CAPITAL STRUCTURE

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Reference: Capital Structure theories by Dev Tech Finance

Capital Structure

➢ Capital structure represents the financial composition of firm to raise fund for its business activities

➢ The financing decision involves generating capital from different sources of fund like debt, equity, preference, retained earning.

➢ An optimum financing mix can maximize the value of firm in long run.

➢ An efficient capital structure helps in managing the cost of raising capital for the firm.

➢ Ultimate objective is to maximize the shareholder's wealth which depends on the value of firm.

Capital Structure

According to Gerestenbeg, "Capital structure of a company refers to the composition or make-up of its capitalization and it includes all long-term capital resources viz : loans, reserves, shares and books."

The capital structure is made up of debt and equity securities and refers to permanent financing of a firm. It is composed of long-term debt, preference share capital and shareholder's funds.

Forms /patterns of Capital Structure
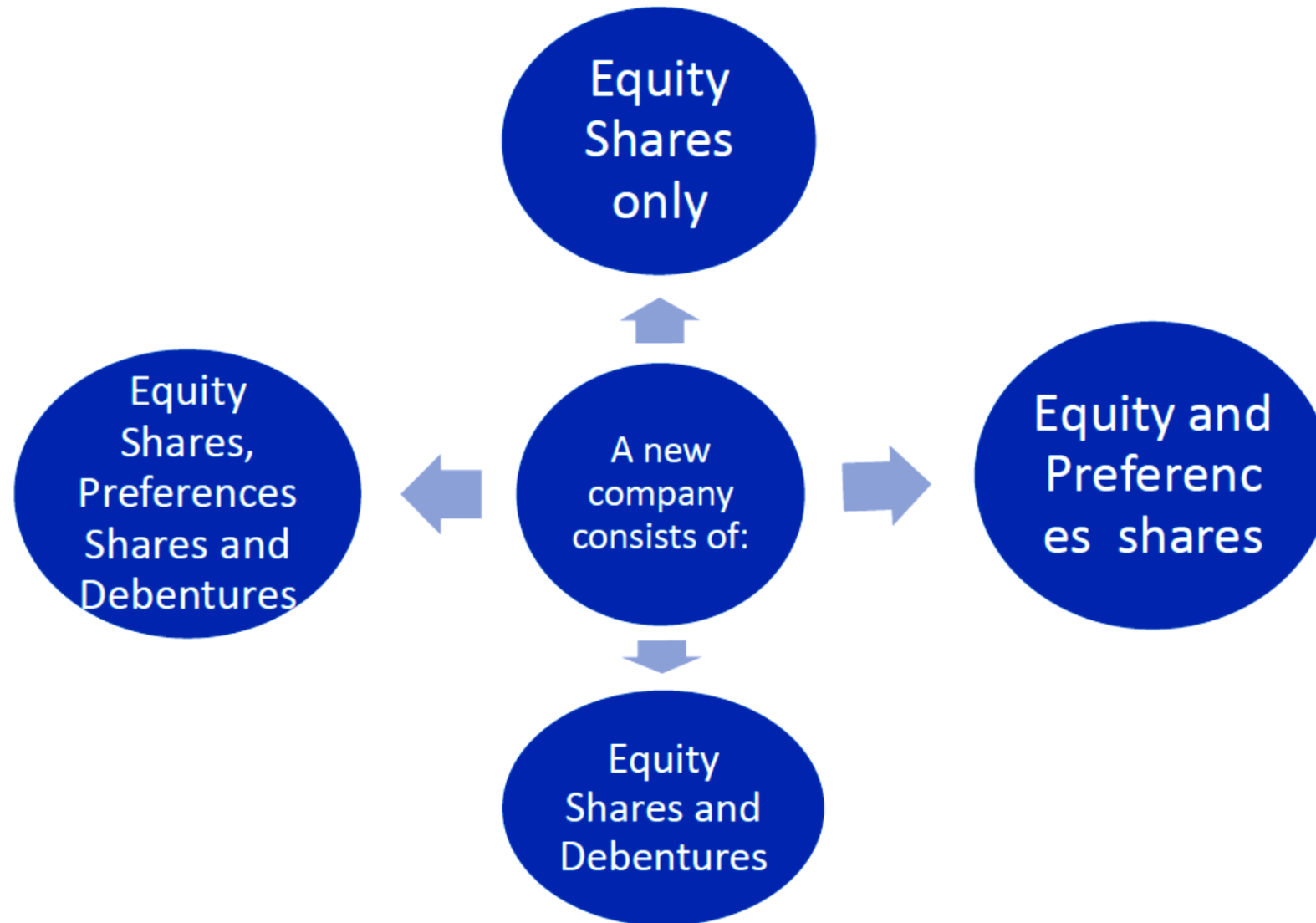
CAPITAL STRUCTURE DECISIONS

CAPITAL STRUCTURE is a blend of company's sources of finance and consists of several types of funding. It is a ratio of short-term, long-term liabilities and equity.

