

Assumptions of capital structure theories

The capital structure theories use the following assumptions for simplicity:

1) The firm uses only two sources of funds: debt and equity.

2) The effects of taxes are ignored.

3) There is no change in investment decisions or in the firm's total assets.

4) No income is retained i.e. all profits are declared as dividends and distributed to shareholders

Theory of capital structure

There are four prominent theories about capital structure and these are as follows:

1. The traditional theory /Relevance/ conventional theory
2. The Modigliani and Miller theory (MM)

   (neo- classical/capital structure irrelevance theory) or modern theory on capital structure.
3. Net Income approach to capital structure
4. The Net Operating Income (NOI) approach to

   capital structure
5. The Pecking order theory

I. The traditional theory / conventional view:

It was proposed by **Ezta Solomon and Fred Weston.**

These believe that;

- For any company or investment there is an optimal mix of debt and equity financing that minimizes the WACC and maximizes firm value.
- A firm can change its financing mix to obtain an optimal capital structure. They also argue that an optimal capital structure exists where the overall cost of capital is minimum.
- In their arguments, they believe that debt **is a relatively cheaper source of funds** because of the tax shield on it, debt also carries a fixed financial charge and because the debt holders (lenders) are the first claimants on repayment, hence a limited degree of risk is perceived by the providers of capital. A company can increase its proportion of debt to reduce its average cost of capital

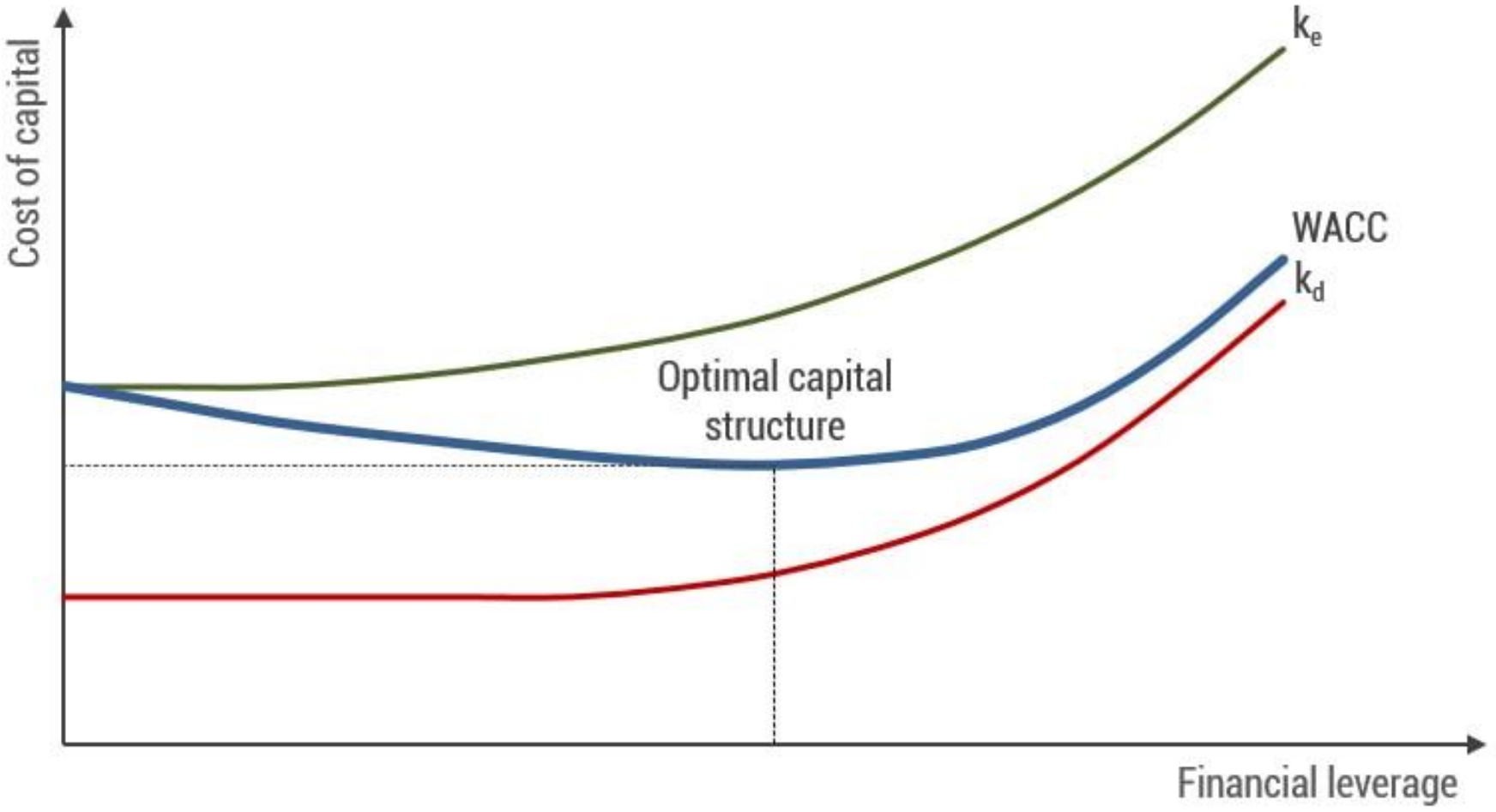
The Traditional View/ Conventional theory

- At some stage however, increased use of debt will reach a point where additional debt capital will be perceived by the shareholders to be a source of increased risk and will demand a higher return.
- Therefore the benefits of cheaper debt will be wiped out by the increasing cost of equity (ordinary shares). Also at some point, the lenders themselves will perceive a greater financial risk in case of insolvency and will also demand higher returns in compensation for the risk. Therefore, any increase in the use of debt (gearing or leverage) beyond that point will increase both the cost of debt and the cost of equity.

The Traditional View/ Conventional theory

The traditional theory of capital structure says that a firm's value increases to a certain level of debt capital, after which it tends to remain constant and eventually begins to decrease. When there is only equity, WACC starts at the cost of equity. As the more expensive equity finance is replaced by cheaper debt finance, WACC decreases. However, as gearing increases further**, both debt holders and equity shareholders will perceive more risk, and their required returns both increase (Due to the higher the risk, the higher the return concept).**

Graph illustrating the Traditional theory on capital structure



The Traditional View/ Conventional theory

This theory predicts that there is an optimum gearing ratio at which WACC is minimised. The optimum level of gearing (optimum capital structure) is where the company's WACC is minimised. It recognises the financial risk as a result of debt.

The Traditional View/ Conventional theory continued

This theory gives the right and correct combination of debt and equity shares and always lead to enhanced market value of the firm. This approach tells us about the financial risk which will be undertaken by the equity shareholders. This approach focuses mainly on increasing the cost of equity capital which will be done after a level of debt in the capital structure.

Traditional theory on capital structure

The traditional theory of capital structure tells us that wealth is not just created through investments in assets that yield a positive return on investment; purchasing those assets with an optimal blend of equity and debt is just as important. Several assumptions are at work when this theory is employed, which together imply that the cost of capital depends upon the degree of leverage/gearing

Assumptions under Traditional Approach

1. The rate of interest on debt remains constant for a certain period and thereafter with an increase in leverage, it increases.

2. The expected rate by equity shareholders remains constant or increases gradually. After that, the equity shareholders starts perceiving a financial risk and then from the optimal point, the expected rate increases speedily.

3. As a result of the activity of rate of interest and expected rate of return, the WACC first decreases and then increases. The lowest point on the WACC curve is **optimal capital structure.**

Assumptions under Traditional Approach

4. There are only debt and equity financing available for firm.
5. The firm pays all of its earnings as a dividend.
6. The firm's total assets and revenues are fixed and do not change,
7. The firm's financing is fixed and does not change,
8. Investors behave rationally i.e. they base their decisions solely on risk and return
9. and there are no taxes.

Criticisms of the traditional theory.

1. This theory illustrates how the optimal capital structure can be obtained which gives the firm maximum value when WACC is minimum but fails to clearly show how much proportion of debt and how much proportion of equity the firm should use in order to yield that optimal structure of the firm.
2. It does not provide a solution in a situation where there are changes in the capital structure such that WACC changes.

Criticisms of The Traditional View

3. Thirdly, the assumption that the cost of equity remains unaffected by gearing up to some reasonable limit is always unrealistic.
4. The assumption that cost of debt is fixed for a certain period is also unrealistic
5. It deals with only outside I.e. investors, investment bankers. The internal decision making is completely ignored in this approach.
6. The traditional approach fails to consider the problems involved in working capital management.

2. The Modigliani and Miller Theory – an introduction

This was proposed by **Franco Modigliani** and **Merton Miller**, and it forms the basis for modern thinking on capital structure. It is generally viewed as a purely theoretical result since it assumes away many important factors in the capital structure decision. The theorem states that in the **absence of taxes, bankruptcy costs, agency costs, and asymmetric information, and in an efficient market,** the value of a firm is unaffected by how that firm is financed. It does not matter what the firm's dividend policy is. This implies that capital structure of a company does not affect the value of the company. Therefore, the Modigliani–Miller theorem is also often called the **capital structure irrelevance principle.**

MM theory

Modigliani and Miller argued that the capital structure debate is a mere detail. They argue that you cannot affect the value of the firm simply by the way you finance its assets. They argue that value comes from assets that the firm has invested in hence the asset mix, which is a function of the investment decision. Once this decision (investment) is made, value will be generated through cash flows which wealth is conserved and when created cannot be altered by the financing decision.

MM Proposition I:

This proposition says that the capital structure is irrelevant to the value of a firm. The value of two identical firms would remain the same, and value would not be affected by choice of finance adopted to finance the assets. The value of a firm is dependent on the expected future earnings. It is where there are no taxes.

Assumptions of Modigliani and Miller (MM) Theory.

1. There are no taxes both personal and corporate taxes.
2. There are many buyers and sellers of securities such that no party can single handedly determine their price.
3. There are no Transaction costs for buying and selling securities as well as bankruptcy cost.
4. There is symmetry of information. This means that an investor will have access to same information that a corporate would have

"When two partners in a business transaction have access to the same relevant information, their business relationship is completely symmetrical. In many transactions, however, one party has access to more information or better information than the other party, which results in a phenomenon known as information asymmetry."

Assumptions of Modigliani and Miller (MM) Theory

5. The cost of borrowing and lending is at the same risk-free rates and the same for investors as well as companies or institutions.
6. Investors are rational i.e. they base their decisions solely on risk and return.
7. There are no bankruptcy costs
8. Securities are completely divisible.

The Modigliani and Miller Theory – an introduction

- In an efficient market, the value of a firm is unaffected by how that firm is financed. It does not matter if the firm's capital is raised by issuing shares or selling debt. It does not matter what the firm's dividend policy is. Therefore, the Modigliani-Miller theorem is also often called the **capital structure irrelevance principle** and is in contrast to the traditional theory seen earlier.
- This analysis can then be extended to look at whether there is in fact an optimal capital structure: the one which maximizes the value of the firm.

