UTEFA – Learning Session #2
Valuation

September 27, 2018

Agenda

Introduction to Valuation

Relative Valuation

Intrinsic Valuation

Discounted Cash Flow Analysis

Valuation Trade-Offs

Introduction to Valuation

Introduction

Valuation is the core to investing in finance. It allows us to answer questions like: Is the company overvalued / undervalued? Should we buy it or sell it right now or hold off and wait?

What is a "Valuation"?

Valuation is the process of determining the current worth of an asset, in this case a company.

- There are many different techniques used to determine this value – a Discounted Cash Flow being the choice valuation technique at UTEFA
- Factors to consider in placing a value on a company include the:
  - Company's management
  - Composition of its capital structure (e.g. debt to equity ratio)
  - Prospect of future earnings
  - Market value of its assets

"Value" of a Stock

- Market value: Price of a security as determined by buyers and sellers on an exchange
- Intrinsic value: Perceived value of a security based on future earnings or some other company attribute **unrelated to the market price of a security**

Valuation Techniques

There are an overwhelming number of valuation techniques available, with DCF only being the tip of the iceberg. However, as with various engineering models being employed in different scenarios, no one valuation method is best suited for every situation.

Valuation Techniques

Generally the valuation technique employed is different for each industry and sector as they have unique properties that may be part of the underlying assumptions in the varying valuation approaches

Valuation Models Categories

Intrinsic Valuation Models

Attempt to find the intrinsic value of an investment based on fundamentals – focus on dividends, cash flow and growth rate for the single company. Examples include:

1. Dividend discount model
2. Discounted Cash Flow (DCF)
3. Residual income models
4. Asset-based models – valuing the firm's assets and assuming that the firm's total value is linked to its adjusted asset value minus its liabilities in some way

Relative Valuation Models

Operate by comparing a company in question to similar companies or competitors. Generally involves calculating multiples or ratios, such as P/E multiple and comparing them to the multiples of other comparable firms. Note that comparables are generally a lot easier/quicker to do – as a result they often serve as a starting point for analysis and a means of vetting comparable stocks. Examples include:

1. Comparable Public Companies
2. Precedent Transactions

When Do You Use Them?

You almost always use both!

You will almost always use relative valuation methods to value companies in **any** industry because they are universally applicable – only difference is that you might use different metrics and valuation multiples depending on the particular industry!

You will also often look at the intrinsic value of your investments and in most "standard" industries (e.g. consumer/retail, industrials, etc.) you will use a DCF analysis, which is why UTEFA primarily focuses on it!

Relative Valuation

Relative Valuation Techniques

There are many different kinds of relative valuation techniques, with UTEFA focusing on two of them – Public Company Comparables and Precedent Transactions!

Relative Valuation Techniques

Public Company Comparables (Public Comps)

Value companies relative to what other comparable companies are worth. Steps:

- Select comparable companies
- Calculate metrics and multiples of the comparable companies
- Value company based on the range of comparable metrics/multiples

Precedent Transactions

Value companies based on what actually companies recently paid to acquire another company

- Select comparable company transactions
- Calculated implied metrics and multiples from the transactions
- Determine company valuation assuming your company can be acquired for the same multiples

Generally produces a higher number than Public Comps because a buyer must pay a premium to acquire another company!

When Do They Work Best?

- A lot of good market data is available
- They are truly similar companies

- Data is spotty
- Company you're analyzing is unique/can't easily be compared to others

Other Variants to Be Aware Of

- **M&A Premiums Analysis** – still select Precedent Transactions, but instead of calculating valuation multiples you calculate the premium that the buyer paid over the seller in each case
- **Future Share Price Analysis** – project a company's future share price based on a multiple (usually P/E) of comparable companies and then discount it to the Present Value
- **Sum-of-the-Parts (SOTP)** – split a company into different segments, pick a different set of comparables for each division and value each division separately

How Do You Pick Comparables?