FACTORS AFFECTING CAPITAL STRUCTURE DECISIONS

There's common erroneous conclusion that equity is free of any cost – that's not true. Dividend and Floatation cost of issue are costs of equity capital | **Cost of Equity Capital**

Change in Control | Issuing new shares to the open market introduce new shareholders who can have significantly different understanding on how company should be run.

These prescribe what proportion of equity a company should have in its capital structure. | **Regulatory Framework**

Debt Convenants | Raising debt also usually imposes various debt covenants that restrict a proportion of debt a company is allowed to have.

These prescribe what proportion of equity a company should have in its capital structure. | **Regulatory Framework**

Other Factors | Other Factors : Cost of Debt, Tax Rate, Interest Coverage Ratio, Cash Flow, DSCR, Net Operating Income, Capital Structure of other companies

- **Factors Affecting Capital Structure of a Firm**

1. Trading on Equity
2. Desire to Retain Control
3. Size of Company
4. Nature of Business
5. Amount of Capital Required
6. Cost of Financing
7. Growth Rate
8. Period of Finance
9. Flexibility
10. Profitability
11. Timing
12. Taxes
13. Attitude of Lenders
14. Purpose of Financing

Capital structure theories

- Capital structure theories represents the relationships between the capital structure ,cost of capital and value of firm.

- These theories are based on certain assumptions.

- Capital structure theories argues whether any change in the financing mix would have impact on the value of the firm or not.

Theories of Capital Structure

1.Net Income approach

2.Net Operating Income Approach

3.Modigilani –Miller Approach

4.Traditional Approach

Assumptions

✓ There are only two source of financing –Debt and Equity.

✓ The firm has decided to distribute all its earnings as dividend rather than keeping as retained earning (100% dividend payout)

✓ The operating profit of firm is given and is not expected to grow or decline over time.

✓ The business risk will remain constant irrespective of financial composition.

✓ There is no income tax or corporate tax.

✓ No transaction cost

✓ No change in investment decision or assets.

NET INCOME APPROACH

Introduction

➢ Capital structure matters in determining the value of firm.

➢ It suggests that the value of the firm increases by decreasing the weighted average cost of capital.

➢ Weighted average cost of capital could be reduced with higher debt proportion in financing.

➢ Cost of raising fund through debt is lower as compared to equity capital $K_d < K_e$

➢ Lower cost of raising fund through debt results in decrease in overall cost of capital.

➢ Thus, the value of firm is maximized.

Assumptions

- ✓ There are only two sources of financing

- ▪ Debt and Equity

- ✓ No transaction cost

- ✓ Risk perception of the investors remain same.

- ✓ Dividend pay-out ratio is 1.

- ✓ No taxes

- ✓ No retained earning

Numerical (Case 1)

- **Information Given :-**

Earning before Interest & Tax = 5,00,000

Debt = 3,00,000

Cost of Debt = 5%

Cost of Equity = 10%

- **Solution :-**

EBIT = 5,00,000

Less Interest : (15,000)

Shareholder's Earnings = 4,85,000

Market value of equity = Shareholder's Earnings / Cost of equity = 4,85,000 / 0.10 = 48,50,000

Market value of debt = 3,00,000

Total Market Value of firm = Market value of equity + Market value of debt = 51,50,000

Overall Cost of Capital = EBIT / Total value of Firm

= 5,00,000 / 51,50,000 = 0.097* 100 = **9.70%**

Numerical (Case 2)

- **Information Given :-**

Earning before Interest & Tax = 5,00,000

Debt = 4,00,000 (Increased by 1 lakh)

Cost of Debt = 5%

Cost of Equity = 10%

- **Solution :-**

EBIT = 5,00,000

Less Interest : (20,000)

Shareholder's Earnings = 4,80,000

Market value of equity = Shareholder's Earnings / Cost of Equity = 4,80,000 / 0.10 = 48,00,000

Market value of debt = 4,00,000

Total Market Value of firm = Market value of equity + Market value of debt = 52,00,000

Overall Cost of Capital = EBIT / Total value of Firm

= 5,00,000 / 52,00,000 = 0.0961* 100 = **9.61%**

Weighted Average Cost of Capital

- **Verify :- (Case 1)**

$$\text{WACC} = \left(K_d * \frac{D}{D+E} + K_e * \frac{E}{D+E} \right)$$

$$= \left(5 * \frac{3,00,000}{3,00,000+48,50,000} + 10 * \frac{48,50,000}{3,00,000+48,50,000} \right)$$

$$= 0.291 + 9.417 = 9.70\%$$

- **Verify :- (Case 2)**

$$\text{WACC} = \left(K_d * \frac{D}{D+E} + K_e * \frac{E}{D+E} \right)$$

$$= \left(5 * \frac{4,00,000}{4,00,000+48,00,000} + 10 * \frac{48,00,000}{4,00,000+48,00,000} \right)$$

$$= 0.384 + 9.230 = 9.61\ \%$$

Comparison

Case 1

- EBIT = **5,00,000**
- Cost of Debt = **5%**
- Cost of equity = **10%**
- Debt = **3,00,000**
- Equity = **48,50,000**
- WACC = **9.70%**
- Market Value of firm = **51,50,000**

Case 2

- EBIT = **5,00,000**
- Cost of Debt = **5%**
- Cost of equity = **10%**
- Debt = **4,00,000**
- Equity = **48,00,000**
- WACC = **9.61%**
- Market Value of firm = **52,00,000**

NET OPERATING INCOME APPROACH

Introduction

➢ Capital Structure does not matter in determining the value of firm.

