

DISCOUNTED CASH FLOWS (DCF)

1) What is valuation?

- a. Process of determining the current worth of an asset or company
- b. 3 main valuation methods
 1. Discounted Cash Flow Model (DCF)
 2. Comparable Companies
 3. Precedent Transactions

2) What is a DCF Model?

- a. Uses future Free Cash Flow projections and discounts them (using the Weight Average Cost of Capital - WACC) to arrive at a present value
- b. *4 Main Steps:*
 1. *Calculate and forecast Free Cash Flow*
 2. *Calculate WACC*
 3. *Calculate Terminal Value*
 4. *Discount everything to Present Value (Present Value is the Enterprise Value)*

STEP 1: Calculate and forecast Free Cash Flow

3) What is Free Cash Flow (FCF)?

- a. Operating Cash Flow minus Capital Expenditures (Recall Operating Cash Flow from Cash Flow Statement and Capital Expenditures from Investing Cash Flow also from Cash Flow Statement)
- b. Represents cash company is able to generate after laying out money required to maintain and expand its asset base

4) How do you calculate FCF?

- a. $FCF = EBIT \cdot (1 - \text{Tax Rate}) + D\&A - \text{Change in Working Cap.} - \text{CapEx}$
 1. Note $EBIT \cdot (1 - \text{Tax Rate})$ because of tax shield

5) How do you forecast FCF?

- a. Forecast components that make up FCF for the next 5 - 10 years
 1. $EBIT = \text{Revenue} - \text{COGS} - \text{SG\&A} - \text{R\&D} - \text{D\&A}$
 - i. Look at % yearly changes by looking at past income statements for Revenue, COGS, SG&A, R&D, D&A then extrapolate
 2. Tax rate: look in income statement
 3. Change in Working Cap: look in balance sheet (Current Asset - Current Liabilities)
 4. CapEx: look in balance sheet (Change in PP&E)
- b. Apply formula to calculate FCF for the next 5 - 10 years, done!

STEP 2: Calculate Weighted Average Cost of Capital (WACC)

5) What is and how do you calculate WACC?

- a. Firm's cost of capital in which each category of capital is proportionately weighted (Equity - E, Debt - D)

$$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - Tc)$$

- b.
 - i. E = Equity (Market Cap = common stock * share price)
 - ii. D = Debt (value of loans such as bonds, found in balance sheet)
 - iii. V = Equity + Debt

- iv. R_e = Cost of Equity
- v. R_d = Cost of Debt
- vi. T_c = Tax Rate (Note tax effect on debt portion)

6) How do you calculate Cost of Equity (R_e)?

- a. Use the Capital Asset Pricing Model (CAPM) - pronounced “cap-em”
- b. $R_e = R_f + (R_m - R_f) * \beta$
 - i. R_f = Risk free rate (rate of return on investment with no risk ~ 3% (30 years T-bills))
 - ii. R_m = Market Risk premium (expected market return ~ 8%, ex. S&P 500, NASDAQ)
 - iii. β = Levered Beta coefficient (levered to the capital structure of the company being valued)

7) What is Beta (β) - unlevered and levered?

- a. Type of metric that compares risk of a company relative to the market
- b. Unlevered: NOT considering the impact of debt in the capital structure of a company
Levered: Considering the impact of debt

8) How do you find the β to be used in CAPM to get the R_e ?

- a. Get levered β from comparables (ex. If we’re valuing Facebook, find β s from Google, Apple, Microsoft, Twitter, etc. from Yahoo Finance)
- b. Unlever the β s of comparables (take away the impact of debt specific to those comparables, it’s like standardizing β s)
- c. Find a reasonable average of those unlevered β s
- d. Lever that average β to the specific capital structure of Facebook (the company we’re valuing)

9) How do you unlever β from comparable companies?

- a. Levered β s are found in Yahoo Finance
- b. Get Debt (balance sheet) and Equity value (Market Cap) for all those comparables companies
- c. Plug in the equation below to get a list of unlevered β s

10) How do you calculate Beta (β) - unlevered and levered?

$$\beta_U = \frac{\beta_L}{[1 + (1 - T_c) \times (D/E)]}$$

- a. β_u : Unlevered Beta
- b. β_l : Levered Beta
- c. E: Equity (Market Cap = common stock * share price)
- d. D: Debt (found in balance sheet)
- e. T_c : Tax rate

11) How do you calculate Cost of Debt (R_d)?

- a. Not usually an important equation to memorize fyi
- b. R_d = Find average weighted interest rate paid on all of the different kinds of debt of company

STEP 3: Calculate Terminal Value

11) What is Terminal Value?

- a. Value of cash flow into infinity (you can only project a certain amount of years, ex 5-10 yrs)

12) What are methods to find Terminal Value?

- a. Gordon Growth Model: Use a terminal growth rate to project the terminal value

- b. Multiple Method: Use a terminal multiple based on comparables (ex. Enterprise Value / EBITDA)

13) What is Gordon Growth Model?

- a. $TV = FCF_x * (1 + g) / (r - g)$
- b. TV: Terminal Value
- c. FCF_x : Cash flow of the last projection year (so the 5th or the 10th depending on number of years projected)
- d. g: terminal growth rate (~2% around growth of GDP)
- e. r: WACC

STEP 4: Discount everything to Present Value

14) How do you calculate Present Value (Enterprise Value)?

- a. $PV = FCF_1 / (1+r)^1 + \dots + FCF_x / (1+r)^x + TV / (1+r)^x$
- b. x: numbers of years you project it to (5-10yrs)
- c. r: WACC

15) What is Enterprise Value?

- a. The value of a company to both its shareholders (owners of stocks) and debt holders (owners of loans, bonds)
- b. Enterprise Value = Equity Value (Market Cap) + Debt - Cash

16) Why is Cash subtracted from Enterprise Value?

- a. Cash is assumed to be acquired by the buyer so not included in the “value” of the target company

NEXT STEPS: Compare valuation to actual current share price

16) What do you do with the Enterprise Value found...?

- a. Use the equation to get Equity Value and divide by current number of stocks to get your share price
- b. Compare share price from DCF to actual share price (yahoo finance)
- c. See whether you think stock is under and over valued