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Security Valuation

Study Session 2

LOS 1 : Introduction

Note: Total Earnings mean Earnings available to equity share holders

Income Statement

Sales
Less: Variable cost
Contribution
Less: Fixed cost excluding Dep.
EBITDA
Less: Depreciation and Amortization
EBIT
Less: Interest
EBT
Less: Tax
EAT
Less: Preference Dividend
Earnings Available to Equity Share holders
Less: Equity Dividend
T/F to R&S

LOS 2 : SOME BASIC RATIOS

- EPS $= \frac{\text{Total earning available to equity shareholders}}{\text{Total number of equity shares}}$
- DPS $= \frac{\text{Total dividend paid to equity shareholders}}{\text{Total number of equity shares}}$
- MPS $= \frac{\text{Total Market Value/ Market Capitalization/ Market Cap}}{\text{Total number of equity shares}}$
- REPS $= \frac{\text{Total Retained earnings}}{\text{Total number of equity shares}}$

OR

- REPS = **EPS - DPS**

- Dividend Yield = $\frac{\text{Dividend per share}}{\text{Market price per share}} \times 100$
- Dividend pay-out Ratio = $\frac{\text{Dividend per share}}{\text{Earning per share}} \times 100$
- Dividend Rate = $\frac{\text{Dividend per share}}{\text{Face value per share}} \times 100$
- Earning Yield = $\frac{\text{Earning per share}}{\text{Market Price per share}} \times 100$
- P/E Ratio = $\frac{\text{MPS}}{\text{EPS}}$
- Retention Ratio = $\frac{\text{Retained Earning per share}}{\text{Earning per share}} \times 100$

  = $\frac{\text{EPS} - \text{DPS}}{\text{EPS}} \times 100$

OR

- Retention Ratio = 1 – Dividend Payout Ratio

Note :

- **Relationship Between DPR & RR:**

RR + DPR = 100% or 1

- Dividend yield and Earning Yield is always calculated on annual basis.
- Dividend is 1st paid to preference share holder before any declaration of dividend to equity share holders.
- Dividend is always paid upon FV(Face Value) not on Market Value.

LOS 3 : Define Cash Dividends, Stock Dividend ,Stock Split

Cash Dividends: As the name implies, are payments made to shareholders in cash. They come in 3 forms:

(i) **Regular Dividends**: Occurs when a company pays out a portion of profits on a consistent basis. E.g. Quarterly, Yearly, etc.

(ii) **Special Dividends:** They are used when favourable circumstances allow the firm to make a one-time cash payment to shareholders, in addition to any regular dividends. E.g. Cyclical Firms

(iii) **Liquidating Dividends**: Occurs when company goes out of business and distributes the proceeds to shareholders.

Stock Dividends (Bonus Shares) :

- Stock Dividend are dividends paid out in new shares of stock rather than cash. In this case, there will be more shares outstanding, but each one will be worth less.
- Stock dividends are commonly expressed as a percentage. A 20% stock dividend means every shareholder gets 20% more stock.

Stock Splits :

- Stock Splits divide each existing share into multiple shares, thus creating more shares. There are now more shares, but the price of each share will drop correspondingly to the number of shares created, so there is no change in the owner's wealth.
- Splits are expressed as a ratio. In a 3-for-1 stock split, each old share is split into three new shares.
- Stock splits are more common today than stock dividends.

Effects on Financial ratios:

- Paying a cash dividend decreases assets (cash) and shareholders' equity (retained earnings) .Other things equal, the decrease in cash will decrease a company's liquidity ratios and increase its debt-to-assets ratio, while the decrease in shareholders' equity will increase its debt-to-equity ratio.
- Stock dividends, stock splits, and reverse stock splits have no effect on a company's leverage ratio or liquidity ratios or company's assets or shareholders' equity.

LOS 4 : RETURN CONCEPTS

- A sound investment decision depends on the correct use and evaluation of the rate of return. Some of the different concepts of return are given as below:

Required Rate of Return:

An asset's required return is the minimum return an investor requires given the asset's risk. A more risky asset will have a higher required return. Required return is also called the opportunity cost for investing in the asset. If expected return is greater (less) than required return, the asset is undervalued (overvalued).