➢ It suggests that the value of firm remains same and is not affected by the change in debt composition of financing.

➢ Increases in debt composition results in increased risk perception by investors.

➢ Thus, firm appears to be more risky with more debt as capital which results in higher required rate of return by investors.

➢ The weighted average cost of capital and market value of firm remains same with increases cost of equity.

Assumptions

- ✓ There are only two sources of financing

- ▪ Debt and Equity

- ✓ Value of equity is calculated by deducting the value of debt from total value of firm.

- ✓ Value of firm is EBIT/Overall cost of capital.

- ✓ WACC remains constant and with an increase in debt ,the cost of equity increases.

- ✓ Dividend pay-out ratio is 1.

- ✓ No taxes and No retained earning

Numerical (Case 1)

- **Information Given :-**

Earning before Interest & Tax = 3,00,000

Debt = 5,00,000

Cost of Debt = 5%

WACC = 10%

- **Solution :-**

EBIT = 3,00,000

WACC = 10%

Market value of firm = EBIT / WACC = 3,00,000 / 0.10 = **30,00,000**

Total debt = 5,00,000

Total equity = Market value of firm – Total debt = 30,00,000 – 5,00,000 = 25,00,000

Shareholder's Earnings = EBIT – Interest on debt = 3,00,000 – (5% of 5,00,000) = 2,75,000

Cost of equity = Shareholder's earnings / Total equity = 2,75,000 / 25,00,000 = 0.11 * 100 = **11%**

Numerical (Case 2)

- **Information Given :-**

Earning before Interest & Tax = 3,00,000

Debt = 8,00,000 (Increased by 3 lakh)

Cost of Debt = 5%

WACC = 10%

- **Solution :-**

EBIT = 3,00,000

WACC = 10%

Market value of firm = EBIT / WACC = 3,00,000 / 0.10 = **30,00,000**

Total debt = 8,00,000

Total equity = Market value of firm – Total debt = 30,00,000 – 8,00,000 = 22,00,000

Shareholder's Earnings = EBIT – Interest on debt = 3,00,000 – (5% of 8,00,000) = 2,60,000

Cost of equity = Shareholder's earnings / Total equity = 2,60,000 / 22,00,000 = 0.1181 * 100 = **11.81%**

Comparison

Case 1

- EBIT = **3,00,000**
- WACC = **10%**
- Market Value of firm = **30,00,000**
- Debt = **5,00,000**
- Equity = **25,00,000**
- Cost of equity = **11%**

Case 2

- EBIT = **3,00,000**
- WACC = **10%**
- Market Value of firm = **30,00,000**
- Debt = **8,00,000**
- Equity = **22,00,000**
- Cost of equity = **11.81%**

NOI Approach to Capital Structure

✓ WACC (Weightage Average Cost of Capital) remains constant and with the increase in debt, the cost of equity increases.

✓ Increase in debt in the capital structure results in increased risk for shareholders.

✓ As a compensation of investing in highly leveraged company, the shareholders expect higher return resulting in higher cost of equity capital.
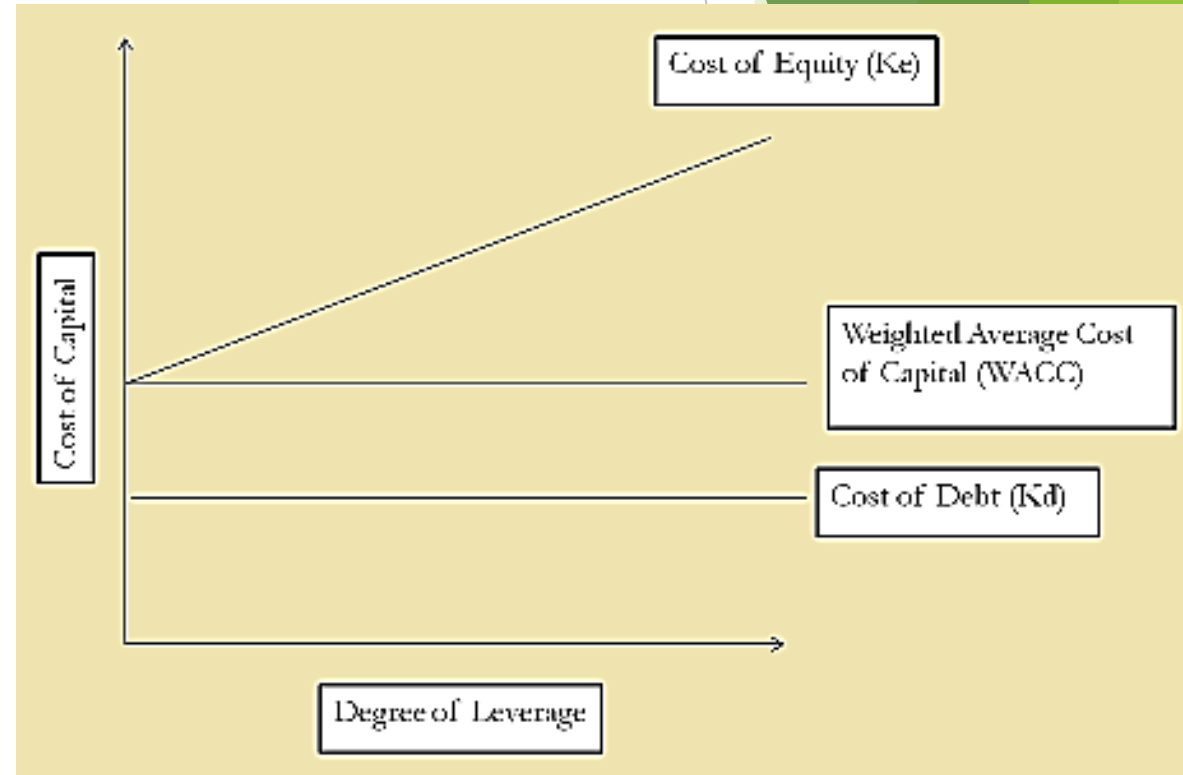
TRADITIONAL APPRAOCH