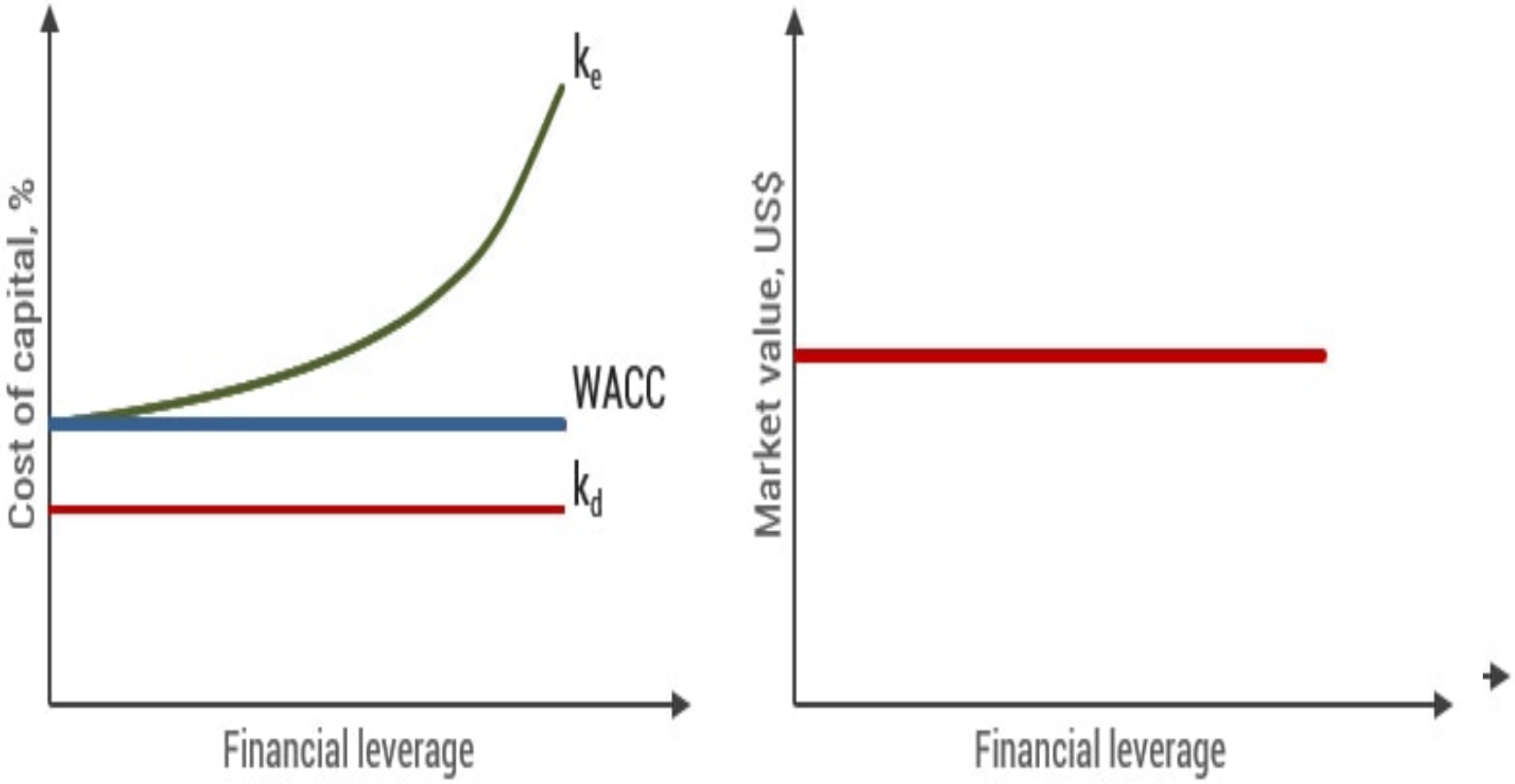
Modigliani-Miller Debate

The MM theory sets out to show what ought to happen to the cost of capital when a company increases or decreases its debt. The MM view is that companies which operate in the same type of business and which have similar operating risk must have the same total value irrespective of their capital structure because the value of a company should depend on the present value of its operations not on the way it is financed.

Modigliani-Miller Debate

Firms identical in all respects except for their capital structure, cannot command different market values nor have different cost of capital. Arbitrage will take place to enable investors engage in personal or home-made gearing as against corporate gearing to restore equilibrium in the market such that the WACC is kept constant when change in the company's gearing occur and the market values of the two companies are the same . Arbitrage involves buying and selling until the market price is in equilibrium such that the arbitrager takes on risk less profits. "Arbitrage is the strategy of taking advantage of price differences in different markets for the same asset to profit from unequal prices.".

MM diagrammatically



MM diagrammatically

- The overall cost of capital will remain constant because an increase in cost of equity will be followed by a decrease in cost of debt and vice versa. Hence cost of capital will not be affected because a decrease will be offset by an increase hence will not affect the value of the firm.
- The MM position emphasizes that the financial manager concentrates on the investment decision (asset mix) instead of the financing decision.

MM Proposition II (MM with taxation effect)

This proposition says that the financial leverage boosts the value of a firm and reduces WACC. It is when tax information is available. In a world with taxation, personal gearing cannot be the same as corporate gearing. Tax authorities allow deductions for interest on gearing (debt).

Therefore, there will be tax savings in corporate gearing and no savings in personal gearing.

Give D as the market value of debt, K_d, the interest rate upon which interest is paid and t, the tax rate

MM with taxation effect

Annual interest = K_d x D

Annual tax savings = K_d x D X t = K_d D_t

If this level of debt is perpetually maintained where reinvestment is assumed:

The present value of tax savings on debt will be got by discounting tax savings at the cost of debt, K_d such that:

PV of tax savings = $\frac{K_d D_t}{K_d}$ = Dt

Therefore V_g = V_u + Dt Where;

V_g - Market value of geared company

V_u - Market value of un-geared company

Dt - Tax savings on debt **(i.e. the tax shield)**

Modigliani and Miller (M&M) with tax

Debt, because of tax relief on interest, becomes unassailably cheap as a source of finance. It becomes so cheap that even though the cost of equity increases, the balance of the effects is to keep reducing the WACC. With taxation, there will be tax savings in corporate gearing.

Given D as the market value of debt, K_d the interest rate upon which interest is paid and t the tax rate:

Therefore $V_g = V_u + Dt$

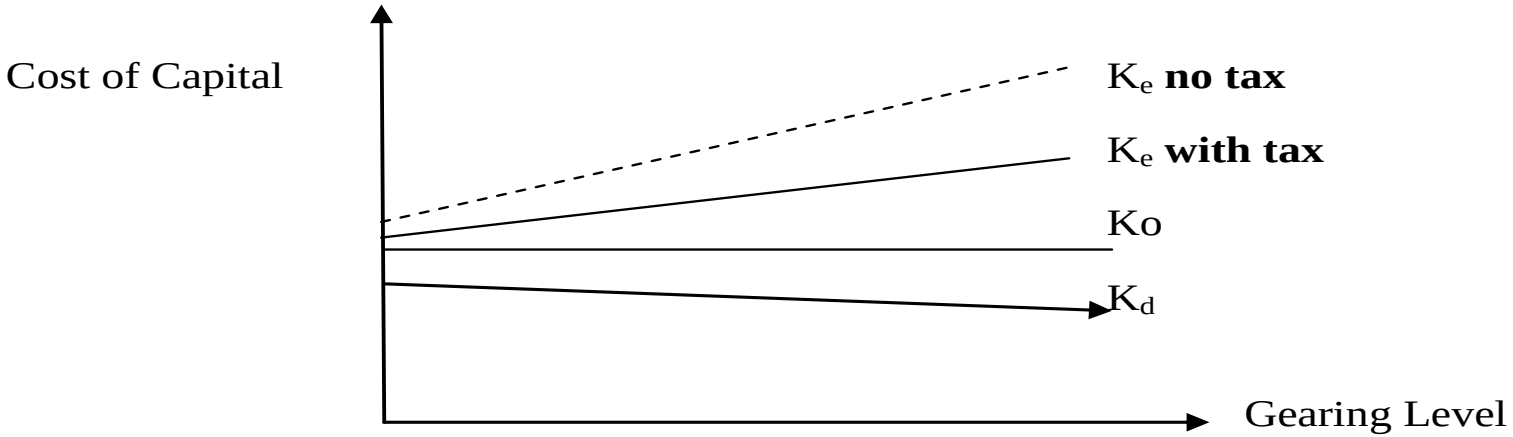
Where: V_g = Market value of a geared company

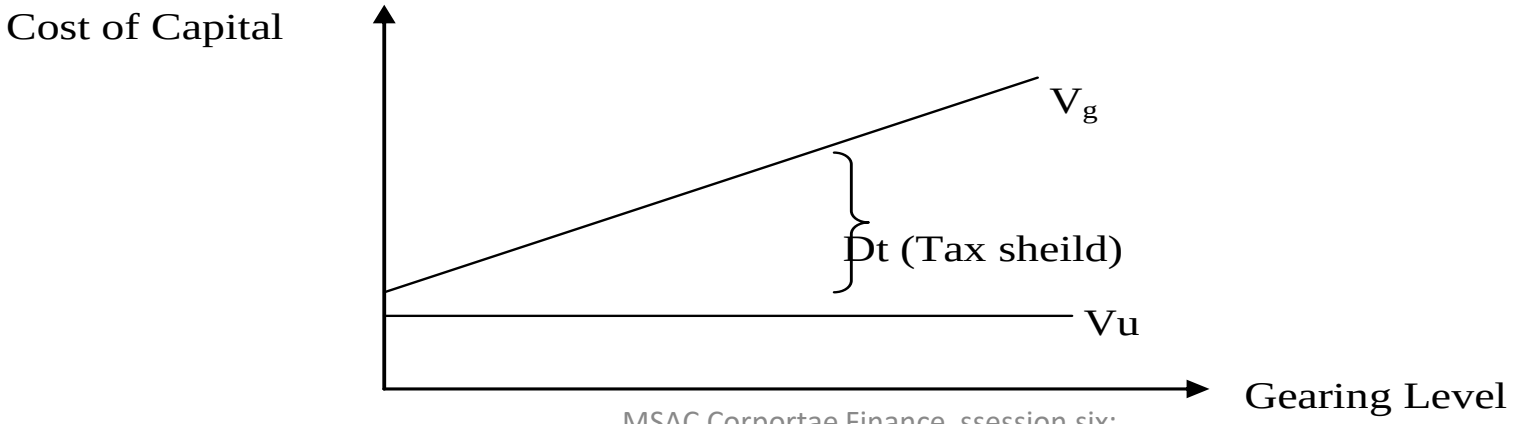
V_u = Market value of un-geared company

Dt = Tax savings on debt (tax shield)

Modigliani and Miller (M&M) with taxation effect

Diagrammatically:





Reason for failure of Arbitrage process

The short comings of this hypothesis lie in the assumption of perfect capital market in which arbitrage is expected to work. Due to the existence of imperfections in the capital market, arbitrage may fail to work and give rise to discrepancy between market values of geared and un-geared firms. Arbitrage process may fail to bring equilibrium in the capital market for the following reasons;

i. Market inefficiencies hamper the arbitrage process.
ii. Investors do not act rationally at all times.
iii. Personal gearing / borrowing is not a perfect substitute for corporate gearing/ borrowing.