Price Convergence

If the expected return is not equal to required return, there can be a "return from convergence of price to intrinsic value."

Letting V_0 denote the true intrinsic value, and given that price does not equal that value (i.e., $V_0 \neq P_0$), then the return from convergence of price to intrinsic value is $\frac{V_0 - P_0}{P_0}$.

If an analyst expects the price of the asset to converge to its intrinsic value by the end of the horizon, then $\frac{V_0 - P_0}{P_0}$ is also the difference between the expected return on an asset and its required return:

$$\text{Expected Return} = \text{Required Return} + \frac{V_0 - P_0}{P_0}$$

Example:

Suppose that the current price of the shares of ABC Ltd. is ₹30 per share. The investor estimated the intrinsic value of ABC Ltd.'s share to be ₹35 per share with required return of 8% per annum. Estimate the expected return on ABC Ltd.

Solution :

Intel's expected convergence return is (35 - 30)/30 * 100 = 16.67%, and let's suppose that the convergence happens over one year. Thus, adding this return with the 8% required return, we obtain an expected return of 24.67%.

Discount Rate

Discount Rate is the rate at which present value of future cash flows is determined. Discount rate depends on the risk free rate and risk premium of an investment.

Internal Rate of Return

Internal Rate of Return is defined as the discount rate which equates the present value of future cash flows to its market price. The IRR is viewed as the average annual rate of return that investors earn over their investment time period assuming that the cash flows are reinvested at the IRR.

LOS 5 : EQUITY RISK PREMIUM

Equity risk premium is the excess return that investment in equity shares provides over a risk free rate, such as return from tax free government bonds. This excess return compensates investors for taking on the relatively higher risk of investing in equity shares of a company.

Calculating the Equity Risk Premium

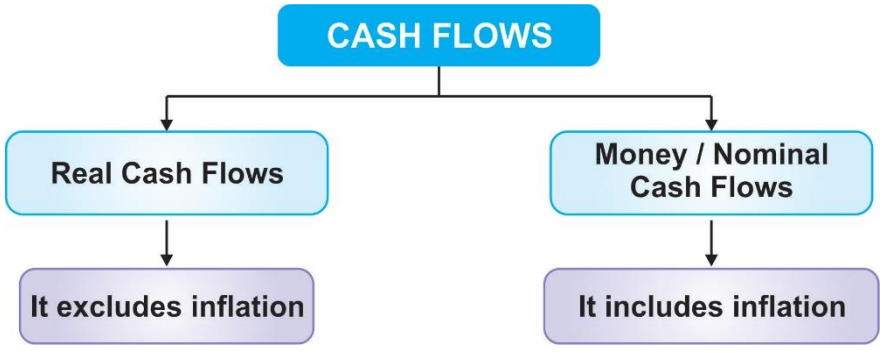
To calculate the equity risk premium, we can begin with the capital asset pricing model (CAPM), which is usually written:

$R_x = R_f + \beta_1 (R_m - R_f)$ Where:
R_x = required return on investment in "x"(company x)
R_f = risk-free rate of return
β_x = beta of "x"
R_m = required return of market

Equity Risk Premium = $R_x - R_f = \beta_x (R_m - R_f)$

LOS 6 : Concept of Nominal Cash Flow and Real Cash Flow

Cash Flow:



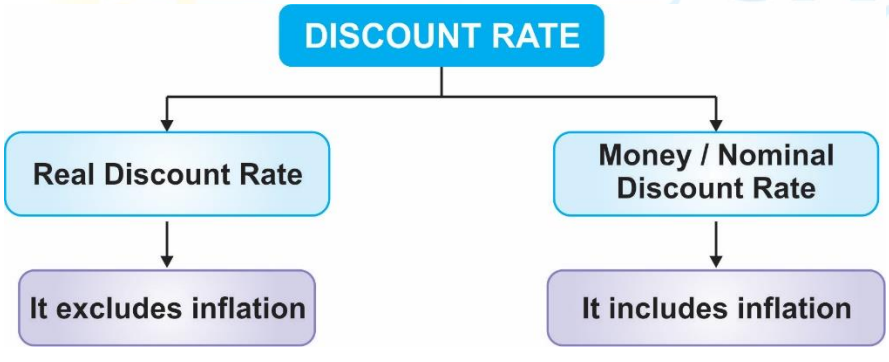
Conversion of Real Cash Flow into Money Cash Flow & Vice-versa

$$\text{Money Cash Flow} = \text{Real Cash Flow } (1 + \text{Inflation Rate})^n$$