Introduction

➤ It suggests that the firm value is maximum with right proportion of debt and equity mix.

➤ As per this approach, debt funding should exist in the capital structure only up to a certain level ,after which any increase in debt funding would result in the reduction in the value of the firm by increasing cost of equity.

➤ It advocates that there exists an optimum level of debt and equity at which the WACC is the lowest and the market value of the firm is the highest.

Assumptions

➤ There are only two sources of financing –Debt and Equity

➤ The interest rate on debt remains constant to a certain level after which it increases with an increase in debt financing.

➤ The expected rate of return on equity increases gradually to certain level after which it increases speedily with increase in debt because of the financial risk involved.

➤ WACC first decreases and then starts increasing with increased interest rate on debt and increased required rate of return on equity.

➤ No taxes and transaction cost.

NUMERICAL EXAMPLE

Case 1

- Information Given –

EBIT – 2,00,000
Equity – 100%
Debt – 0%
Cost of Equity – 15% (K_e)

Solution –
Shareholder's Earnings = EBIT – Interest – Tax
$$= 2,00,000$$

Value of Equity = Shareholder's Earnings / K_e
$$= 2,00,000 / 0.15 = 13,33,334$$
Value of debt = 0

Total Value of Firm = $V_e + V_d$
$$= 13,33,334$$

WACC = EBIT / V_f = 2,00,000 / 13,33,334
$$= 0.149 = \textbf{14.99\%}$$

NUMERICAL EXAMPLE

Case 2

- Information Given –

EBIT – 2,00,000
Debt – 3,00,000 @ 10% rate of interest
Cost of Equity – 16% (K_e)

Solution –
Shareholder's Earnings = EBIT – Interest – Tax
$$= 2,00,000 - 30,000 = 1,70,000$$

Value of Equity = Shareholder's Earnings / K_e
$$= 1,70,000/ 0.16 = 10,62,500$$
Value of debt = 3,00,000

Total Value of Firm = $V_e + V_d$
$$= 10,62,500 + 3,00,000 = 13,62,500$$

WACC = EBIT / V_f = 2,00,000 / 13,62,500
$$= 0.1467 = \textbf{14.67\%}$$

NUMERICAL EXAMPLE

Case 3

- Information Given –

EBIT – 2,00,000
Debt – 5,00,000 @ 12% rate of interest
Cost of Equity – 19% (K_e)

Solution –
Shareholder's Earnings = EBIT – Interest – Tax
$$= 2,00,000 – 60,000 = 1,40,000$$

Value of Equity = Shareholder's Earnings / K_e
$$= 1,40,000 / 0.19 = 7,36,842$$
Value of debt = 5,00,000

Total Value of Firm = V_e + V_d
$$= 7,36,842 + 5,00,000 = 12,36,842$$

WACC = EBIT / V_f = 2,00,000 / 12,36,842
$$= 0.1617 = \textbf{16.17\%}$$

COMPARISON

Case 1

EBIT = 2,00,000

Debt = 0

Cost of Equity = 15%

Value of Firm = 13,33,334

WACC = 14.99%

Case 2

EBIT = 2,00,000

Debt = 3,00,000

Cost of Equity = 16%

Value of Firm = 13,62,500

WACC = 14.67%

Case 3

EBIT = 2,00,000

Debt = 5,00,000

Cost of Equity = 19%

Value of Firm = 12,36,842

WACC = 16.17%

Traditional Approach

✓ This approach of capital structure is based on the conviction that optimal capital structure always exists, and financer can increase the value of firms by making use of leverage.

✓ It is a combination of two previous approaches (NI and NOI). It has three stages.

✓ The supporter of Traditional theory were financial experts Ezta Solomon and Weston.