Criteria for Picking Comparable Companies

Public Company Comparables (Public Comps)	Precedent Transactions
1. Geography (US? China? Europe? South America?) 2. Industry (Consumer Staples? Manufacturing?) 3. Financial (Revenue/EBITDA above, below or between X)	1. Geography (US? China? Europe? South America?) 2. Industry (Consumer Staples? Manufacturing?) 3. Financial (Revenue/EBITDA above, below or between X) 4. Time (Transactions Since … or Transactions Between X and Y)

Which Metrics/Multiples Do You Use?

Highly dependent on the industry you're analyzing and what stage of growth the company is in, but you *generally* use both Revenue Multiples as well as Profitability Multiples

Major Kinds of Multiples

Revenue Multiples	Profitability Multiples
Revenue multiples measure how valuable a firm is relative to its net sales. Examples include: • EV/Revenue	Profitability multiples assess how valuable a company is relative to its profits. Examples include: • P/E • **EV/EBITDA & EV/EBIT → Most common in Finance because of convenience and comparability!** • EV/UFCF or Equity Value/LFCF Often you will use multiple Profitability Multiples to gain a better perspective on what the company could be worth

Book Value Multiples and Financial Ratios

- Book Value Multiples and the Financial Ratios we looked at last week are also common as they tell us how valuable a company is relative to its Balance Sheet.
- However, book value multiples have become less relevant in valuations over time for most industries because most companies' Equity Value is vastly different from the Shareholders' Equity on their Balance Sheets (most companies are more service-oriented and intellectual-property oriented these days!)
- The Financial Ratios we discussed last week are still important considerations to assess the financial health of a company and should not be overlooked, but they are rarely used to make valuations.

Profitability Multiples and their Uses

The Profitability Multiples presented all measure different things. A summary of their meaning and use is provided below

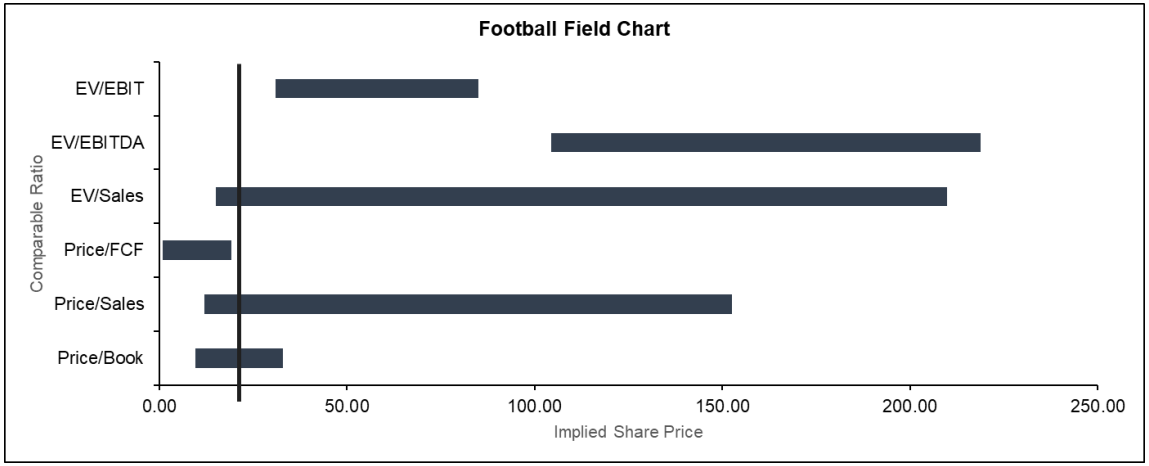
Multiple	Meaning	Usage
EV/EBIT	• Rough approximation of how valuable a company is relative to its income from business operations	• Most useful for companies where CapEx is more important to factor in (since D&A is correlated to CapEx) E.g. industrials, manufacturing, retail, etc.
EV/EBITDA	• Rough approximation of how valuable a company is relative to its CFO	• Most useful for companies where CapEx and D&A are not as important E.g. technology companies
P/E	• Rough measure of how valuable a company is in proportion to its after-tax earnings	• Most relevant for banks and financial institutions • Distorted by non-cash charges, capital structure and tax rates
Equity Value/LFCF	• Most accurate measure of a company's true "cash flow" and how valuable it is relative to that	• Not very common because it requires more work to calculate and may produce very different numbers depending on capital structure
EV/UFCF	• Similar to LFCF, but it's capital structure-neutral so it's better for comparing different companies (no two companies have the same capital structure!)	• Used when CapEx or changes in Operational Assets and Liabilities have a big impact • Commonly used in DCFs