Or

$$\text{Real Cash Flow} = \frac{\text{Money Cash Flow}}{(1+\text{Inflation Rate})^n}$$

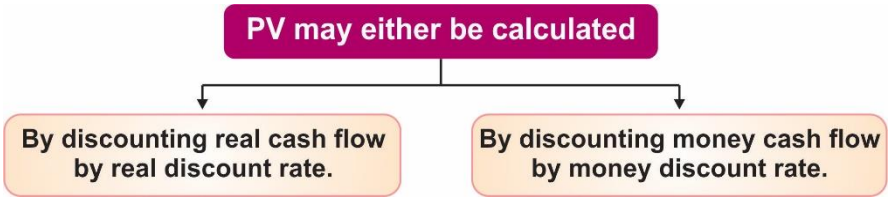
Discount Rate:



Conversion of Real Discount Rate into Money Discount Rate & Vice-versa

$$(1 + \text{Money Discount Rate}) = (1 + \text{Real Discount Rate})\ (1 + \text{Inflation Rate})$$

PV:



Discount rate selection in Equity Valuation

- While valuing equity shares, only nominal cash flows are considered. Therefore, only nominal discount rate is considered. The reason is that the tax applying to corporate earnings is generally stated in nominal terms. Therefore, using nominal cash flow in equity valuation is the right approach because it reflects taxes accurately.
- Moreover, when the cash flows are available to Equity Share Holders only, nominal cost of Equity is used. And when cash flows are available to all the companies capital providers, nominal after tax weighted average cost of capital is used.

LOS 7 : Ex – Dividend and Cum – Dividend Price of a share

- If Question is Silent, always Assume Ex- Dividend price of share.
- If cum-dividend price is given, we must deduct dividend from it.
- It may be noted that in all the formula, we consider Ex-Dividend & not Cum-Dividend.

LOS 8 : Valuation Models based on Earnings & Dividends

Walter's Model :

Walter's supports the view that the dividend policy plays an important role in determining the market price of the share.

He emphasis two factors which influence the market price of a share:-

(i) Dividend Payout Ratio.

(ii) The relationship between Internal return on Retained earnings (r) and cost of equity capital (K_e)

Walter classified all the firms into three categories:-

a) Growth Firm:

- If ($r > K_e$). In this case, the shareholder's would like the company to retain maximum amount i.e. to keep payout ratio quite low.
- In this case, there is negative correlation between dividend and market price of share.
- If $r > K_e$, Lower the Dividend Pay-out Ratio Higher the Market Price per Share & vice-versa.

b) Declining Firm:

- If ($r < K_e$). In this case, the shareholder's won't like the firm to retain the profits so that they can get higher return by investing the dividend received by them.
- In this case, there is positive correlation between dividend and market price of share.
- If $r < K_e$, Higher the Dividend Pay-out Ratio, Higher the Market Price per Share & vice-versa.

c) Constant Firm:

- If rate of return on Retained earnings (r) is equal to the cost of equity capital (K_e) i.e.($r = K_e$). In this case, the shareholder's would be indifferent about splitting off the earnings between dividend & Retained earnings.
- If $r = K_e$, Any Retention Ratio or Any Dividend Payout Ratio will not affect Market Price of share. MPS will remain same under any Dividend Payout or Retention Ratio.

Note: Walter concludes:-

- The optimum payout ratio is NIL in case of growth firm.
- The optimum payout ratio for declining firm is 100%
- The payout ratio of constant firm is irrelevant.

Summary: Optimum Dividend as per Walter's

Category of the Firm	r Vs. K_e	Correlation between DPS & MPS	Optimum Payout Ratio	Optimum Retention Ratio
Growth	r >K_e	Negative	0 %	100 %
Constant	r = K_e	No Correlation	Every payout is Optimum	Every retention is Optimum
Decline	r <K_e	Positive	100%	0 %

Valuation of Equity as per Walter's

Current market price of a share is the present value of two cash flow streams:-

a) Present Value of all dividend.
b) Present value of all return on retained earnings.