✓ According to this theory, good combination of debt and equity will always lead to market value improvement of the firm.

Traditional Approach

- ✓ This approach admits that the equity shareholders perceive financial risk and expect premiums for the risks undertaken.
- ✓ This theory also affirms that after a level of debt in the capital structure, the cost of equity capital upsurges.
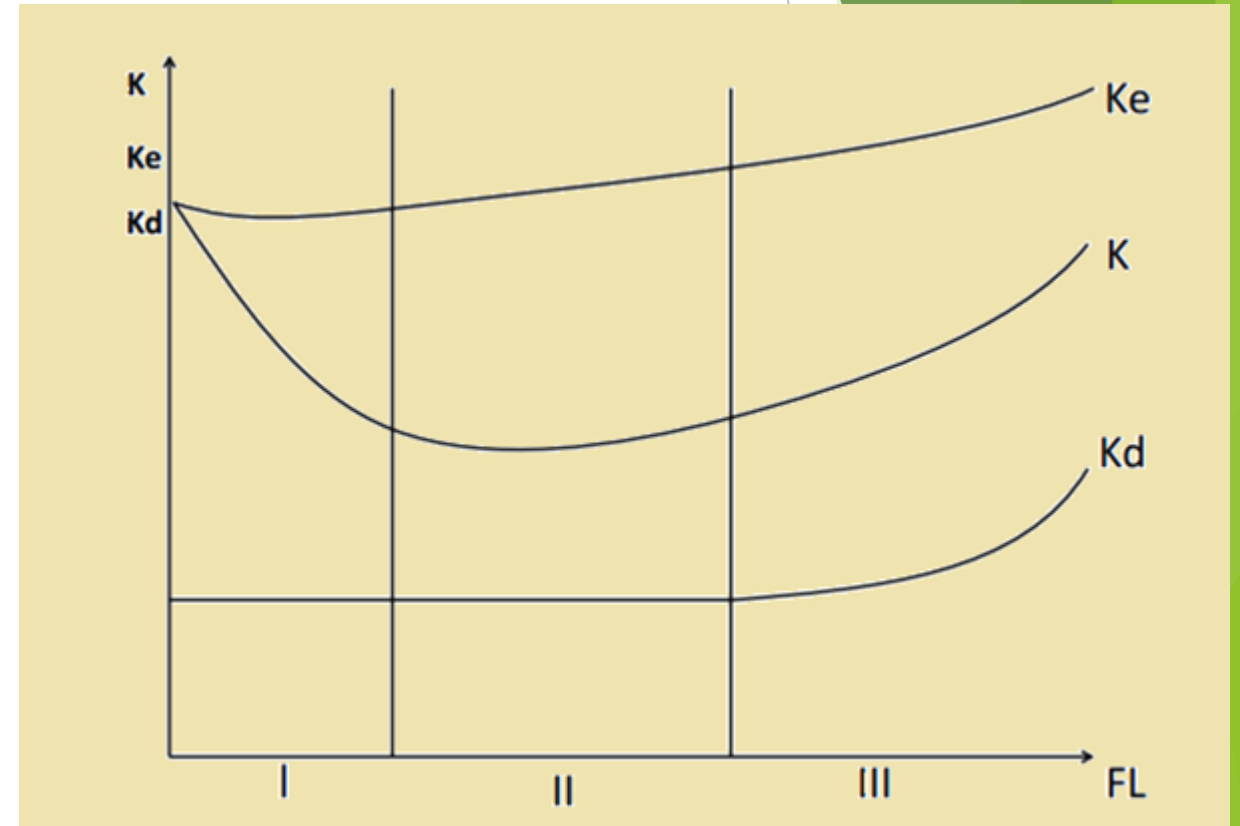
MODIGLIANI AND MILLER APPROACH (MM APPROACH)

Introduction

➤ The capital structure of a company is the way a company finances its assets. A company can finance its operations by either equity or different combinations of debt and equity.

➤ The capital structure of a company can have a majority of the debt component or a majority of equity, or an even mix of both debt and equity.

➤ Each approach has its own set of advantages and disadvantages.

➤ There are various capital structure theories that attempt to establish a relationship between the financial leverage of a company (the proportion of debt in the company's capital structure) with its market value.

➤ One such approach is the Modigliani and Miller Approach.

Introduction

➤ The Modigliani and Miller approach to capital theory, devised in the 1950s, advocates the capital structure irrelevancy theory.

➤ The fundamentals of the Modigliani and Miller Approach resemble that of the Net Operating Income Approach.

➤ This suggests that the valuation of a firm is irrelevant to the capital structure of a company. Whether a firm is highly leveraged or has a lower debt component has no bearing on its market value.

➤ The Modigliani and Miller Approach further states that the market value of a firm is affected by its operating income, apart from the risk involved in the investment.

Assumptions

• There are no taxes.

• Transaction cost for buying and selling securities, as well as the bankruptcy cost, is nil.

• There is a symmetry of information. This means that an investor will have access to the same information that a corporation would and investors will thus behave rationally.

• The cost of borrowing is the same for investors and companies.