Reason for failure of Arbitrage process

iv. Corporate borrowing does not expose the investor to personal liability in the way that personal borrowing does.

v. Institutional restrictions, some institutional investors are prohibited from indulging in "home made" gearing.

vi. Companies can borrow often at better terms than individual investors.

vii. It is practically difficult to identify firms with identical business risk and operating risk characteristics.

Reason for failure of Arbitrage process

viii. Transaction costs will restrict the arbitrage process.

ix. Under MM, risk is measured entirely by variability of cash flows ignoring the possibility that cash flows might cease because of bankruptcy and the theory may not be valid at very high levels of gearing.

x. Not all earnings are distributed to shareholders as dividend, some may be retained.

xi. The model ignores taxation. This is a serious problem as one of the key advantages of debt is the tax relief on interest payments.

Criticisms of the Modigliani and Miller theory

1. There are different forms of taxes both personal and corporate for example Pay As You Earn and Value Added Taxes.
2. There are many buyers and sellers of securities and no single party can single handedly determine their price.
3. There are various Transaction costs for buying and selling securities as well as bankruptcy costs.

Criticisms of the Modigliani and Miller theory

4. There is no symmetry of information. This means that an investor will have access to different kind of information that a corporate would have and investors would behave irrationally while making decisions on risk and return.
5. The cost of borrowing and lending is at varying or different rates for investors as well as companies or institutions.
6. Debt financing greatly affects the company's EBIT (Earnings Before Interest and Tax).

Net Income approach to Capital Structure

It was found by **David Durand** who first suggested this approach in 1952, and he was a proponent of financial leverage. He postulated that a change in financial leverage results in a change in cost of capital. In other words, if a company takes on more debt to leverage investments, its capital structure increases in size and its Weighted Average Cost of Capital (WACC) decreases, which results in higher firm value

Net Income approach to Capital Structure

This capital structure theory known as the net income approach says that there is a direct relationship between the capital structure and the value of the business. That is, lowering the cost of capital can increase the value of a company. More debt is cheaper because of the **tax shield argument** i.e. the ability to deduct interest and lower (shield) taxes.

Net Income approach to Capital Structure

The *theory of the net income approach* suggests increasing the value of a firm by decreasing the overall cost of capital. The cost of capital in the theory is measured in terms of Weighted Average Cost of Capital (WACC). It can be done by incurring and collecting a higher proportion of debt because it is a cheaper source of finance in comparison to equity finance.

WACC is the Weighted Average Costs of equity and debts, and the weights are the units of capital collected from each source

Net Income approach to Capital Structure contd

- According to the Net Income Approach theory, changes in the financial leverage of a firm leads to a corresponding change in the WACC and also the value of the company. The Net Income Approach stresses on the fact that –
- With the increase in financial leverage (or the proportion of debt), the WACC decreases, and the value of the firm increases.
- Alternately, if there is a decrease in the leverage, the WACC will increase, and thereby the value of the firm will decrease.

Assumptions of the Net Income approach

i. **Only two sources of finance** are considered in the theory, which are *debt* and *equity*. Other sources of finance like Retained Earnings and Preference Share Capital are not considered.

ii. All companies must have a **uniform dividend payout ratio**, which is 1.

iii. There are **no costs** such as flotation cost, no transaction cost, and corporate dividend tax.

iv. The **capital market is operating perfectly**, which means information about all the relevant companies is available to all the investors. There are no opportunities for overpricing or underpricing of security.

v. Furthermore, it assumes that all the investors **are rational** who want to maximize their return with minimization of risks.

vi. All sources of **funds are perpetuity,** which means the finance is for infinity. Moreover, there are no redeemable sources of finance.

Advantages of Net Income (NI) approach:

The Net Income approach is easy to understand and implement. It takes into account the impact of financial leverage on a firm's cost of equity and overall value. It provides a clear framework for determining the optimal capital structure.

Generally, in case of the Net Income approach, with an increase in debt, the total market value of the company increases, while the cost of capital decreases. The reason for this conclusion is due to the assumption of the Net Income approach that irrespective of debt financing in capital structuring, the cost of equity will remain constant. Moreover, the cost of debt stays lower than the cost of equity; so when the debt finance is increased, WACC reduces, thereby increasing the value of the firm.

4. Net Operating Income approach

- Net Operating Income (NOI) was also developed by **David Durand**. According to Net Operating Income approach, firm value is not affected by change in company or firm's debt components.
- Net Operating Income approach says that value of a firm depends on operating income and associated **business risk**. Value of firm will not be affected by change in debt components.

Business risk: Variability in returns due the nature of the firm

Financial Risk : Variability in returns due the method of financing employed

Net operating income Approach

Assumptions of the Net Operating Income are as follows :

i. Debt and equity are sources of financing.
ii. Dividend pay-out ratio is 1.
iii. No taxes.
iv. No retained earnings.
v. Constant debt capitalization.
vi. Constant WACC.
vii. Difference between firm value and value of debt is value of equity.
viii. Cost of equity is larger than cost of debt.

Formulae for computing firm value

- Market value of a firm (V) is ratio of earnings before income taxes (EBIT) and Weighted Average Cost of Capital (WACC).

$$V = \frac{EBIT}{WACC}$$

- Total equity (E) is difference of market value of a firm (V) and market value of Debt (D).

$$E = V - D$$

- Cost of equity (Ke) is ratio of difference between Earnings per share (EBIT) and interest (I) to market value of equity shareholder's (Es).
- $$Ke = \frac{(EBIT-I)}{Es}$$

Net Operating Income approach contd

Companies raise debt and equity capital to buy operating and non-operating assets which are expected to generate revenue going forward. The activities related to the utilization of these operating assets are called the core operations of a business. For example, the activity of producing and selling toys for a toy manufacturing company would be considered its core operations. The net difference between the revenue generated by the core operations and the expenses directly incurred to generate this revenue is called the Net Operating Income.

Net operating income Approach contd

Net Operating Income is an important measure of operating efficiency as it excludes the effect of financial leverage and taxes, which can vary widely among companies even in similar industries. The level of Operating Income is driven by various factors including pricing strategies, the cost of raw materials, salaries and the level of fixed versus variable costs.

Advantages of NOI

i. Net Operating Income is closely followed by investors as it represents the ability of a company to generate earnings through its core operations. It is the pre-tax income from operating assets that is available to all capital providers.

ii. It is also often used to compare profitability metrics between companies in a similar industry as it takes into account the capital intensiveness of a business.

Net Operating Income should not be confused with Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA), which is another commonly used measure by investors to assess the profitability of the core operations of a business.

Similarity between NOI and MM

The MM, approach is identical to NOI approach, when there are no corporate tax effects. MM argues that in the absence of taxes the cost of capital and value of the firm are not affected by capital structure or debt equity mix.

According to them cost of capital is independent of capital structure and financial leverage does not affect the overall cost of capital and hence there is no optimum capital structure. MM theory is just similar to NOI approach with a basic difference in the case of taxation effects

Disadvantages of NOI

i. No corporation tax.

ii. If cost of debt increases, then financial leverage also increases which also, increases the capital cost.

iii. Investors will have different view of firm's having high debt in their capital structure.

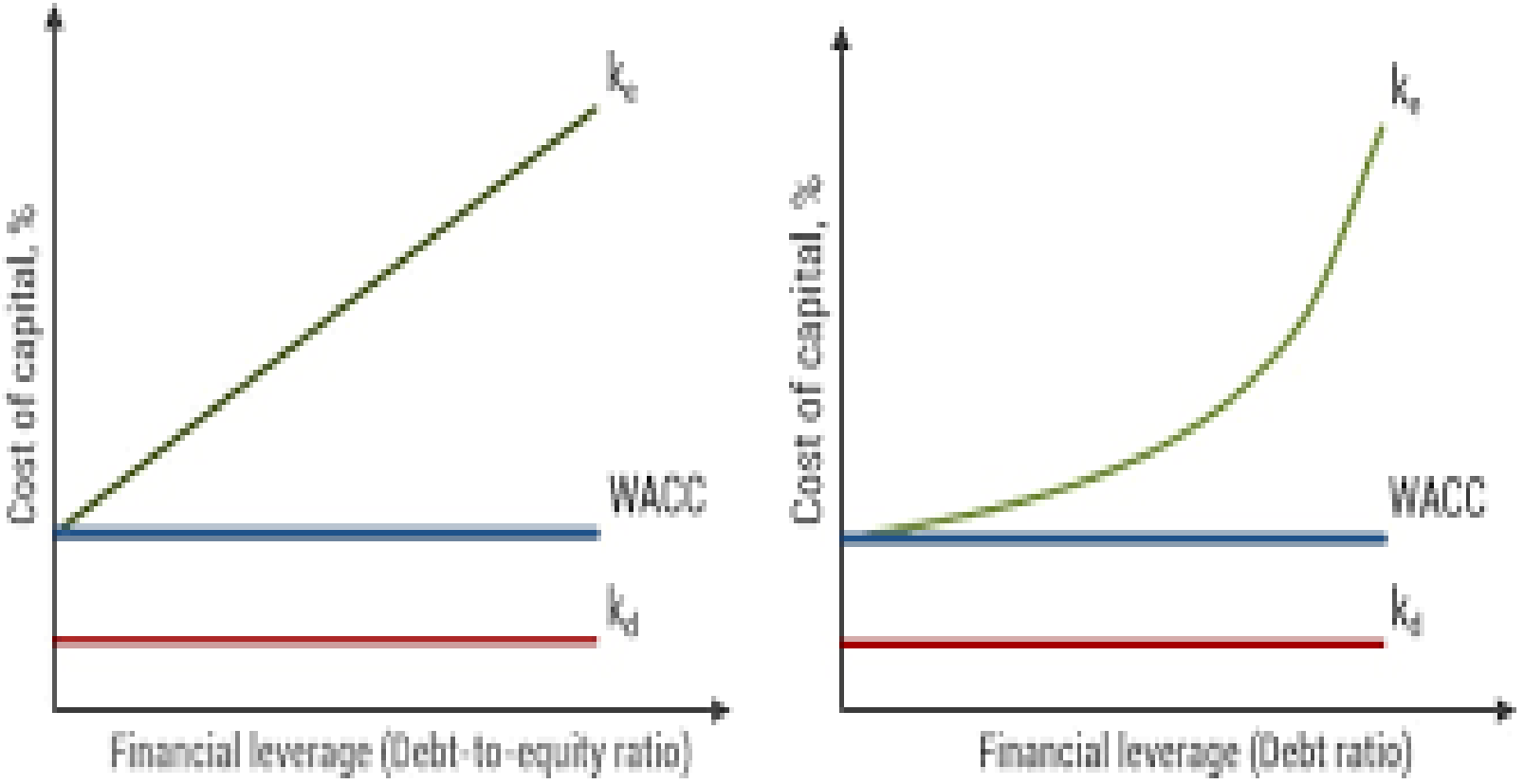
Net Operating Income approach contd

- The cost of equity > cost of debt when a company borrows, risk to equity holders increases to cover for the cost of debt
- The cost of debt remains unchanged as the level of gearing increases
- The cost of equity rises in such a way as to keep WACC constant

Net Operating Income approach contd

- Therefore, the level of gearing is a matter of indifference to an investor, because it does not affect the market value of the company nor of an individual share . This is because as the level of gearing rises , so does the cost of equity in such a way as to keep both the WACC and the market value of shares constant.
- It ignores financial risk. Gearing increases the risk for shareholders and therefore the cost of equity and (WACC) must increase.