Putting it All Together

Relative Valuations

Once you calculated all the relevant multiples of the comparable companies, you find the minimum, maximum, median, 25th percentile and 75th percentile and apply them to the company's own financial figures!

Note, you don't necessarily just use the medians, but you create a "Football Field Chart" to show the full range of values.



Interpreting Valuations

- Valuation is all about the potential range for a company's value – a asset is considered a buy if it seems to be undervalued in most potential scenarios
- The most common **incorrect** interpretation of a valuation is that it gives you the **exact** value of a company!

Intrinsic Valuation

Intrinsic Valuation Techniques

There are many different kinds of relative valuation techniques, with UTEFA focusing on the Discounted Cash Flow

Discounted Cash Flow (DCF) Analysis

Basic concept: A company is worth the Present Value of its future cash flows. Future cash flows are divided into the near-tear (i.e. projection period) and far-term (i.e. Terminal Value).

What the "market" thinks the company is worth is irrelevant and all that matters is how much in real cash flow it can generate in the future.

From the Info Session we looked at time value of money, and since money today is worth more than money tomorrow we have to discount these future cash flows back to their present value to account for that "cost." Although the concept is simple the execution can be more difficult:

1. How do you project cash flows for a company?
2. What is the appropriate discount rate to use?
3. How do you estimate the Terminal Value (the value of the company in the "distant future)?

When Do They Work Best?

- Stable and mature companies with predictable growth and profit margins

- High-growth startups
- Companies on the brink of bankruptcy
- Other situations where growth and margins are unusually high, low or unpredictable