In order to testify the above, Walter has suggested a mathematical valuation model i.e.,

$$P_0 = \frac{DPS}{K_e} + \frac{\frac{r}{K_e}(EPS - DPS)}{K_e}$$

When

P_0	=	Current price of equity share (Ex-dividend price)/ Fair or Theoretical or Intrinsic or Equilibrium or present Value Price per Share
DPS	=	Dividend per share paid by the firm
r	=	Rate of return on investment of the firm / IRR / Return on equity
K_e	=	Cost of equity share capital / Discount rate / expected rate of return/opportunity cost / Capitalization rate
EPS	=	Earnings per share of the firm
EPS – DPS	=	Retained Earning Per Share

Assumptions :

- DPS & EPS are constant.
- K_e & r are constant.
- Going concern assumption, company has infinite life.
- No external Finance

LOS 9 : Gordon's Model/Growth Model/ Dividend discount Model

- Gordon's Model suggest that the dividend policy is relevant and can effect the value of the share.
- Dividend Policy is relevant as the investor's prefer current dividend as against the future uncertain Capital Gain
- Current Market price of share = PV of future Dividend, growing at a constant rate

$$P_0 = \frac{D_0\,(1+g)}{K_e - g_c} \quad \text{OR} \quad P_0 = \frac{D_1\,(\text{next expected dividend})}{K_e - g_c} \quad \text{OR} \quad P_0 = \frac{EPS_1\,(1-b)}{K_e - br}$$

P_0 = Current market price of share.
K_e = Cost of equity capital/ Discount rate/ expected rate of return/ Opportunity cost/ Capitalization rate.
g = Growth rate
D_1 = DPS at the end of year / Next expected dividend / Dividend to be paid
D_0 = Current year dividend / dividend as on today / last paid dividend
EPS_1 = EPS at the end of the year
b = Retention Ratio
1-b = Dividend payout Ratio

Note:

Watch for words like ' Just paid ' or ' recently paid ', these refers to the last dividend D_0 and words like ' will pay ' or ' is expected to pay ' refers to D_1 .

Assumptions:

(i) No external finance is available.
(ii) K_e & r are constant.
(iii) 'g' is the product of its Retention Ratio 'b' and its rate of return 'r'

$$g = b \times r \quad \text{OR} \quad g = RR \times ROE.$$

(iv) $K_e > g$
(v) g & RR are constant.
(vi) Firm has an infinite life

Applications

1. **EPS_1 (1-b) = DPS_1**

Proof :

EPS_1 (1-b) = EPS_1 × Dividend payout Rate

$$= EPS_1 \times \frac{DPS1}{EPS1}$$

$$= DPS_1$$

We know that DPR + RR = 1 or 100%

2. **If EPS = DPS, RR = 0 then g = 0**

$$P_0 = \frac{D_0\,(1+g)}{K_e - g}$$

$$P_0 = \frac{D_0}{K_e} \text{ as } g = 0$$

$P_0 = \frac{EPS}{K_e}$ (∵ EPS = DPS)

3. Calculation of P_1 (Price at the end of year 1)

Price at the beginning = PV of Dividend at end + PV of market price at end

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

4. $K_e = \frac{1}{P.E\ Ratio}$

Note:
The above equation for calculating K_e should only be used when no other method of calculation is available.

LOS 10 : Determination of Growth rate

The sustainable growth rate is the rate at which equity, earnings and dividends can continue to grow indefinitely assuming that ROE is constant, the dividend payout ratio is constant, and no new equity is sold.

Method 1: Sustainable growth (g) = (1 - Dividend payout Ratio) × ROE

Or **g = RR × ROE**

Method 2 : $D_n = D_0 (1 + g)^{n-1}$

D_0 = Base year dividend
D_n = Latest (Current year dividend)
n-1 = No. Of times D_0 increases to D_n

LOS 11: Calculation of K_e in case of Floating cost is given

Floating Cost are costs associated with the issue of new equity. E.g. Brokerage, Commission, underwriting expenses etc.