Diagrammatic illustration of NOI



5. The Pecking order theory

The pecking order theory states that: ’a company should prefer to finance itself first internally through retained earnings. If this source of financing is unavailable, a company should then finance itself through debt. Finally, and as a last resort, a company should finance itself through the issuing of new equity.’

The pecking order theory continued

It has therefore been suggested that businesses have a ‘pecking order’ when taking on long-term finance. This pecking order can be summarized as follows:

1. Retained profits will be used to finance the business if possible.
2. Where retained profits are insufficient, or unavailable, loan capital will be used.
3. Where loan capital is insufficient, or unavailable,
4. Share capital will be used as a last resort

Advantages of pecking order theory

i. It helps companies decide the optimal way to raise funds for financing corporate strategies, such as a new project.

ii. It shows how the company managers are eager to maintain control of the firm

Disadvantages of pecking order theory

i. The empirical findings show that the pecking order theory **is not valid for high- and low-leverage firms**;

- High-leverage firms prefer equity financing at high investment levels when internal funds are insufficient to finance investment expenditures,
- and low-leverage firms prefer to borrow as their first choice.

ii. The theory is very **limited in determining the number of variables that affect the cost of financing**. An enterprise often borrows money from different financing sources to run their operations in return for interest payments and capital gains.

Determining the Optimal Capital Structure

From the foregoing capital structure discussions, there is value in debt:

- A geared company has higher value than an un-geared company. (**Vg = Vu +Dt)**
- A geared company has a lower WACC than one that is un-geared **(due to the tax shield)**
- Management would then be tempted to borrow as much as they can to benefit from the above advantages.
- As already noted, the capital structure decision is a complicated one involving return-risk considerations.
- All in all, firms would be advised to borrow provided the following factors are taken care of

Factors Determining the Optimal Capital Structure

1. **The level of leverage**:

Firms with high levels of leverage should employ less debt and more equity in order to have optimum leverage and minimize the financing and business risks. However, this can only be feasible if additional cost of financing through equity can be offset by higher returns in future.

2. The cash flow stability:

Firms with stable revenues can safely use debt and be able to service the resulting fixed charges like interest. If sales are variable, then caution would demand that more equity than debt should be used.

Factors Determining the Optimal Capital Structure

3. The cash flow potential:

If an investment has a very high cash flow, it can safely employ more debt than equity because it will have the capacity to meet the fixed obligations that will arise from debt.

4. The stage of growth of the firm:

When a business is formal, it grows, matures , circulates and then declines. Like wise, its products go through similar stages in terms of market development. This is referred to as the product life cycle and each stage has different requirements and characteristics.

Factors Determining the Optimal Capital Structure

5. Availability of alternative sources of finance

If the firm can easily and cheaply access funds from other sources other than equity, then it relies more on debt in the understanding that funds can be obtained from other sources to meet debt obligations when they fall due. In this case, there is capacity to borrow and the company has adequate collateral for security against debt. Adequate collateral means fixed assets not currently used to secure other debt.

Factors Determining the Optimal Capital Structure

6. The level and nature of control desired by the firm

Control can be categorized into closed and open-ended control . In closed control, the ownership of a firm is restricted and the owners of such closely held companies are particularly concerned about dilution of control. Issues of additional shares can cause conflict between finance and control, so such firms rely more on internally generated funds or debt funds and the reverse is true for open-ended control firms.

Factors Determining the Optimal Capital Structure

7. Profitability and return:

The overall cost of capital should be minimized in order to maximize the firm's return. Cost of capital includes dividends and interest. Firms with very high rates of return on investments use relatively little debt and vice versa. A firm with a big number of value-adding (positive NPV) projects for the company to invest in can use more debt.

Factors Determining the Optimal Capital Structure

8. Financial flexibility:

Flexibility refers to a firm's ability to adapt its capital structure to the needs of the changing conditions. The company should be able to raise funds, without undue delay and cost whenever needed to finance the profitability investments. The capital structure should be able to substitute one form of financing for another to economize the use of funds.

Factors Determining the Optimal Capital Structure

9. Risk averseness of management.

Whereas all the above conditions may have been met, the decision to acquire more debt will depend on the extent to which management views the risk involved in more debt on one hand and the risk involved in new projects on the other. Therefore, the risk averseness of management is also a key factor in taking the financing decision(s).

Determining the Optimal Capital Structure

In a nutshell, firms should borrow only when

- There is capacity to borrow – the company has adequate collateral for security against debt. Adequate collateral means fixed assets not currently used to secure other debt.
- There is capacity to service debt – the company is earning sufficient profits to pay for interest on debt - adequate interest cover!
- There are a number of value-adding (positive NPV) projects for the company to invest in.
- The acquisition of debt is in line with the company's overall strategy.

Example on capital structure

Assume that Kazinda ltd (KAL) is an all equity company with an equilibrium market value of SHS. 65 billion and a cost of capital of 18% per year. The company proposes to make a repurchase of SHS. 10 billion of equity and to replace it with 13% irredeemable debt. KAL's earnings before interest and tax are expected to be constant for the fore seeable future. Corporation tax is charged at a rate of 30% and all profits are paid out as dividends to shareholders.

Example on capital structure

Required:

Using the assumptions of Modigliani and Miller (MM) explain and demonstrate how this change in capital structure will affect;

i. The market value

ii. The cost of equity

iii. The cost of capital of KAL

Solution on capital structure example

a) First scenario: KAL is ungeared

Cost capital (WACC) = cost of Equity (k_e)	18%
Market value for Equity	ushs 65 billion
Earnings before interest and tax (EBIT) (A)	X
Interest (B)	-
Earnings before tax (EBT)= A-B	= X
Corporate tax (30%)	0.3X
Earnings after tax or Profits = Dividends	= X-0.3X = 0.7X

Profit after tax (=Dividends) = 0.7 EBIT

Cost of equity is of 18%, meaning $ke = \frac{Div}{Market\ \ value\ \ of\ \ shares}$

$0.18 = \frac{Div}{65}$, Div = 0.18*65= ushs 11.7 billion

And then 11.7 = 0.7 EBIT,

EBIT=11.7/0.7= Ushs 16.7 billion **(3 marks**

Solution on capital structure example

b) Second scenario: KAL proposes to repurchase of ushs 10 billion of equity and to replace it with 13% irredeemable debt.

Equity	Ushs 55 billion
Debt	Ushs 10 billion
Earnings before interest and tax (EBIT) (A)	16.7
interest (13% of ushs 10 billion) (B)	(1.3)
Earnings before tax (EBT)= A-B	15.4
corporate tax (30%)	(4.62)
Earnings after tax or Profits = Dividends	10.78

Solution on capital structure example

According to Modigliani and Miller assumption when including tax effect, the value of a geare d company is equal to the value of the ungeared company plus the tax shield.

$V_g = V_u + Dt$

$V_g = 65 + 10*0.3 = 65+3 =$ ushs 68 billion

The value of the levered company has increased due to the tax benefits of debt.

The market value of Equity will now be of ushs 68 billion – ushs 10 billion of debt = ushs 58 billion.

The new capital structure of the company is comprised of:

Equity: $\frac{58\ billion}{68\ billion} = 0.8529 \approx 85.3\%$ and Debt : $\frac{10\ billion}{68\ billion} = 14.7\%$.

Solution on capital structure example

The cost of Equity can now be obtained as follows: $ke =$

$$\frac{Div}{Market\ value\ of\ shares} = \frac{10.78}{58}$$ Ke **= 0.1858= 18.6**

Meaning that the new cost of equity is 18.6% which is higher than k_e of the un-geared company which was only 18%

As the company introduces debt in its capital structure, shareholders perceive it as an introduction of risk. For this matter, they will require a high rate of return in reference to the principle "the higher the risk the higher the return". This required rate of return is known as the cost of equity.

Solution on capital structure example

Finally, let us compute the Weighted Average Cost of Capital (WACC):

- $\boldsymbol{WACC = k_e \frac{E}{E+D} + k_d(1-t)\frac{D}{E+D}}$
- $WACC = 0.186\frac{58}{68} + 0.13(1-0.3)\frac{10}{68} = 0.172$
- Therefore, the new **WACC is 17.2%.** The cost of capital has decreased due to the mixture of debt and equity. Under Modigliani and Miller theory of capital structure with tax effect, the Weighted Average Cost of Capital decreases as the firm introduces debt in its capital structure.

***Conclusion*:** We notice clearly that the geared company (in scenario two) has a higher value (shs. 68 billion), a higher cost of equity (18.6%) and a lower WACC (17.2%) than the equivalent un geared company (in scenario one).

Discussion question one

Amolator Limited (AMOL|) is a limited liability company incorporated, operating and residing in the pearl of Africa and mainly dealing in agrochemicals. Recent debate within top management meeting has concentrated on discussing the role of Financial Management, causes and impact of systematic and non-systematic risks. AMOL is an all equity company with an equilibrium market value of SHS. 85 billion and a cost of capital of 10% per annum. Management of the company now proposes to make a repurchase of SHS. 20 billion of equity and to replace it with 10% irredeemable debt. AMOL's Earnings Before Interest and Tax are expected to be constant for the fore seeable future. Corporation tax is charged at a rate of 40% and all profits are paid out as dividends to shareholder.

Required:

A) Explain the advantages and disadvantages associated with irredeemable debt as proposed in the above new capital structure of AMOL.

B) Using the assumptions of Modigliani and Miller (MM) explain and demonstrate how this change in capital structure will affect:

i. The market value

ii. Cost of equity

iii. Cost of capital of AMOL.