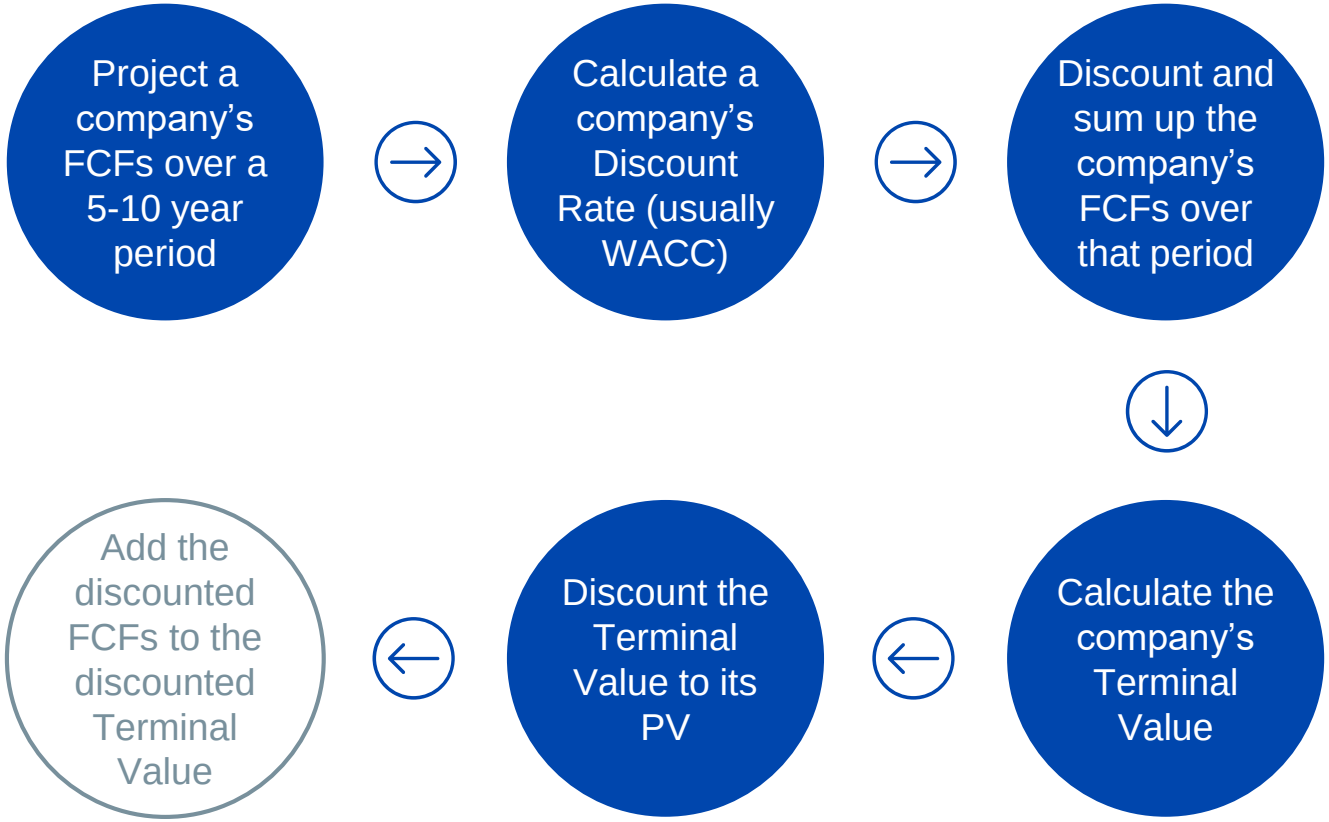
Other Variants to Be Aware Of

- **Liquidation Valuation** – value a company's assets, assume they are sold to repay its liabilities, and that whatever remains goes to Equity Investors and is the company's Equity Value
- **Leveraged Buyout (LBO) Analysis** – assume that a PE firm acquires a company and needs to achieve a certain Internal Rate of Return (IRR) and work backwards to calculate how much they could pay to achieve that return

Discounted Cash Flow Analysis

DCF Overview

In a DCF analysis, you value a company with the PV of its future Free Cash Flows (FCFs) plus the PV of its Terminal Value. I like to think of the process as if it was divided in 6 steps!



Calculating and Projecting Free Cash Flow

Free Cash Flow

Meaning	How much after-tax cash flow the company generates on a **recurring** basis, after taking into account non-cash charges, changes in Operating Assets and Liabilities, and required Capital Expenditures.
Use	You calculate and use FCF in a DCF because that closely corresponds to the actual cash flow that you, as an investor, would receive each year if you bought the entire company. Far more accurate than other metrics like NI and EBITDA because those leave out big uses of cash like CapEx and don't account for changes in cash due to operationally-linked Balance Sheet items (Inventory, A/R, A/P, etc.)

Kinds of Free Cash Flow

Unlevered Free Cash Flow (UFCF)	Levered Free Cash Flow (LFCF)
UFCF *excludes* (i.e. does not account for) net interest expense and mandatory debt repayments As such, UFCF belongs to **all** investors (both debt and equity): • Uses Enterprise Value in multiples • Uses Weighted Average Cost of Capital (WACC) as the discount rate • Produces Enterprise Value in the DCF Analysis	LFCF *includes* (i.e. accounts for) net interest expense and mandatory debt repayments As such, LFCF **only** belongs to equity investors and hence: • Uses Equity Value in multiples • Uses Return on Equity (R_E) as the discount rate • Produces Equity Value in the DCF Analysis

Calculating Unlevered Free Cash Flow

Most of the time you care about Unlevered FCF, which is good news because it's easier to calculate and will be UTEFA's focus.

