Enterprise Valuation Using Discounted Cash Flows

We may want to value a company because either we may be looking to buy a company or sell some part of it, or want to know the actual price of the share(this will help me make a decision whether the share is underpriced or overpriced, hence help in making informed decisions about the company.

1. Multiple based approach - Comparing the valuation of a company relative to the other existing companies. P/E = Share Price/ Earnings per share
   Various Factors for comparison -
   a. Enterprise Value/ Sales
   b. Price/Earnings
   c. Enterprise value/ Earnings before Interest Tax Depreciation and Amortization(EBITDA)

2. Discounted Cash Flow Model(DCF)-
   Focuses only on the company's internal operations as opposed to the external factors.
   DCF is used to predict the value of a company based on the projections of how much the company is going to generate in the future.
   Discounted Cash Flows are used because the value of money today won't be similar to the money in future and hence, we need to take in account factors like inflation in order to value the company properly.
   We also define a Terminal Value - The value of the company after the forecasted period(say 5y).
   Ways to calculate the terminal value
   Perpetual Growth Method
   Exit Multiple method
   So to calculate the total valuation of the company we can use the sum of Discounted cash flows + Terminal Value of the company.

   How to calculate the discount rate.
   We can solve it using the WACC (weighted Average cost of Capital)
   DCF is highly time consuming and heavily assumption based. Since there so many assumptions we can be a bit optimistic or pessimistic about the companies growth, hence we can make mistakes in company evaluation, and hence we say that we should take three scenario base case, best case and worst case to evaluate the valuation and then go with one fits and suits the best according to the current case scenario.

3. Cost Approach-
   Purpose: Estimate the value of a company based on the cost to replace its assets.
   Steps:

   Reproduction or Replacement Cost: Calculate the cost to reproduce or replace the company's assets.

   Depreciation: Subtract accumulated depreciation to account for asset wear and tear.

Add Intangible Assets: Include the value of intangible assets such as patents, trademarks, and goodwill.

Formula: Value=(Reproduction/Replacement Cost−Depreciation)+Intangible Assets\text{Value} = (\text{Reproduction/Replacement Cost} - \text{Depreciation}) + \text{Intangible Assets}Value=(Reproduction/Replacement Cost−Depreciation)+Intangible Assets

More About the DCF Model-

The time value of money assumes that a dollar that you have today is worth more than a dollar that you receive tomorrow because it can be invested. As such, a DCF analysis is useful in any situation where a person is paying money in the present with expectations of receiving more money in the future.

For example, assuming a 5% annual interest rate, $1 in a savings account will be worth $1.05 in a year. Similarly, if a $1 payment is delayed for a year, its present value is 95 cents because you cannot transfer it to your savings account to earn interest.

Discounted cash flow analysis finds the present value of expected future cash flows using a discount rate. Investors can use the concept of the present value of money to determine whether the future cash flows of an investment or project are greater than the value of the initial investment.

If the DCF value calculated is higher than the current cost of the investment, the opportunity should be considered. If the calculated value is lower than the cost, then it may not be a good opportunity, or more research and analysis may be needed before moving forward with it.

To conduct a DCF analysis, an investor must make estimates about future cash flows and the ending value of the investment, equipment, or other assets.

The investor must also determine an appropriate discount rate for the DCF model, which will vary depending on the project or investment under consideration. Factors such as the company or investor's risk profile and the conditions of the capital markets can affect the discount rate chosen.

If the investor cannot estimate future cash flows or the project is very complex, DCF will not have much value and alternative models should be employed.

The formula for DCF is:

$$DCF = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_n}{(1+r)^n}$$

Understanding WACC(Weighted Average cost of Capital) and CAPM(Capital Asset Pricing Model)

CAPM can be used as the cost of equity in the WACC.

Expected Returns of a Company = Risk Free Interest Rate (Rate of the treasury bonds) + Beta(Market Rate of Return - Risk Free Rate)

Beta is the relationship between the market and the stock. It tells how the stock price moves with the entire market.
The market Rate of return is quoted by the analysts and by analyzing the historical data sets. Beta describes the volatility of the shares with respect to the share market.

The weighted average cost of capital (WACC) is the average rate that a business pays to finance its assets. It is calculated by averaging the rate of all of the company's sources of capital (both debt and equity), weighted by the proportion of each component.

You can calculate WACC by applying the formula:

WACC = [(E/V) x Re] + [(D/V) x Rd x (1 - Tc)],

where: E = equity market value. Re = equity cost. D = debt market value and V = E+D, since WACC is the weighted average of both equity and debt.

Below are the links of two excel sheets that will help to find the share value using the discounted cash flow model.
https://iitbacin-my.sharepoint.com/:x:/r/personal/22b3011_iitb_ac_in/_layouts/15/Doc.aspx?sour cedoc=%7BF065F70E-C6A9-493A-B748-F1F30BF9AFC1%7D&file=Start%20File%20DCF% 20Exercise_v2%203.xlsx&action=default&mobileredirect=true

This is a basic calculation of the DCF model which considers a lot of direct information from the income, balance sheet and net working capital.

https://iitbacin-my.sharepoint.com/:x:/r/personal/22b3011_iitb_ac_in/_layouts/15/Doc.aspx?sourcedoc=%7B743DADFC-D37E-4B55-BA1E-8D9FA5D5D294%7D&file=DCF%202.xlsx&action=default&mobileredirect=true

This is a real DCF calculation in which almost all the intermediate used elements are used from their original locations. This is how the DCF for a company is made. Although a lot assumptions have been made in predicting the future cash flows of the company.

The link for the DCF model for NVIDIA is -
NVIDIA DCF MODEL 1.xlsx (sharepoint.com)