Discussion question two

The capital structure theory created a lot of debate amongst members of COCA COLA LTD (COCOL) management. Their arguments have centered on whether capital structure affects the valuation of COCOL or not and whether there is an optimal capital structure where cost of capital is minimum or not. COCOL has in issue 10% redeemable loan notes with 5 years to redemption. The par value of the loan notes is SHS. 1,000,000 and redemption will be at par. The investors require a return of 10% and note that the **$PVIFA_{5, 0.10}$ = 3.791.** You are the Finance Manager of COCOL.

Required:

a) Compare and contrast the following capital structure theories:

i. Modigliani and Miller and traditional theories as they relate to capital structure of a company of COCOL**.**

ii. The Net Income method and the Net Operating Income method

as they relate to capital structure of a company of COCOL**.**

a) Assume that you are a capital structure consultant, on what grounds would agree with each of those theories and on grounds would you criticize each one of them.

b) Describe the factors that you would consider in determining the optimal capital structure of COCOL

c) Compute the Market Value of the 5 year loan note of COCOL.

Cost of capital

- Cost of capital is defined as the rate of return one pays to the supplier of capital for use of their funds.

OR

- The minimum acceptable rate of return on funds committed to the project. However, since projects differ in risk, each one of them will have its own unique cost of capital. The two main sources of financing are debt and equity whose main purpose is profit maximization.

TYPES OF COST OF CAPITAL
a) Specific Cost of Capital

It refers to the Cost of each component of capital such as **equity, debenture and preference share, retained earnings** etc. It can also be called component cost of capital.

Example:

What is the cost of a 100m loan payable in 12 months, whose Interest rate is fixed at 24 % (VAT Inclusive).

24% of 100m is 24m. Thus, at the end of 12 months, the loan will yield 24m in interest. This is the cost of the loan (cost of capital)

b) Overall or Weighted Average Cost of Capital (WACC)

This refers to the cost of the various components of financing techniques used to determine the specific cost of each of the sources; including debt, preference shares, retained earnings, and equity shares.

OR

The minimum rate of return on an asset a firm must earn in order to satisfy the requirements of the various investors. The return is looked at in terms of dividends remaining constant or growing.

Types of cost of capital
c) Historical Cost of Capital

Costs incurred in the past in acquiring funds. Since estimating the future dividend growth rate is also very difficult, Historical dividend trends are usually analysed and on the somewhat risky assumption that the future will repeat the past, the historic dividend growth rate is used as a substitute for the future dividend growth rate. In other words, the past is assumed to repeat itself.This is put into consideration when evaluating the viability.

Types of cost of capital

d) Future or marginal cost of capital.

Cost of capital funds yet to be raised by the firm, funds which are being planned for. It is determined by conditions relating to the future when these funds will be raised. It is marginal because it is a cost of **additional** funds to be raised in the future. These costs are very important as they determine the value or wealth potential of the firm.

Importance of cost of capital

1. **Used in capital budgeting decisions**

cost of capital is used as a financial standard for evaluating investment decision. An investment is accepted if it has positive NPV. In calculating this NPV, cash flows are discounted to their present worth using an appropriate discount factor (K), which is the cost of capital in that case. This factor is common to all the other discounted appraisal techniques i.e. IRR and profitability index. Therefore cost of capital evaluates the Capital Budgeting Decision. Cost of Capital acts as a measuring road for adopting an investment proposal. Naturally, the firm will choose the project which gives a satisfactory return on investment.

Importance of cost of capital

2. Used in capital structure decisions

An optimal capital is that structure at which the Value of the firm is maximum and cost of capital is the lowest. In designing the financing policy of the firm, attention should be placed on minimizing the overall cost of capital. A decision to finance the firm by either debt or equity will depend on the cost of each individual source to determine an appropriate capital structure that will maximize wealth to entrepreneurs. It helps in designing a firm's capital structure reflected in its debt and equity policies.

Importance of cost of capital

He may try to substitute the various methods of finance in an attempt to minimize the cost of capital so as to increase the market price and the earning per share. The financial manager monitors the capital market fluctuations and further tries to achieve a sound and economical capital structure of the firm.

Importance of cost of capital

3. Used in Dividend decisions

A decision to pay or not to pay dividends to shareholders can have implications on the wealth of the firm through cost of capital. Firms that pay constant and stable dividends are usually perceived as less risky. Shareholders will attach a lower required rate of return on such a firm which constitutes the cost of capital.

Importance of cost of capital

4. Used in Working Capital management decisions

The concept of cost of capital also plays an important role in the decision to invest in short term assets for example, when making decisions in respect to increasing investment in debtors /receivables, the marginal rate of return is compared with the required rate of return, which is the cost of capital.

5. Used in Valuation of Businesses

Cost of capital is used in business valuation models such as discounted cash flow (DCF) analysis and the Gordon Growth Model to determine the present value of future cash flows generated by a business. By discounting these cash flows at the appropriate cost of capital, analysts can estimate the intrinsic value of a company's equity.

Importance of cost of capital

6. It helps in the considerations of control and risk avoidance

One should have Knowledge of the fluctuations in the capital markets and should analyze the rate of interest on loans and normal dividend rates in the market from time to time. Whenever a company requires additional finance, it may have a better choice of the source of finance which bears the minimum cost of capital. Understanding the cost of capital allows companies to assess and manage risk effectively by considering factors such as market conditions, industry risks, and company specific risk factors.

Importance of cost of capital

7. It can be used to evaluate the financial performance of the top executives

Evaluation of the financial performance will involve a comparison of actual profitability of the projects undertaken by the firm with the projected overall cost of capital and an appraisal of the actual cost incurred by management in raising the required fund.

Importance of cost of capital

8. It is also vital in regulating industries

Cost of capital is important in Industries including electric, gas, telephone, railroad, airline and trucking companies. In essence, a regulatory commission seeks to measure a utility cost of capital then reduces prices so that the company will just earn adequate rate of return. If the estimates are too low, then the company will not be able to attract sufficient capital to meet long-run demand for service, and the public will suffer. If this estimate is too high customer will pay too much for service.

Importance of cost of capital

9. Determining company value or worth

Cost of capital is used by investors to value the company: the higher the cost of capital, the higher the risk, the higher the required rate on return, the lower the market price of the company and the more reluctant are the investors to subscribe on new shares and bonds issued by the company.

Calculation on Weighted Average Cost of Capital

- There are various sources of long-term capital i.e. equity, debentures (they could be various with different terms and conditions), preference shares and term loans. The dilemma is to determine the minimum required rate of return on investments that are variously financed with differing costs of the various sources of capital.
- The WACC is the effective (after tax) cost of the different sources of long term finance used by a company. It is an underlying assumption that long-term finance will be used to finance long-term capital investment projects hence matching the company's long-term assets and liabilities.
- The Weighted Average Cost of Capital is also known as the **discount rate.**

Determining cost of equity

The Dividend valuation model .

The value of an ordinary share will be the present value of the expected future dividends from the particular share.

The value of an ordinary share (*P0) can be expressed as* follows:

$$P0 = \frac{D1}{(1+Ke)^1} + \frac{D2}{(1+Ke)^2} + \text{-----} \frac{D3}{(1+Ke)^3} + \frac{Dn}{(1\ Ke)^n}$$

- where *P0 = the current market value of the share*
- *D = the expected future dividend in years 1 to n*
- *n = the number of years over which the business expects to issue dividends*
- *Ke = the cost of ordinary shares to the business (that is, the required return for* investors).

Determining cost of equity

The dividend valuation model above can be used to determine the *cost of ordinary shares to* the business (*Ke). Assuming the value of an ordinary share and the expected future* dividends are known, the cost of an ordinary shares will be the **discount rate** that, when applied to the stream of expected future dividends, will produce a present value that is equal to the current market value of the share. Thus, the required rate of return for ordinary share investors (that is, the cost of ordinary shares to the business) is similar to the internal rate of return (IRR) used to evaluate investment projects.

Determining cost of equity

The first assumption is that dividends will remain constant overtime. Where dividends are expected to remain constant for an infinite period, the fairly complicated equation to deduce the current market value of a share stated above can be reduced to.

$$P0 = \frac{D1}{Ke}$$

where *D1 = the annual dividend per share in year 1 (which, assuming a constant* dividend, will also be the annual dividend in perpetuity.

Determining cost of equity

This equation (which is the equation for capitalizing a perpetual annuity) can be rearranged to provide an equation for calculating the *cost of ordinary shares (ke) to the* business. Hence:

$$Ke = \frac{D1}{P0}$$

Determining cost of equity

The second simplifying assumption that may be employed is that dividends will grow at a constant rate over time. Where dividends are expected to have a constant growth rate, the equation to deduce the current market value of a share can be reduced to,

$$P0 = \frac{D1}{Ke - g}$$

where *g is the expected annual growth rate. (The model assumes Ke is greater than g).*This equation can also be rearranged to provide an equation for calculating the *cost of* ordinary share capital. Hence:

$$Ke = \frac{D1}{P0} + g$$

Dividend growth model

But D1 = D0(1+g)

- Po (Market Value) = $\frac{D0(1+g)}{(r-g)}$

Where

- Po is the price per share ex-dividend
- Do is the dividend per share first paid
- r is the cost of equity

This is sometimes referred to as Gordon's growth model after the name of the person credited with developing it.

Determining cost of equity

Ordinary shares are normally floated on the market which implies costs e.g. brokerage commission, legal fees, underwriters fees, etc. These comprise the floatation costs and have an effect of reducing proceeds from the sale of shares and therefore have an impact on the cost of ordinary shares. The formula therefore has to be adjusted to reflect these costs.

$$Ke = \frac{D_1}{P_O (1-f)} + g$$

NB: Floatation costs change cost of ordinary share capital.

Summary of cost of equity(ordinary) shares

- Cost of equity is comprised of shares and retained earnings
- The cost of equity can be got from the Divided Valuation Model (DDM).
- If the dividends are constant throughout the year,

Po or MV = $\frac{d}{ke}$

Where MV = market value of shares

d = dividends per share

ke = cost of capital

Making ke the subject of the formula =

$\frac{Po \times ke}{} = \frac{d}{Po}$ Therefore $ke = \frac{d}{Po}$

Dividend Discount model

It is also called the Gordon growth model

$$P_{o\ (\text{Market Value})} = \frac{d_0(1+g)}{(ke-g)}$$

Where

P_o is the price per share ex-dividend

d_o is the dividend per share first paid

r is the cost of equity

Computing cost of equity using Gordon growth model

This done by making Ke the subject of: $P_{o\ (\text{Market Value})} = \frac{d_0(1+g)}{(ke-g)}$

ke-g x Po = do(1+g)

kePo – gPo = do(1+g)

$\frac{MV(ke-g)}{Po} = \frac{do(1+g)}{Po}$

$ke-g = \frac{do(1+g)}{Po}$

$ke-g+g = \frac{do(1+g)}{Po} + g$

$ke = \frac{do(1+g)}{Po} + g = \frac{D1}{P0} + g$

This is the formula for cost of capital Ke using the Gordon Growth model

Where, ke = cost of capital

do = dividends per share (last dividend paid)

g = dividend growth

do(1+g) = D1

Ex-div and cum-div

The dividend valuation model assumes that the first payment will arise in one year's time. Hence the share price quoted is called ex-div. However, if the dividend is about to be paid, the share price is called cum-div (cum dividend share price

Example 1 on calculation of cost of Ordinary (equity) shares

Avalon Plc has ordinary shares in issue that have a current market price of SHS.1,500. The dividend expected for next year is SHS. 200 per share and future dividends are expected to grow at a constant rate of 3 per cent a year. What is the cost of the ordinary shares to the business?