Projecting Levered FCF can be considerably more time-consuming (you need to know how the company's Debt and Cash balances change from year to year, and you need to find the mandatory debt repayments for each year) and it's not incredibly useful as these things can change in the future and your assumptions will no longer be valid. You can always go from UFCF to LFCF and experiment with different assumptions in that way!

$$UFCF = EBIT(1 - Tax\ Rate) + Noncash\ Charges - \Delta Operational\ Working\ Capital - CapEx$$

Ways of Calculating UFCF

Project Entire 3-Statement Model	Shortcuts (occasionally accepted at UTEFA)
Project the relevant line items that go into the UFCF from the three financial statements line-by-line and calculate the UFCF using the formula above! **Preferred method in UTEFA** – if you go with the shortcut to the right you will need serious supplementary reasons to justify a buy recommendation. Reasons could include: • Strong qualitative considerations and good financial health • Strong relative valuation • Sound justification for the estimates used I recommend using the shortcut for a quick estimate of the valuation. If the stock seems overvalued with quick, conservative estimates value another stock!	1. Project the company's revenue growth 2. Assume an operating margin to calculate EBIT – saves time in calculating all the I/S items that come before it! 3. Apply company's effective tax rate to calculate Net Operating Profit After Tax (NOPAT) 4. Project 3 key items that impact FCF on CFS (i.e. non-cash charges, changes in operating assets and liabilities and CapEx) – saves time in projecting the individual Balance Sheet items associated with these! 5. Add back non-cash charges (can make them a percentage of revenue if you really want to cut corners) 6. Estimate change in Operational Working Capital 7. Estimate Capital Expenditures

Discount Rates and WACC

The Discount Rate is probably the most important parameter in the DCF model, with the model valuation varying greatly depending on the Discount Rate used!

Discount Rate

Meaning Aside from accounting for the time value of money, the discount rate also reflects the **return** that an investor expects/requires to obtain before they can invest. As such, the discount rate represents the **"risk"** of a company, because higher potential returns correspond to higher risk!

Calculation You estimate a company's Discount Rate by separating its capital structure into components – normally Debt, Equity and Preferred Stock and calculating the "cost" of each one.

Components of Discount Rates

Cost of Debt (R_D)

Use Interest Rate on Debt

Cost of Preferred Stock (R_{PS})

Use Effective Yield on Preferred Stock

Cost of Equity (R_E)

Cost of Debt and Cost of Preferred Stock are hopefully fairly intuitive. Equity on the other hand costs the company something in two ways:

1. Dividends are an actual cash expense
2. By issuing Equity, the company is giving up future stock price appreciation to someone else rather than keeping it for yourself

These "expenses" are hard to estimate, so in practice, you use CAPM to estimate R_E

Cost of Equity

$$R_E = r_f + \beta(r_m - r_f)$$

Definitions of Variables

r_f	Risk-free rate – the interest rate we could earn by investing in a "risk-less" security such as a government bond
r_m	Market return – the expected return of the market
$r_m - r_f$	Equity Risk Premium – the extra yield you could earn by investing in an index that tracks the stock market in your country
β	Beta – refers to the "riskiness" of this company relative to all other companies in the stock market If Beta = 1, that means the company is just as risky as the overall index If Beta = 2, that means the company is twice as risky as the market

Calculating Beta

We will explore Beta more later, but for now we consider two ways of estimating Beta in our models!