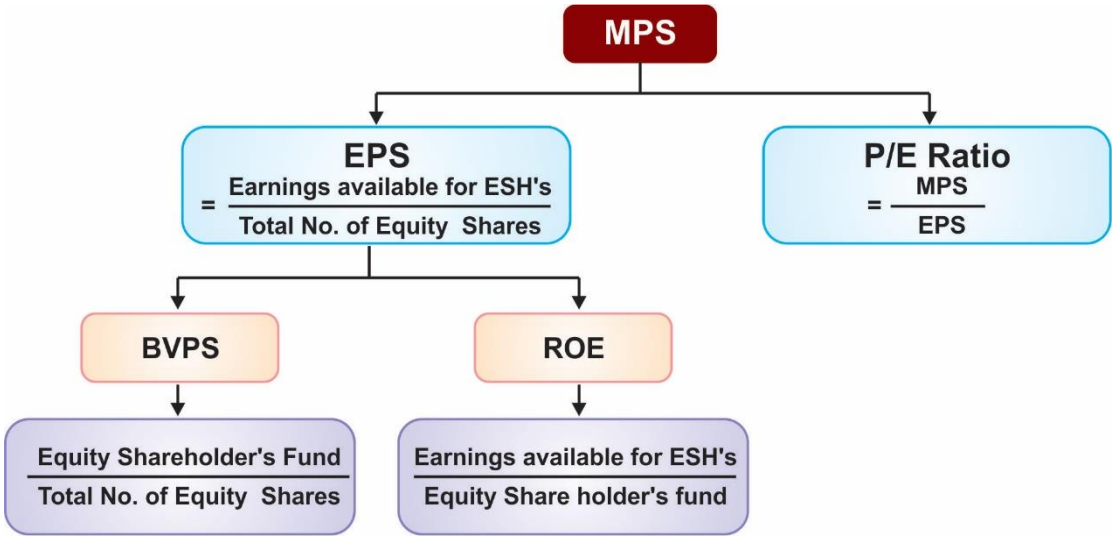
- If issue cost is given in question, we will take P_0 net of issue cost (Net Proceeds).
- If floating Cost is expressed in % i.e. $P_0 (1 - f) = \frac{D_1}{K_e - g_c}$
- If floating Cost is expressed in Absolute Amount i.e. $P_0 - f = \frac{D_1}{K_e - g_c}$

Note:

- K_e of new equity will always be greater than K_e of existing equity.
- Floatation Cost is only applicable in case of new equity and not on existing equity (or retained earnings).

LOS 12 : Return on Equity (ROE) and Book Value Per Share (BVPS)

EPS = BVPS × ROE



Note : Calculate P / E Ratio at which Dividend payout will have no effect on the value of the share.

When r = K_e , dividend payout ratio will not affect value of share.

Example:

If r = 10% then K_e = 10% and $K_e = \frac{1}{P/ERatio}$ => $0.10 = \frac{1}{P/ERatio}$

=> P/E Ratio = 10 times

LOS 13 : Over – Valued & Under – Valued Shares

Cases	Value	Decision
PV Market Price < Actual Market Price	Over – Valued	Sell
PV Market Price > Actual Market Price	Under – Valued	Buy
PV Market Price = Actual Market Price	Correctly Valued	Buy / Sell

LOS 14 : Holding Period Return (HPR)

$$HPR = \frac{(P_1 - P_0) + D_1}{P_0}$$

$$HPR = \frac{P_1 - P_0}{P_0} + \frac{D_1}{P_0}$$

(Capital gain Yield / Return) (Dividend Yield / Return)

LOS 15 : Multi-stage Dividend discount Model [If g >K e]/ Variable Growth Rate Model

- Growth model is used under the assumption of g = constant.
- When more than one growth rate is given, then we will use this concept.

or

If g > K_e

- A firm may temporarily experience a growth rate that exceeds the required rate of return on firm's equity but no firm can maintain this relationship indefinitely.

Value of a dividend- paying firm that is experiencing temporarily high growth =

PV of dividends expected during high growth period.

+

PV of the constant growth value of the firm at the end of the high growth period.

$$\text{Value} = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \ldots\ldots\ldots\ldots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

$$\text{When } P_n = \frac{D_n(1+g_c)}{K_e - g_c}$$

LOS 16 : IRR Technique & Growth Model

IRR is the discount rate that makes the present values of a project's estimated cash inflows equal to the Present value of the project's estimated cash outflows.