The cost is:

$$Ke = \frac{D1}{P0} + g$$

$$= \frac{200}{1500} + 0.03$$

Cost of ordinary shares or equity (ke) = 0.163 or 16.3%

Example 2 on cost of equity

The following company has the information below:

	market share	last dividends	growth rate
X	60	15	4%
Y	80	20	5%

Calculate the cost of capital in each case

Solution for example 2

(X) $Ke = \frac{do(1+g)}{Po} + g$

$Ke = \frac{15(1+0.04)}{60} + 0.04$

$ke = 0.26 + 0.04 = 0.3 = 30\%$

(Y) $\frac{20\ (1+\ 0.05)}{80} + 0.05$

Cost of equity $Ke = r = 0.2625 + 0.05 = 0.312 = 31\%$

Weaknesses of the dividend growth model

The dividend growth model or the dividend valuation model (DVM) has a sound basic premise. The weaknesses occur because;

- The input data used may be inaccurate in the sense that the following may be difficult to accurately estimate:
  - The current market price
  - Future dividend patterns

Determining Cost of debt (Kd)

Debt can broadly be categorized into redeemable and irredeemable debt. Redeemable debt is one which has a maturity period at the end of which it is paid back to the holder of the security. In case of irredeemable debt the debt holder is entitled to interest in perpetuity and it has no maturity period hence never paid back to the holder.

Calculating Cost of debt (loan capital)

Debt capital or Loan capital may be irredeemable (that is, the principal sum is not expected to be repaid and so interest will be paid indefinitely) or redeemable after some time. Where the rate of interest on the loan is fixed, the equation used to derive the value of irredeemable loan capital is similar to that used to derive the value of ordinary shares, where dividends remain constant over time.

Redeemable debt

- Here the company will pay interest for a number of years and then repay the principal (sometimes at a premium or discount to the original loan amount)
- Hence the market value of redeemable loan notes (debt) is the sum of the present values of the interest and the redemption payment.

Example on redeemable debt

A company has in issue 12% redeemable loan notes with 5 years to redemption. The par value of the loan notes is $100 and redemption will be at par . The investors require a return of 10%. What is the MV of the loan note?

Solution:

The MV is calculated by finding the PVs of the interest and the principal and totaling them As Shown below:

Solution for example on Redeemable debt

	Time	Details	cash flows	Discount factor 10%	Present value PV
Annuity	0	**MV(Po)**		**Balancing figure**	**$107.59**
	1-5	Interest payment	12	3.791	45.49
	5	Capital payment	$100	0.621	62.10
		PV			0

Exercise on redeemable debt

- A company has in issue 12% redeemable debt with 5 years to redemption. Redemption is at par. The current MV of the debt is 107.59. The corporation tax is 30%
- What is the cost of debt for this company?

Cost of irredeemable debt

- Here the market price is assumed to be equal to future income stream from debt discounted at the investor's required rate of return where this stream is the interest paid in perpetuity
- The company does not intend to repay the principal but to pay interest for ever
- $MV = \frac{I}{r}$

Where I is the annual interest rate starting in year one

MV = Market price of debt at present

r= Debt holders required rate of return

In order to adjust the cost of debt for tax purposes

$Kd = \frac{i(1-t)}{MV}$

Calculating cost of debt

The value of irredeemable loan capital is

$$Pd = \frac{I}{Kd}$$

where *Pd = the current market value of the loan capital*

Kd = the cost of debt (loan capital) to the business

I = the annual rate of interest on the loan capital.

This equation can be rearranged to provide an equation for calculating the *cost of debt (loan* capital).

Hence:

$$Kd = \frac{I}{Pd}$$

Calculating cost of debt

Interest on debt (loan capital) is a tax-deductible expense and so the net cost is the interest charge after tax. For investment appraisal purposes, we take the after-tax net cash flows resulting from a project, and so, when calculating the appropriate WACC (discount rate), we should be consistent and use the after-tax rates for the cost of capital.

The after-tax cost of debt will be

$$Kd = \frac{I\,(1 - t)}{Pd}$$

Where, t is the rate of tax payable.

Pd is the market value of debt

Example on calculating cost of debt

Tamale and Co plc has irredeemable loan capital outstanding on which it pays an annual rate of interest of 10 per cent. The current market value of the loan capital is SHS.88 per SHS.100 nominal value and the tax rate is 20 per cent. What is the cost of the loan capital to the business?

Using the above formula, the cost is:

$$Kd = \frac{I(1 - t)}{Pd}$$

$$= \frac{10(1 - 0.20)}{88}$$

Cost of debt (kd) = 9.1%

Cost of preference shares

Preference shares may be redeemable or irredeemable. They are similar to loan capital in the fact that holders normally receive an agreed rate of return each year (which is expressed in terms of the nominal value of the shares). They differ, however, in that the **annual dividend paid to preference shareholders is not a tax-deductible expense.** Thus, the full cost of the dividend payments must be borne by the business (that is, the ordinary shareholders). As the rate of dividend on the preference shares is normally fixed, the equation used to derive the value of irredeemable preference shares is again similar to the equation used to derive the value of ordinary shares, where the dividends remain constant over time. The equation for irredeemable preference shares is as follows:

Cost of preference shares

The equation for irredeemable preference shares is

$$Pp = \frac{Dp}{Kp}$$

where; *Pp = the current market price of the preference shares*

Kp = the cost of preference shares to the business

Dp = the annual dividend payments.

This equation can be rearranged to provide an equation for Calculating the *cost of* irredeemable preference shares.

Hence:

$$Kp = \frac{Dp}{Pp}$$

Example on calculating cost of preference shares

Elias plc has 12 per cent irredeemable preference shares in issue with a nominal (par) value of 100. The shares have a current market price of SHS.90 (excluding dividends). What is the cost of these shares?

The cost is:

$$Kp = \frac{Dp}{Pp}$$

$$= \frac{12}{90}$$

Cost of preference shares Kp = 13.3%

Cost of Retained Earnings:

Retained earnings are funds internally generated from operations. They have a cost associated with them in form of opportunity cost and are therefore not cost free. This cost is reflected in the returns which the shareholders would normally expect like in the case of ordinary share capital. In essence, retained earnings belong to ordinary shareholders only that they have not been distributed. Their cost is therefore determined in the same way as ordinary share capital but without floatation costs.

$$K_{re} = \frac{D_1}{P_O} + g$$

Weighted Average Cost of Capital (WACC)

- The weighted average cost of capital can be calculated by taking the cost of the individual elements and then weighting each element in proportion to the target capital structure (by market value) of the business.
- **The general formula for calculating the Weighted Average Cost of Capital (WACC)**

$$= Ke\frac{E}{(E+D)} + Kd(1-t)\frac{D}{(E+D)}$$

Calculation on Weighted Average Cost of Capital

To estimate the WACC:

- Estimate the cost of each source of capital individually;
- Estimate the proportion of each source of capital to total capital on the basis of their market values (the weight); and
- Add the costs of all the sources of capital attaching an appropriate weight to each source.

$$WACC = K_e \frac{E}{(E+D)} + K_{d(1-t)} \frac{D}{(E+D)}$$

- E is the market value of equity
- D is the market value of debt
- K_e is the cost of equity of a geared company
- K_d is the pretax cost of debt

1. t is the rate of corporation tax

Example

HANS Ltd. is currently using the following source of funds;

Bonds	-	400,000,000
Preference shares	-	300,000,000
Ordinary shares	-	500,000,000
Reserves	-	300,000,000
		1,500,000,000

Example continued

The bonds/debentures were issued as irredeemable bearing an interest rate of 25% and have a nominal value/face value of Shs.200,000 each. The going market rate for these debentures is Shs.280,000. The preference shares are in denominations of Shs.20,000 per share and with a dividend rate of 12½%. Ordinary shares were issued at a face value of Shs.80,000 per share and initial dividends were estimated at 16%. The shares are trading for Shs.110,000 in the market and are anticipated to grow at a rate of 12% p.a. Floatation cost on these shares are Shs.2,000 per share and the business is in the 30% tax bracket.

Step One :Determination of the Specific cost of capital

(a) Specific cost of debt.

$$Kd = \frac{I(1 - t)}{Pd}$$

$$Kd = \frac{50{,}000}{280{,}000}(1 - 0.3)$$

Kd = 0.125 = 12.5 %

(b) Specific cost of preference share capital

Kp = **12½%** i.e. is predetermined.

(c) Specific cost of equity Ke = $\frac{12{,}800}{110{,}000(1-0.018)} + 0.12$ f = 2,000 = $\frac{2000}{110{,}000}$ =0.01 0.018

Ke = 24%

[Step 2] - Determination of Proportions.

- Bonds: $\frac{400m}{1.5b} = 0.27$
- Preference shares: $\frac{300m}{1.5b} = 0.2$
- Ordinary shares: $\frac{500m}{1.5b} = 0.33$
- Reserves: $\frac{300m}{1.5b} = 0.2$

Step 3]Determination overall cost of capital (WACC) :

Source (1)	*Amount (2)*	*Prop. (3)*	*Sp.Cost (4)*	*Weighted cost*
Bonds	400m	0.27	0.125	0.033
Preference shares	300m	0.20	0.125	0.025
Ordinary shares	500m	0.33	0.24	0.079
Reserves	300m	0.20	0.236	0.047
	1.5bn	1.00	WACC	0.185

Overall Cost of K = 18.5%:

Example 1 on calculation of Weighted average cost of capital (WACC)

Downtown plc has 10 million ordinary shares in issue with a current market value of SHS. 200 per share. The expected dividend for next year is SHS.16 per share and this is expected to grow each year at a constant rate of 4 per cent. The business also has:

10.0 million 9 per cent SHS. 1 irredeemable preference shares in issue with a market price of SHS. 90 per share, and SHS. 20 million of irredeemable loan capital in issue with a nominal rate of interest of 6 per cent and which is quoted at SHS. 80 per SHS.100 nominal value. Assume a tax rate of 20 per cent and that the current capital structure reflects the target capital structure of the business. What is the Weighted Average Cost of Capital of the business?