Beta

Historical Beta	Make Your Own Estimate for Beta
Use the company's historical Beta found on Yahoo, Google, Bloomberg, Reuters, etc. (e.g. how the stock has moved up or down in relation to the market as a whole) $$\beta_H = \frac{Cov(r_i, r_m)}{Var(r_m)}$$	Make your own estimate for Beta using the Public Company Comparables for the company you're valuing and assuming that the company's "true" Beta is different from what historical data suggests. The reason you go through this exercise is because of the assumption that the company's "true" risk is more in-line with how risky similar companies in the market are than its own historical track record. $$\beta_U = \frac{\beta_L}{1 + (1 - Tax\ Rate)\left(D/E\right)}$$

Calculating WACC

Calculating WACC is the easy part – just put everything together!

$$\boldsymbol{WACC = (\%D)(R_D)(1 - Tax\ Rate) + (\%E)(R_E) + (\%\mathbf{PS})(R_{PS})}$$

Explanation

We are simply determining the "cost" of each part of a company's capital structure, and then calculating a weighted average based on how much Equity, Debt and Preferred Stock the company has

Note: *You need to multiple by (1 – Tax Rate) for Debt because interest payments are tax-deductible so Debt will (almost) always cost a company less than Equity or Preferred Stock (Preferred Dividends are not tax-deductible)*

Recall: When to Use Discount Rate

Recall: Usage depends on the kind of FCF used

Unlevered Free Cash Flow (UFCF)	Levered Free Cash Flow (LFCF)
UFCF *excludes* (i.e. does not account for) net interest expense and mandatory debt repayments As such, UFCF belongs to **all** investors (both debt and equity): • Uses Enterprise Value in multiples • Uses Weighted Average Cost of Capital (WACC) as the discount rate • Produces Enterprise Value in the DCF Analysis	LFCF *includes* (i.e. accounts for) net interest expense and mandatory debt repayments As such, LFCF **only** belongs to equity investors and hence: • Uses Equity Value in multiples • Uses Return on Equity (R_E) as the discount rate • Produces Equity Value in the DCF Analysis

Caution

Unlevered vs Levered Beta has **nothing to do** with Unlevered vs Levered FCF

Regardless of which type of FCF you use, you ALWAYS use Levered Beta when calculating Cost of Equity. Remember that if a company has Debt, it makes both the Equity of the company and the entire company itself riskier!

Calculating Terminal Value

There are two methods of calculating Terminal Value, as shown below. After calculating the Terminal Value discount it to the PV and add it to the PV of the FCFs!

Calculating Terminal Value

Multiples Method

Assume that the company gets sold for a certain multiple (based on public comparables and precedent transactions).

Very simple to do, however the downside is that the exact multiple is hard to estimate years in advance, so you **always use a range of multiples** in the analysis and show the results in a sensitivity table.

Gordon Growth Method

Assume that the company's FCF keeps growing far into the future and the company keeps operating forever! Since the discount rate is higher than the growth rate this is a convergent geometric series!