- At IRR Discount Rate => PV (inflows) = PV (outflows)
- The IRR is also the discount rate for which NPV of a project is equal to Zero.
- IRR technique is used when, K_e is missing in the Question.
- IRR = Lower Rate + $\frac{\text{Lower Rate}_{NPV}}{\text{Lower Rate}_{NPV} - \text{Higher Rate}_{NPV}}$ × Difference in Rate

LOS 17 : Price at the end of each year

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

$$P_1 = \frac{P_2 + D_2}{(1+K_e)^1}$$

$$P_2 = \frac{P_3 + D_3}{(1+K_e)^1}$$

$$P_3 = \frac{P_4 + D_4}{(1+K_e)^1}$$

.

So on

Los 18 : Negative Growth

If Positive Growth, then $P_0 = \frac{D_0(1+g)}{K_e - g}$

If Negative Growth, then $P_0 = \frac{D_0(1-g)}{K_e + g}$

Note: We Know g = RR × ROE

Case I	EPS > DPS	Retention is Positive	g = Positive
Case II	EPS < DPS	Retention is Negative	g = Negative
Case III	EPS = DPS	No Retention	g = 0

LOS 19 : Valuation Using the H-Model

The earnings growth of most firms does not abruptly change from a high rate to a low rate as in the two-stage model but tends to decline over time as competitive forces come into play. The H-model approximates the value of a firm assuming that an initially high rate of growth declines linearly over a specified period. The formula for this approximation is:

$$P_0 = \frac{D_0 \times (1 + g_L)}{K_e - g_L} + \frac{D_0 \times H \times (g_S - g_L)}{K_e - g_L}$$

where:

H = $\frac{t}{2}$ = half-life (in years) of high-growth period

t = length of high growth period

g_S = short-term growth rate

g_L = long-term growth rate

r = required return

LOS 20 : Preference Dividend Coverage Ratio & Equity Dividend Coverage Ratio

Interest Coverage Ratio = $\frac{\text{Earning Before Interest and Tax}}{\text{Interest}}$

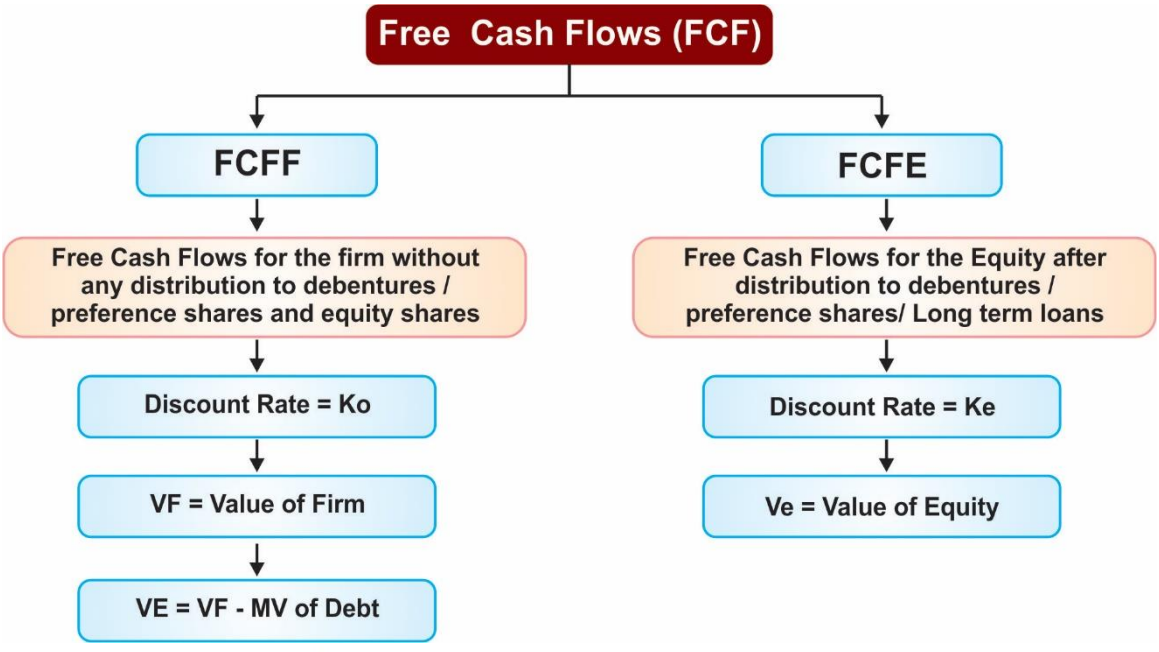
Preference Dividend Coverage Ratio = $\frac{\text{Profit After Tax}}{\text{Preference Dividend}}$