• There is no floatation cost, such as an underwriting commission, payment to merchant bankers, advertisement expenses, etc.

• There is no corporate dividend tax.

Modigliani and Miller Approach

➢ The Modigliani and Miller Approach indicates that the value of a leveraged firm (a firm that has a mix of debt and equity) is the same as the value of an unleveraged firm (a firm that is wholly financed by equity) if the operating profits and future prospects are same.

➢ That is, if an investor purchases shares of a leveraged firm, it would cost him the same as buying the shares of an unleveraged firm.

MODIGLIANI AND MILLER APPROACH

The theory stated that the value of a firm is not dependent on the choice of capital structure or financing decision of firm. On the contrary, it is affected by its operating income apart from the risk involved in the investment. This approach was **devised by Modigliani and Miller** during 1950s. It resembles Net Operating Income Approach.

ASSUMPTIONS

- Tax Rate = 0%
- Transaction Cost = 0
- Same information access to investors and corporates
- Floatation Cost = 0
- CDT Rate = 0%.

PROPOSITIONS WITHOUT TAXES

P 1
- The capital structure does not influence the value of firm.
- Debt holders & equity shareholders have same priority.

P 2
- Financial leverage is in direct proportion to Cost of Equity (Ke).
- With rise in debt, the equity shareholders perceive a higher risk.

PROPOSITIONS WITH TAXES

- It assumes existence of taxes, therefore, tax benefits due to interest payments are recognized.
- So, Cost of Debt reduces by Interest Tax Shields
- Therefore, change in debt component can affect value of a firm.

Modigliani and Miller Approach: Two Propositions without Taxes

Proposition 1

- ✓ With the above assumptions of "no taxes", the capital structure does not influence the valuation of a firm.

- ✓ In other words, leveraging the company does not increase the market value of the company.

- ✓ It also suggests that debt holders in the company and equity shareholders have the same priority, i.e., earnings are split equally amongst them.

Modigliani and Miller Approach: Two Propositions without Taxes

Proposition 2

- ✓ It says that financial leverage is in direct proportion to the cost of equity. With an increase in the debt component, the equity shareholders perceive a higher risk to the company. Hence, in return, the shareholders expect a higher return, thereby increasing the cost of equity.

- ✓ A key distinction here is that Proposition 2 assumes that debt shareholders have the upper hand as far as the claim on earnings is concerned. Thus, the cost of debt reduces.

Proposition 2

$$WACC = k_d \times \dfrac{D}{V} + k_e \times \dfrac{E}{V}$$

$$k_e = WACC + (WACC - k_d) \times \dfrac{D}{E}$$

WACC : weighted-average cost of capital,

k_d is the cost of debt,

k_e is the cost of equity,

D is the absolute value of debt,

E is the absolute value of equity and

V is the value of total assets of the company E + D.

The above equation means that with an increase in debt-to-equity ratio (D/E), cost of equity will increase resulting in a constant weighted-average cost of capital (WACC) at any capital structure.

Modigliani and Miller Approach: Propositions with Taxes (The Trade-Off Theory of Leverage)

✓ The Modigliani and Miller Approach assumes that there are no taxes, but in the real world, this is far from the truth. This theory recognizes the tax benefits accrued by interest payments.

✓ The interest paid on borrowed funds is tax deductible. However, the same is not the case with dividends paid on equity.

✓ In other words, the actual cost of debt is less than the nominal cost of debt due to tax benefits.

✓ This brings us to M&M Theory 2 which relaxes the zero-tax assumption.

Modigliani and Miller Approach: Propositions with Taxes

Proposition 1

In a tax environment, the value of a levered company is higher than the value of an unlevered company by an amount equal to the product of absolute amount of debt and tax rate. This can be expressed mathematically as follows:

$$V_L = V_{UL} + t \times D$$

Where V_L is the value of levered company i.e. company with some debt in its capital structure, V_{UL} is the value of an un-levered company i.e. with no or lower debt, t is the tax rate and D is the absolute amount of debt.

Modigliani and Miller Approach: Propositions with Taxes

Proposition 2

Since interest expense is tax-deductible, equation for the weighted average cost

of capital modifies as follows:

$$WACC = ke \times E/V + kd \times (1 - t) \times D/V$$

All other variables are the same as in Proposition 2 of Theory 1 except for the factor of

(1 – t) which represents the tax shield i.e. the decrease in effective cost of debt due to

existence of tax benefit of debt.

After some mathematical adjustment, we get the following function for cost of equity

in a positive-tax environment:

$$ke = WACC + (WACC - kd) \times (1 - t) \times D/E$$

Modigliani and Miller Approach: Propositions with Taxes

$$ke = WACC + (WACC - kd) \times (1 - t) \times D/E$$

The above equation is the same as in Proposition 2 of Theory 1 except for the factor of $(1 - t)$.

- ✓ The consequence of debt shield is that cost of equity increases with an increase in D/E but the increase in less pronounced than in a no-tax environment.

- ✓ The implication of M&M theory with tax is that the capital structure is no longer irrelevant.