$$Terminal\ Value = \frac{FCF_{final\ year}(1+g)}{WACC\ -g}$$

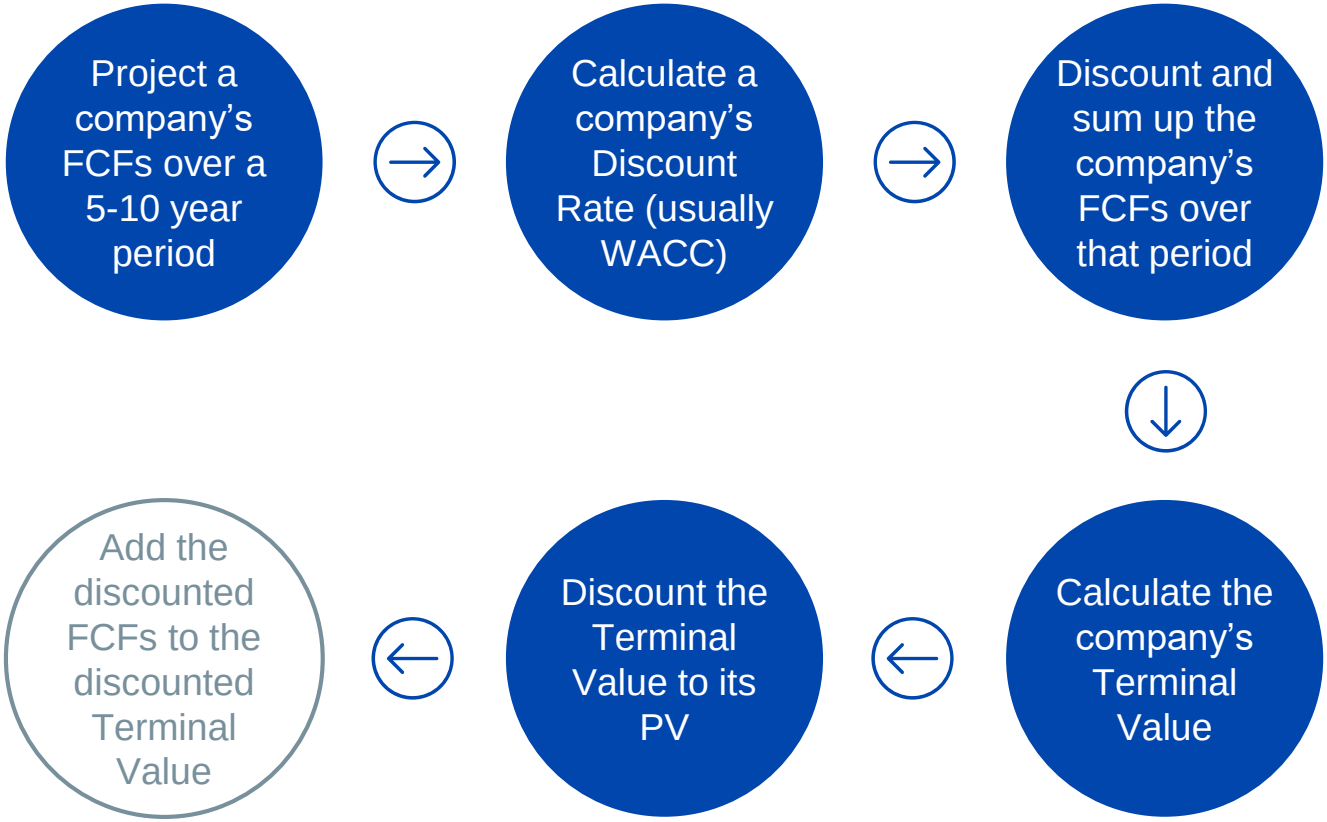
Note: the terminal growth rate, g, must be a very low number (often less than or equal to the country's GDP growth rate, rate of inflation, or something else conservative like that)

Which Method Should You Use?

Both – the main disadvantage with both methods is that the key variables – the Terminal Multiple and the Terminal Growth Rate – are practically impossible to determine precisely.

If the industry is **cyclical** or the multiples are **hard to predict**, Gordon Growth might be better; if multiples are easier to estimate, the Multiples Method might be better.

Putting it All Together!



Valuation Trade-Offs

Advantages and Disadvantages

As alluded to previously, there is a wide array of valuation techniques and here we only scratched the surface. With that said, we highlight some of the advantages and disadvantages of the techniques we covered. We will further discuss the advantages and disadvantages of our methodologies as the year progresses and highlight some other techniques!

Valuation Technique	Advantages	Disadvantages
Public Comps	• Based on **real data** as opposed to future assumptions • Quick and easy to do	• There may not be any true comparables • Less accurate for thinly traded stocks or volatile companies • Stock market is "emotional" and the multiples (and hence valuation) can vary greatly from day-to-day
Precedent Transactions	• Based on what real companies have **actually** paid for other companies	• Data can be spotty (especially for private company acquisitions) • There may not be truly comparable transactions • Data greatly varies on the time and the M&A market might have changed significantly
DCF Analysis	• Not as subject to market fluctuations • Theoretically sound since it's based on the ability to generate cash flow	• Subject to far-in-the-future assumptions • Less useful for fast-growing and unpredictable companies • Not as applicable to all industries

Questions?