Solution for example 1 on WACC

Step 1:

The first step is to calculate the cost of the individual elements of capital. The cost of ordinary shares in Downtown plc is calculated as follows:

$$Ke = \frac{D1}{P0} + g$$

$$\frac{16}{200} + 0.04$$

Cost of equity (ke) = 12%

Solution for example on WACC

Step 2 : The cost of the preference share capital is as follows:

$$Kp = \frac{Dp}{Pp}$$

$$Kp = \frac{9}{90} \qquad \textbf{Kp= 10\%}$$

Step 3: cost of loan capital is:

$$Kd = \frac{I(1 - t)}{Pd}$$

$$= \frac{6(1 - 0.2)}{80} \qquad \textbf{Kd = 0.06 = 6.0\%}$$

Step 4: Having derived the cost of the individual elements, we can now calculate the weighted average cost of these elements.

Calculating the Weighted average cost of capital (WACC)

Details	a	b	c	D = *(b × c)*
	Market value	***Proportion of total market value***	***Cost %***	***Contribution to WACC***
Ordinary shares (10m × SHS.200)	2,000	0.44	12	5.3
Preference shares (10m × SHS. 90)	900	0.20	10	2.0
Loan capital (SHS. 20m × 80	1,600	0.36	6	2.2
	4500	1.00		
Weighted average cost of capital (WACC)				**9.5%**

Class Example

Uniliver ltd is listed on the USE without any gearing. The firm has constant operating earnings of USHS. 20 billion per annum. Assuming there is no taxation and all earnings are paid out as a dividend on the shares. Uniliver's share capital stands at shs.100 billion at market value.

Firm Long liver ltd is another company operating in the same business with the same annual operating earnings of Ushs.20 billion per annum. The firm has the same total value as firm Uniliver but it is financed by, 10% irredeemable debt of value Ushs. 40 billion and equity shares of value Ushs. 60 billion. It is assumed that the firm's value equals its market value.

Class Example 2 continued

Required

a) Assuming there is no tax, Compute the cost of equity, cost of debt and WACC for both companies .

b) Use the information above on firms Uniliver and Longliver assuming that corporation tax is charged at 30% on profits to Compute the cost of equity, cost of debt and WACC for both companies .

c) Compute the total value of firm Long liver ltd and hence the value of Long liver ’s shares

Class Example Solution (a):

	Uniliver ltd USHS. billion	Long liver ltd USHS. billion
Market values;		
Equity shares E	100	60
10 % irredeemable debt, D	-	40
	100	100
Operating earnings	20	20
Interest (10% x 40)	-	4
Equity earnings (dividends distributable)	20	16
Cost of equity K_{eg} = Dividend / P_o	20%	26.7%
WACC: K_{eg} [E]/[E+D] + Kd [D]/[E+D]	20%	20%

Solution

Solution b)

Value of firm Longliver = **Ushs.100 billion**

Firm Longliver:

Debt = Ushs. 40 billion

Tax shield (Dt = 40 x 0.30) = Ushs.12 billion

According MM : $V_g = V_u + Dt$ = 100 + 12 =

Value Longliver = 112billion

Market value of equity = 112 – 40 =

Ushs. 72 billion

Capital structure and application of earnings:

	Uniliver ltd USHS. billion	Long liver ltd USHS. billion
Market values:		
Equity shares	100	72
10% irredeemable debt	-	40
Value of the company	100	112
Operating earnings	20	20
Interest (10% x 40bn)	-	4
Profit before tax	20	16
Tax at 30%	6	4.8
Profit after tax (Dividends)	14	11.2

Capital structure and application of earnings:

Cost of equity:

Uniliver= $\frac{14}{100}$ = 0.14 14%

Longliver = $\frac{11.2}{72}$ = 0.16 - 16%

Cost of debt (after tax):

10% (1-0.30) - 7%

WACC:

Firm Uniliver 14%

Firm Longliver

16% x $\frac{72}{112}$ + 7% X $\frac{40}{112}$ 12.79%

Capital structure and application of earnings:

It can clearly be seen that the geared company has a higher value (shs112bn), a higher cost of equity (16%) and a lower WACC (12.79%) than the equivalent un geared company (Uniliver).

Example 2 on WACC

a) Calculate Weighted Average Cost of Capital of a corporation with the following capital structure

Capital Component	Book Value	Cost of Capital
Long Term Debt (5,000 bonds)	SHS.5, 000,000	5.4%
Common Stock (62,500 shares)	SHS. 2,500,000	13.9%
Preferred Stock (20,000 shares)	SHS.500, 000	12.5%
Retained Earnings	SHS.750, 000	12.0%

Market prices are provided to you as follows:

SHS. 1,060 for bonds, SHS. 66.00 for common stock, and SHS. 35.00 for preferred stock.

Assume corporation tax rate at 30%

Solution

Capital Component	Market Value	
Long Term Debt	5,000 x 1060	5,300,000/=
Common Stock	62,500 x 66	4,125,000/=
Preferred Stock	20,000 x 35	700,000/=
Retained Earnings		750,000/=
TOTAL		**10, 875000/=**

NB: Tax affects the interest paid on debt since interest expense is tax allowable.

Solution

$$WACC = 5.4\%(1-0.3)(5300{,}000/10{,}875{,}000) + 13.9\%(4125{,}000/10{,}875{,}000) +$$

$$12.5\%(700{,}000/10{,}875{,}000) + 12\%(750{,}000/10{,}875{,}000)$$

$$= (0.038 \times 0.487) + (0.139 \times 0.379) + (0.125 \times 0.064) + (0.12 * 0.069)$$

$$= 0.019 + 0.053 + 0.008 + 0.0083$$

$$\underline{WACC = 0.09 \text{ or } 9\% \text{ ANS}}$$

Exercise on The Modigliani and Miller (MM) theory

Canon (U) Ltd is an all equity company with an equilibrium market value of USHS. 32.5billion and a cost of capital of 18% per year. The company proposes to repurchase USHS. 5billion of equity and to replace it with 13% irredeemable loan stock. Canon (u) ltd's earnings before interest and tax are expected to be constant for the foreseeable future. Corporation tax is at the rate of 31%. All profits are paid out as dividends.

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Exercise on The Modigliani and Miller (MM) theory

Required:

Using the assumptions of Modigliani and Miller explain and demonstrate how this change in capital structure will affect:

(i) The market value;

(ii) The cost of capital;

(iii) The cost of equity, of Canon (U) Ltd.

Solution

Capital Component	Market Value	
Long Term Debt	5,000 x 1060	5,300,000/=
Common Stock	62,500 x 66	4,125,000/=
Preferred Stock	20,000 x 35	700,000/=
Retained Earnings		750,000/=
TOTAL		**10, 875000/=**

NB: Tax affects the interest paid on debt since interest expense is tax allowable.

Solution

$$WACC = 5.4\%(1-0.3)(5300,000/10,875,000) + 13.9\%(4125,000/10,875,000) +$$

$$12.5\%(700,000/10,875,000) + 12\%(750,000/10,875,000)$$

$$= (0.038 \times 0.487) + (0.139 \times 0.379) + (0.125 \times 0.064) + (0.12*0.069)$$

$$= 0.019 + 0.053 + 0.008 + 0.0083$$

$$\underline{WACC = 0.09 \text{ or } 9\% \text{ ANS}}$$

Class Exercise

Jorum property consultants ltd is a property development business operating in the Kampala area. The business has the following capital structure as at 30 November 2017:

	SHS. 000
SHS. 1 ordinary shares	10,000
Retained earnings	20,000
9% loan *notes*	*12,000*
SHS.1, 6% preference shares	*10,000*
	52,000

Class Exercise

The ordinary shares have a current market value of SHS.390 and the current level of dividend is SHS.200 per share. The dividend has been growing at a compound rate of 4 per cent a year in recent years. The loan notes of the business are irredeemable and have a current market value of SHS.80 per SHS.100 nominal value. Interest due on the loan notes at the year end has recently been paid.

Class Exercise

The SHS. 1 irredeemable preference shares in issue have a market price of SHS. 90 per share. The business has obtained planning permission to build a new office block in a redevelopment area. The business wishes to raise the whole of the finance necessary for the project by the issue of more irredeemable 9 per cent loan notes at SHS.80 per SHS.100 nominal. This is in line with a target capital structure set by the business where the amount of loan capital will increase to 70 per cent of ordinary share capital within the next two years. The tax rate is 30 per cent.

Class Exercise

Required:

(a) Giving particular subdivisions, Explain what is meant by the term 'cost of capital' and Why it is important for a business to calculate its cost of capital with care?

(b) Calculate the Weighted Average Cost of Capital of Jorum property consultants ltd that should be used for future investment decisions.

Advantages of Equity financing

i. **Dividend is not a fixed financial charge** as compared to long-term debt. It is therefore not mandatory.

ii. **It is a permanent source of capital** i.e. has no maturity

iii. By issuing its common stock, a firm **increases its financial base** and future borrowing capacity.

iv. **Less burden**. With equity financing, there is no loan to repay. The business doesn't have to make a monthly loan payment which can be particularly important if the business doesn't initially generate a profit. This in turn, gives you the freedom to channel more money into your growing business.

Advantages of Equity financing

v. Credit issues gone. If you lack creditworthiness – through a poor credit history or lack of a financial track record – equity can be preferable or more suitable than debt financing.

vi. Learn and gain from partners. With equity financing, you might form informal partnerships with more knowledgeable or experienced individuals. Some might be well-connected, allowing your business to potentially benefit from their knowledge and their business network.

Disadvantages of equity financing

i. **Floatation implies costs** making common stock an expensive source of capital compared to debt.

ii. Issuance of new common stock may result into **dilution of ownership** and therefore will have implications on its control.

iii. Dividends are not tax deductible expenses making common stock an expensive source of finance through a high cost of capital.

iv. Because ordinary shareholders perceive a high risk because of their nature (residual claims**), they attach a high RRR** hence using the cost of ordinary share capital.

Disadvantages of equity financing

v. Sharing profits.

Investors will expect – and deserve – a piece of company profits. However, it could be a worthwhile trade-off if the company is benefiting from the value they bring as financial backers and/or their business acumen and experience.

vi. Potential conflict.

Sharing ownership and having to work with others could lead to some tension and even conflict if there are differences in vision, management style and ways of running the business. It can be an issue to consider carefully.

Cost of Debt Versus Cost of Hire Purchase Versus Cost of Leasing as a Source of Financing

Rationale for debt finance

Debt finance is more attractive than equity finance, not only because the costs of raising funds are lower, but because the annual return required to attract investors is less than that for equity. This because investors recognize that investing in a firm via debt finance is less risky than investing via shares. It is less risky because interest is paid out before dividends are paid so there is greater certainty of receiving a return than there would be for equity holders. Also if a firm goes into liquidation, the holders of debt type of finance are paid before shareholders receive anything.