- ✓ The value of a company with debt is higher than the value of a company with no or lower debt.

Modigliani and Miller Approach

Example: A company is considering a business in which the expected weighted average cost of capital is 10% keeping in view the associated business risk. It has option to incorporate in Country A which has no taxes or in Country B which as 20% corporate taxes. If the company's cost of debt is 6% in both countries, find out its cost of equity in both countries at the following debt-to-equity ratio levels: (a) zero, (b) 1, and (c) 2.

Country A: Country A has no taxes, so we can use the cost of equity function as in Proposition 2 of the Theory 1:

$$k_e = WACC + (WACC - k_d) \times (1 - t) \times D/E$$

k_e @ D/E of 0 = 10% + (10% − 6%) × 0 = 10%

k_e @ D/E of 1 = 10% + (10% − 6%) × 1 = 14%

k_e @ D/E of 2 = 10% + (10% − 6%) × 2 = 18%

Modigliani and Miller Approach

We can demonstrate that the weighted average cost of capital at all level of debt-

to-equity ratio is the same i.e. 10%. Let's see what happens at D/E of 1 or D/V of

50%: WACC = 50% × 6% + 50% × 14% = 10%

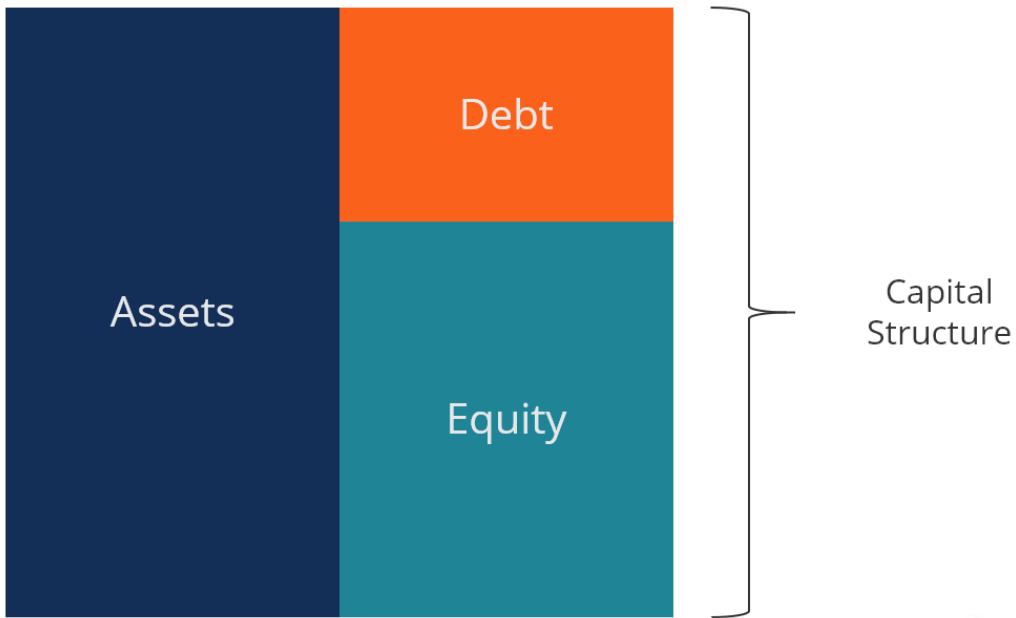$$ke = WACC + (WACC - kd) \times (1 - t) \times D/E$$

Country B: Existence of taxes creates a preference for debt resulting in a lower increase

in equity with addition of debt as demonstrated below:

k_e @ D/E of 0 = 10% + (10% − 6%) × (1 − 20%) × 0 = 10%

k_e @ D/E of 1 = 10% + (10% − 6%) × (1 − 20%) × 0 = 13.2%

k_e @ D/E of 2 = 10% + (10% − 6%) × (1 − 20%) × 2 = 16.2%

The consequence of this less pronounced increase in cost of equity is that the weighted

average cost of capital decrease with increase in debt-to-equity ratio. Theoretically, the
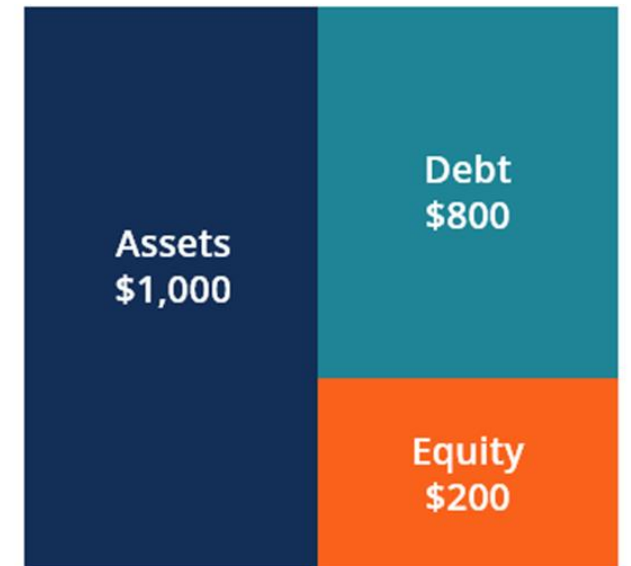
value is maximized for an all-debt company.

