

AFIN 353- NOTES

Week 1: DCF and Multiples valuation

Discounted Cash-flow Valuation (DCF)

$$= \text{Sum of } CF_t / (1+r)^t + TV / (1+r)^n$$

Rates and returns

- Discount rates must match the periodicity of cash-flows
- Only effective rates can be used to discount cash-flows

Annual Percentage Rates:

$$\text{Effective annual percentage rate} = \text{APR} / \# \text{ compounding periods}$$

$$\text{Nominal annual percentage rate} = \text{Effective APR} \times \# \text{ compounding periods}$$

Effective annual rates:

$$\text{Effective annual rate (EAR)} = (1 + \text{Effective n-year APR})^n - 1$$

$$\text{N-year effective rate} = (1 + \text{EAR})^{1/n} - 1$$

Real vs. Nominal rates

- If discounted cash-flows are nominal we must use the nominal rate of return
- If discounted cash-flows are in real terms we must use the real rate of return

$$r_{\text{real}} = 1 + n_{\text{ominal}} / 1 + r_{\text{inflation}} - 1$$

Total returns, income returns and capital returns

$$\text{Total rate of return} = P_1 - P_0 + \text{Income} / P_0$$

$$- \text{Income rate of return (Dividend yield)} = \text{Income} / P_0 = r - g$$

$$- \text{Capital rate of return} = P_1 - P_0 / P_0 = g$$

Dividend discount model (DDM)

- The value of a stock can be derived by calculate the present value of all expected cash-flows discounts at a rate that reflects the risk of holding assets of similar risk(Cost of equity or required rate of return)

Constant growth

$$V_0 = d_1 / r - g$$

$$- D_1 = \text{Dividend next period} = \text{EPS} \times \text{payout ratio}$$

- g = Constant growth rate (Capital rate of return)
- r = total return of the stock

NOTE:

- The growth rate (g) can also be given by
Retention rate (b) x ROE
- If dividends are paid quarterly but grow annually then we:
 1. Find D_1 on an annual basis using the effective quarterly rate (R_4)
 2. Apply DDM using D_1 on an annual basis

Multi-stage growth

$$V_0 = D_1 / (1+r)^1 + D_2 / (1+r)^2 + P_2 / (1+r)^2$$

$$P_2 = D_3 / r - g$$

Application:

- Mature companies with stable earnings history

Limitations:

- Not suitable for high growth companies due to the sensitivity of price changes to changes in growth rate g and where $G > R$
- Arbitrary assumptions of the dividend growth rate
- Future dividends are not accurate and uncertain
- Constant dividend growth is unrealistic
- Doesn't work on non-dividend paying firms

Total Pay-out Models

- Share re-purchase occurs when the firm uses excess cash to buy back its own stock
 - Reduces the amount of dividends the firm can pay out
 - Decreases the number of shares which increases its EPS and DPS
- Total pay-out model values the firms total equity rather than a single share

$$PV_0 = \frac{PV(\text{Future Total Dividends and Repurchases})}{\text{Shares Outstanding}_0}$$

Multiples valuation

- Is a relative valuation technique that prices assets using prices and multiples of similar assets
- The most common type of multiple used to value firms is the PE multiple

PE multiple

$$= \text{Share price} / \text{EPS}$$

- $\text{EPS} = \text{Earnings (NPAT)} / \# \text{ of shares}$

$$= \text{Market capitalisation} / \text{Earnings (NPAT)}$$

- Shows how much the market is willing to pay for every dollar of earnings
 - High PE ratio means investors are expecting higher earnings growth
 - Low PE ratio means investors are expecting low earnings growth and have high systematic risk since their required rate of return is so high meaning their price is low (PV of future CF's)

Application:

- Useful for mature companies with stable earnings history
- Not useful for fast growing companies due to high sensitivity of price changes to changes in g leading to extreme variation in price valuations.

Calculating the price of a stock given PE ratio's of comparable firms

1. Calculate the average of all comparable firms PE ratio's
2. Calculate EPS of the stock
3. Calculate share price of the stock
= Average of comparable firms PE ratio x EPS_{Stock}
4. Market capitalisation of equity = SP x # of shares on issue

Forward leading justified PE ratio:

$$= 1-b/r-g$$

EV Multiple

- EV is the value of a firms underlying business which is different to firm value since it excludes cash assets

$$= EV_0/EBITDA_1$$

$$- EV = (\# \text{ Shares} \times SP) + \text{Net Debt}$$

Application:

- Useful for valuing companies with different levels of debt or those that are highly geared

Calculating the price of a stock given EV multiple of a firm

1. Calculate the EV of the firm by solving for EV in the EV/EBITDA multiple
2. Calculate the SP by solving for SP in the EV formula

Limitations of multiples

- Difficult to find true multiples as all firms are different
- We assume that comparable companies have similar future risks, pay-out rates and growth rates which is commonly not the case
- Cannot adjust for differences in expected future growth rates, risk, or differences in accounting policies which will affect our valuations