Equity Dividend Coverage Ratio = $\frac{\text{Profit After Tax – Preference Dividend}}{\text{Dividend payable to equity share holders}}$

Note:

The Higher the Better. These Ratios indicates the surplus profit left after meeting all the fixed obligation.

LOS 21 : Cash Flow Base Models



Calculation of FCFF

EBITDA	xxx
Less : Depreciation & Amortisation (NCC)	xxx
EBIT	xxx
Less : Tax	xxx
NOPAT	xxx
Add : Depreciation (NCC)	xxx
Less : Increase in Working Capital (WCInv)	xxx
Less : Capital Expenditure (FCInv)	xxx
Free Cash Flow For Firm (FCFF)	**xxx**

a) **Based on its Net Income:**
FCFF= Net Income + Interest expense *(1-tax) + Depreciation -/+ Capital Expenditure –/+ Change in Non-Cash Working Capital

b) **Based on Operating Income or Earnings Before Interest and Tax (EBIT):**
FCFF= EBIT *(1 - tax rate) + Depreciation -/+ Capital Expenditure –/+ Change in Non-Cash Working Capital

c) **Based on Earnings before Interest, Tax , Depreciation and Amortisation (EBITDA):**
FCFF = EBITDA* (1-Tax) +Depreciation* (Tax Rate) -/+ Capital Expenditure – /+Change in Non-Cash Working Capital

d) **Based on Free Cash Flow to Equity (FCFE):**
FCFF = FCFE + Interest* (1-t) + Principal Prepaid - New Debt Issued + Preferred Dividend

e) **Based on Cash Flows:**
FCFF = Cash Flow from Operations (CFO) + Interest (1-t) -/+ Capital Expenditure

Calculation of FCFE

Method 1 : If Debt financing ratio is given:

EBITDA	xxx
Less : Depreciation & Amortisation	xxx
EBIT	xxx
Less : Interest	xxx
EBT	xxx
Less : Tax	xxx
PAT	xxx
Add : Depreciation × % Equity Invested	xxx
Less: Increase in Working Capital × % Equity Invested	xxx
Less: Capital Expenditure × % Equity Invested	xxx
Free Cash Flow for Equity (FCFE)	**xxx**

Method 2 : If Debt financing ratio is not given:

EBITDA	xxx
Less : Depreciation & Amortisation	xxx
EBIT	xxx
Less : Interest	xxx
EBT	xxx
Less : Tax	xxx
PAT	xxx
Add : Depreciation (NCC)	xxx
Less: Increase in Working Capital (WCInv)	xxx
Less: Capital Expenditure (FCInv)	xxx
Add : Net Borrowings	xxx
Free Cash Flow for Equity (FCFE)	**xxx**

a) Calculating FCFE from FCFF

FCFE = FCFF - [Interest (1- tax rate)] + Net borrowing

b) Calculating FCFE from net income

FCFE = NI + NCC - FCInv - WCInv + net borrowing

c) Calculating FCFE from CFO

FCFE = CFO - FCInv + net borrowing

LOS 22 : Valuation Based on Multiples

1. **P/E Multiple Approach** **MPS = EPS × P/E Ratio**
2. **Enterprise Value to Sales** $= \frac{EV}{Sales}$
3. **Enterprise Value to EBITDA** $= \frac{EV}{EBITDA}$

EV = market value of common stock + market value of preferred equity + market value of debt + minority interest – cash & cash equivalents and Equity investments, investment in any co. & also Long term investments.

EBITDA = EBIT + depreciation + amortization