Relation Between Capital structure and corporate Value

Capital Structure

Assets | Debt
Equity

Low leverage

Assets $1,000 | Debt $200
Equity $800

High leverage

Assets $1,000 | Debt $800
Equity $200

Relation Between Capital structure and corporate Value

A company

Capital Structure
Assets — Debt
Assets — Equity

Investment dynamics

Risk	Return	Ownership	Performance
Low risk	Low return • Interest • Capital back	No ownership rights	Temporal
High risk	High return • Dividend • Capital growth	Ownership rights – voting rights	Permanent

OPTIMAL CAPITAL STRUCTURE

Optimal Capital Structure

✓ The capital structure is how a firm finances its overall operations and growth by using different sources of funds.

✓ The optimum capital structure indicates the best debt-to-equity ratio for a firm that maximizes its value.

✓ It is a financial measurement that firms use to find out the best mix of debt and equity financing to use for operations and expansions.
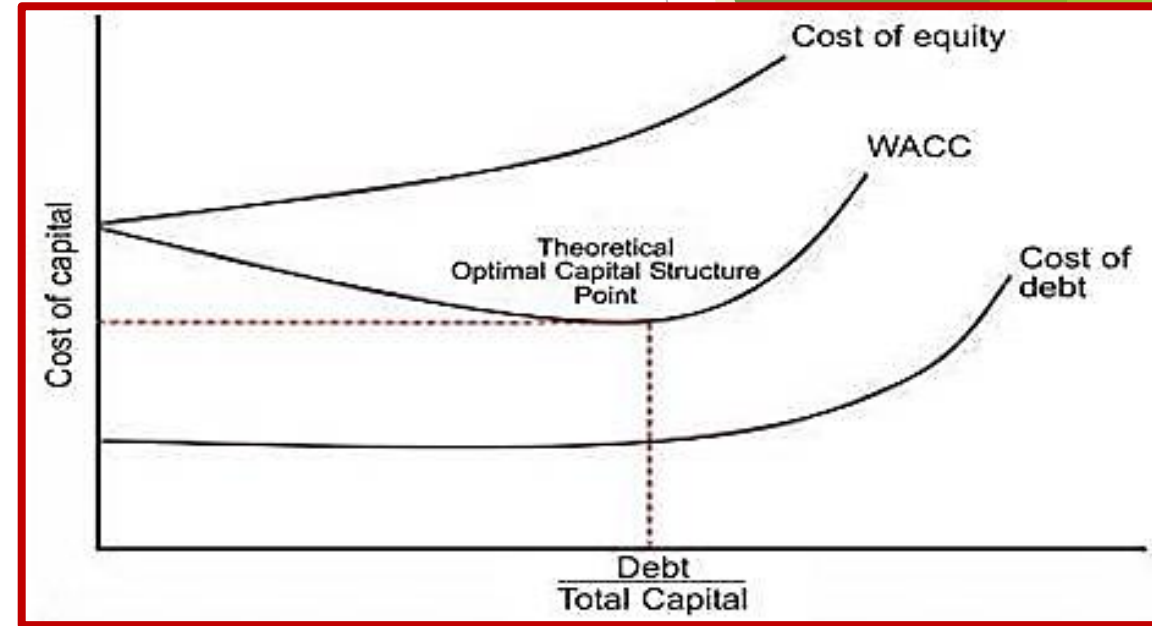
Optimal Capital Structure

The capital structure is said to be an optimal capital structure when

a company selects such a mix of debt and equity which:

✓ Minimises the overall cost of capital;

✓ Maximises the earning per share(EPS);

✓ Maximises the value of company;

✓ Maximises the market value of the company's equity shares;

✓ Maximises the wealth of the shareholders.

Features

- ✓ It maintains the financial stability of the firm.

- ✓ The finance manager determines the proportion of debt and equity in such a manner that the financial risk remains low.

- ✓ The advantage of the leverage offered by corporate taxes is taken into account in achieving the optimal capital structure.

- ✓ Borrowings help in increasing the value of company leading towards optimal capital structure.

- ✓ The cost of capital reaches at its minimum and market price of share becomes maximum at optimal capital structure.

Optimal Capital Structure

Factors determining the optimum capital structure of an enterprise

1.Nature of business: The nature of business itself is one of the factors determining a capital structure to be maintained.

2.Size of the company: Small enterprises have to rely less on borrowed capital and depend more on owner's capital.

3.Trading on equity: In case of trading on equity, there is greater dependence on borrowed capital in the capital structure.

Optimal Capital Structure

Factors determining the optimum capital structure of an enterprise

4.Cash flows: The more the cash inflows, more wilt be the amount (Ask) of borrowed capital in the overall capital structure and vice-versa.

5.The purpose of financing: The purpose of financing also affects the capital structure of the enterprise.

6.The condition of the future: The scope of changing the capital structure in future is another basic consideration for determining capital the capital structure of an enterprise