Advantages of debt financing

1. Like other types of financing available to small businesses, debt financing has both advantages and disadvantages. The primary advantage of debt financing is that **it allows the founders to retain ownership and control of the company**. In contrast to equity financing, the entrepreneurs are able to make key strategic decisions and also to keep and reinvest more company profits.
2. Another advantage of debt financing is that **it provides small business owners with a greater degree of financial freedom** than equity financing. Debt obligations are limited to the loan repayment period, after which the lender has no further claim on the business, whereas equity investors' claim does not end until their stock is sold.

Advantages of debt financing

3. Furthermore, a debt that is paid on time **can enhance a small business's credit rating** and make it easier to obtain various types of financing in the future.
4. **Debt financing is also easy to administer**, as it generally lacks the complex reporting requirements that accompany some forms of equity financing.
5. Finally, **debt financing tends to be less expensive for small businesses** over the long term, though more expensive over the short term, than equity financing.
6. Debt financing is a cheaper source of finance due to the tax shield advantage

Disadvantages of debt financing

1. The main disadvantage of debt financing is that it requires a small business **to make regular monthly payments of principal and interest.** Very young companies often experience shortages in cash flow that may make such regular payments difficult. Most lenders provide severe penalties for late or missed payments, which may include charging late fees, taking possession of collateral, or calling the loan due early. Failure to make payments on a loan, even temporarily, can adversely affect a small business's credit rating and its ability to obtain future financing.

Disadvantages of debt financing

2. Another disadvantage associated with debt financing is that **its availability is often limited to established businesses.** Since lenders primarily seek security for their funds, it can be difficult for unproven businesses to obtain loans.
3. Finally, the **amount of money small businesses may be able to obtain via debt financing is likely to be limited**, so they may need to use other sources of financing as well.

Disadvantages of debt financing

4. Creditors are able to **claim some or all of the assets of the firm in the event of non-compliance with the terms of the loan**. This may result into liquidation of the firm.

5. Institutions which provide debt finance often try to minimize the risk of not receiving interest and their original capital by looking at the earnings ability of the firm , that is the pre- interest profits in the years over the period.

Leasing

Firms are normally interested in using fixed assets such as buildings and equipment. One way of obtaining their use is through buying them but an alternative is to lease them. Leasing simultaneously provides for the acquisition of assets and their financing. Its advantage over debt is that the lessor has a better position than a creditor in the case of debt if the firm experiences financial difficulties. The lessor can even take back his asset.

Leasing

When the owner of an assets (lessor)rents out the use of the assets to another user (the lessee) without conveying the benefits or risks of legal ownership ,then a lease form of financing is created.

Leasing

Because of the tax savings that can be realized when an asset is classified as a leased item and the lease payments are expensed, firms may have an incentive to disguise the use of the assets as a lease rather than as an installment purchase (hire-purchase) to be depreciated.

A Finance lease

A finance lease, as such an arrangement is known, is in essence a form of lending. This is because, had the lessee borrowed the funds and then used them to buy the asset itself, the effect would be much the same. The lessee would have use of the asset but would also have a financial obligation to the lender – just as with a leasing arrangement.

- With finance leasing, legal ownership of the asset remains with the lessor; however, the lease agreement transfers to the lessee virtually all the rewards and risks associated with the item being leased. The finance lease agreement will cover a substantial part of the life of the leased item, and often cannot be cancelled.

Operating lease

A finance lease can be contrasted with an **operating lease where the rewards and risks of ownership** stay with the owner and where the lease is short-term. An example of an operating lease is where a builder hires some earth-moving equipment for a week to carry out a particular job. Over the years, some important benefits associated with finance leasing have disappeared. Changes in the tax laws make it no longer such a tax-efficient form of financing, and changes in accounting disclosure requirements make it no longer possible to conceal this form of 'borrowing' from investors. Nevertheless, the popularity of finance leases has continued. Other reasons must, therefore, exist for businesses to adopt this form of financing.

Advantages

1. ***Ease of borrowing***. *Leasing may be obtained more easily than other forms of long term* finance. Lenders normally require some form of security and a profitable track record before making advances to a business. However, a lessor may be prepared to lease assets to a new business without a track record and to use the leased assets as security for the amounts owing.
2. ***Cost***. *Leasing agreements may be offered at reasonable cost. As the asset leased is* used as security, standard lease arrangements can be applied and detailed credit checking of lessees may be unnecessary. This can reduce administration costs for the lessor and, thereby, help in providing competitive lease rentals.

Advantages

3. ***Flexibility***. *Leasing can help provide flexibility where there are rapid changes in technology.* If an option to cancel can be incorporated into the lease, the business may be able to exercise this option and invest in new technology as it becomes available. This will help the business to avoid the risk of obsolescence.
4. ***Cash flows***. *Leasing, rather than buying an asset outright, means that large cash outfl*ows can be avoided. The leasing option allows cash outflows to be smoothed out over the asset's life. In some cases, it is possible to arrange for low lease payments to be made in the early years of the asset's life, when cash inflows may be low, and for these to increase over time as the asset generates positive cash flows.

Advantages

5. Simplicity

Lease formalities and arrangement of lease finance facilities are very simple and easy. If the lesser agrees to use the assets or fixed equipments by the lessee, the leasing arrangement is mostly finished.

6. Less Transaction cost

When the company mobilizes finance through debt or equity, they have to pay some amount as transaction cost. But in case of leasing finance, transaction cost or floating cost is very less when compared to other sources of finance.

Advantages of leasing

7. Reduced risk

Leasing finance reduces the financial risk of the lessee. Hence, he needs not buy the assets and if there is any price change in the assets, it will not affect the lessee.

8. Better alternative

Now days, most of the commercial banks and financial institutions are providing lease finance to the industrial concern. Some of them have specialized lease finance company. They are established to provide faster and speedy arrangement of lease finance.

Disadvantages of leasing

1. Leasing creates a commitment to pay the rentals even when the business experiences a downturn
2. The lessee has no legal ownership of the leased asset
3. The lessee has to maintain the asset without having ownership of the asset
4. Any failure to pay the lease rentals on The lessee' side will lead to the asset being repossessed by the lessor

Leasing versus buy option

- The decision to lease or buy the assets with borrowed funds depends upon which alternative has the lower present value of after tax costs.
- If funds are borrowed to purchase an assets, the tax shield provided by interests expense and depreciation should be considered in the lease/buy decision.
- If an asset is categorized as an operating lease, the tax shield due to lease expenses should be considered in the lease/buy decision

Hire purchase

- **Hire purchase** (abbreviated **HP**, colloquially sometimes **never-never** is the legal term for a contract, in which a purchaser agrees to pay for goods in parts or a percentage over a number of months. A hire purchase is termed an **installment plan** although these may differ slightly as in a hire purchase agreement the ownership of the good remains with the seller until the last payment is made

Hire purchase

- A hire-purchase contract allows the buyer to hire the goods for a monthly rent. When a sum equal to the original full price plus interest has been paid in equal installments, the buyer may then exercise an option to buy the goods at a predetermined price (usually a nominal sum) or return the goods to the owner.
- If the buyer defaults in paying the installments, the owner may repossess the goods, a vendor protection not available with unsecured-consumer-credit systems. HP is frequently advantageous to consumers because it spreads the cost of expensive items over an extended time period.

Hire purchase

- Business consumers may find the different balance sheet and taxation treatment of hire-purchased goods beneficial to their taxable income. The need for HP is reduced when consumers have collateral or other forms of credit readily available.
- You can use our Hire Purchase (HP) facility to finance your purchase of machinery and equipment. This is a financing arrangement for your machinery and equipment purchase whereby the bank will pay the vendor directly. The Bank therefore acquires and retains legal ownership of the financed asset, while you become the hirer. The ownership of the financed asset will be transferred to you when the final installment is fully paid to the bank. This is unlike a term loan where the borrower holds legal title to the goods from the outset.

Advantages of Hire purchase

1. **You can access newer, higher specification assets**

When paying for a car out of your own pocket, you're usually limited in choice by the amount you can or want to spend. With a hire purchase agreement, it becomes possible to afford a higher specification car and use it right away.

2. **You can spread the cost over a fixed term**

With a hire purchase agreement, you can spread the cost of the vehicle with monthly repayments. How long the term lasts is dependent on how much you can afford to pay back every month. There's also flexibility in how much you'll pay monthly, as you can pay a larger deposit amount for lower payments.

3. The interest rate is fixed

The interest rate will remain fixed throughout the term. This won't change, no matter what the Bank of England's base rate does. So you'll know upfront exactly how much the car will cost over the length of your agreement and can budget accordingly.

Advantages of Hire purchase continued

4. **You'll own the asset at the end of the agreement**

After paying the last instalment, the ownership of the vehicle will transfer from the finance company to you. At that point, you'll legally own the car. You could also alternatively part-exchange it for a newer vehicle if you wish.

5. Option to pay off the loan early

Most hire purchase agreements allow you to pay off the balance early, reducing the long-term cost. Some, however, will require a minimum amount of monthly payments to be made first before they allow early repayment.

6. **There are fewer restrictions**

Unlike leasing a vehicle, there are no mileage or conditional restrictions that must be met with a hire purchase agreement, as the car becomes yours once the term has ended. However, you must remember that you're not the legal owner of the car during the agreement, so there could be stipulations on modifying the car until your agreement ends.

Disadvantages of hire purchase

1. **The loan is secured against the asset**

With a hire purchase agreement, you're in a fixed contract. As you don't own the asset until the final payment is made, if, for any reason, you can't afford to make payments, the finance company could take your assets away.

2. It will cost more overall

The interest charges on hire purchase mean the final cost of your car will be more than if you were to purchase it outright. Monthly payments with hire purchase are also generally higher than for PCP or leasing deals.

3. Monthly payments are based on credit rating

As it's a secured loan, hire purchase agreements are available to buyers with poor credit ratings. However, if you happen to have a poor credit rating or even no credit (for instance, if you haven't borrowed in the past), you may not be eligible for the lower interest rate deals.

Disadvantages of hire purchase contd

4. It can be expensive for short term agreements

If you're looking for a short-term agreement rather than one spread out over several years, choosing a hire purchase can turn out to be an expensive route.

5. Missing or late payments could affect your credit score

It's usual for a hire purchase agreement to be registered with credit agencies. So if over the term, you miss a payment or even make a late payment, it will be flagged on your credit report and may affect your credit score or even your ability to borrow in the future.

Conclusion

- Every company in its normal course of business at some point in time requires funds for its operations, expansion, acquisition, modernizations and replacement of long-term assets.
- Therefore, a progressive management should take cost of capital into consideration while taking any financial decision to prove a healthy financial policy.

END OF SESSION SIX