Valuation



Equity Value and Enterprise Value



Enterprise Value vs. Equity Value

Enterprise Value = Equity Value + Net Debt (Total Debt – Cash & ST Securities)

Enterprise Value

Equity Value

- EV represents the value of the company's core business operations to all investors
- On a practical level EV also implies how much you would have to pay to acquire the entire business. I.e., buying out the interests of both debt and equity investors
- Not influenced by financing actions

- Equity Value represents the value of all a company's assets, but only to the company's equity investors
- Includes non-operating assets and liabilities
- Equity Value is influenced by financing actions

Net Debt and Financial Obligations

When moving from Enterprise Value to Equity Value (and Vice Versa) we want to consider the impacts of non-operating assets and liabilities

Easy Formula

Complex Formula

- Enterprise Value = Equity Value +
 - Total Debt Excess Cash

 Enterprise Value = Equity Value + Total Debt + Non-Controlling Interest + Preferred Stock + Financing Leases
 Unfunded Pension Obligations – Excess
 Cash – Net Operating Losses – Equity
 Investments

Perpetuity Formula

A company's value is measured based off its cash flow, discount rate, and future growth

 $Value = \frac{Cash Flow}{Discount Rate - Growth Rate}$

- Give a constant WACC and growth rate, we can estimate the value of the company
 - Use WACC and ULFCF for Enterprise Value
 - Use Cost of Equity and LFCF for Equity Value
- We will dive into what these terms are later in the lecture
- Note: this formula is really important for interviews

Intrinsic vs Relative Valuation



Why do we care and what do we use it for?

- The entire theory of value investing is purchasing shares in a business at a discount to actual value
- Less than high quality companies can become excellent investments given the right price
 - Highest quality of company can prove to be a poor investment given an egregious valuation
- Valuation is critical because it enables us to determine which companies are trading at the wrong price and which companies are trading at prices that could make them attractive investments
- There are two primary valuation methodologies: intrinsic valuation and relative valuation

Intrinsic Valuation vs. Relative Valuation

Intrinsic Valuation

- Intrinsically values a company based off expected future cash flow generation
- Works more through theory not the market
- Based heavily on modeled assumptions

• Bases the value of the firm off what its peer companies are valued at

Relative Valuation

- Determines this valuation off some "multiple" of a metric
- Ex: EV/EBITDA, EV/EBIT, EV/Revenue
- Include Comparable Companies, Precedent Transactions, etc...

Valuation in Practice

Intrinsic Valuation

• Use the company's historical

financials to project revenue down to cash flows

 Determine the sum of the present value of those cash flows to arrive at a valuation

Relative Valuation

- Determine what multiples peer firms are trading at
 - Ex: EV = 8x EV / EBITDA, 6x EV / EBITDA, etc...
- Take the min, first quartile, median, etc... of the data set
- Apply multiple to company's metric
- Ex: Company ABC has 100 million EBITDA. Using the median 7x EV/EBITDA leads Enterprise Value to 700 million

Specific Methodologies

Intrinsic Valuation

- Discounted Cash Flow
 - Calculates value based off present value of future cash flows
 - Most common
- Residual Income Model
 - Calculates value based off returns generated above cost of equity
 - Used commonly in banks
- Dividend Discount Model
 - Calculates value based off present value of future dividends

- Comparable (A.K.A Comps) Valuation
 - Find public companies in similar industries
 and markets, and find what the value the
 market has placed on that firm
- Precedent Transactions Valuation
 - Find companies in similar industries and markets that have been sold or acquired and find the value they were bought for

Intuition Behind Intrinsic Valuation

Advantages

Disadvantages

- Discounted Cash Flow Analysis is theoretically "correct"
- The formulaic nature of analysis enables analysts to tweak
 assumptions at their discretion and give them a 10,000-foot view over
 the drivers of valuation
- It is incredibly difficult, for all practical purposes impossible, to determine how a company will perform over the next ten years much less perpetuity
- Producing earnings assumptions within either period will likely be far off and certainly not be 100% accurate

Intuition Behind Relative Valuation

Advantages

- Relative valuation is based off of market conditions and thus can be more reflective of the market's view of growth rates, reinvestment rates, and discount rates (the drivers of multiples) than a discounted cash flow analysis
- Fewer assumptions baked into the valuation methodology reduces the margin for error substantially, of course you still have the trouble of forecasting financials

- Highly volatile data and sensitive to the current market
- Markets are not efficient, and they can always be wrong
- When a multiple is fair vs. nonsensical is difficult to interpret, i.e., if you valued tech companies using 1999/2000 multiples
- Often comparable companies are not actual perfect comparable

Comparable Valuation



Comparable Valuation Method Overview

1. Find the public companies you think are good comparisons to the firm you are

analyzing

- 2. Identify metrics and multiples to use (Ex: EV / EBITDA)
- 3. Find the said metrics and the multiples for all the comparable companies
- 4. Find and apply the median, 25th or 75th multiples from the data to your company to

find the implied Equity or Enterprise Value

Finding the Right Comparable

- 3 main factors in deciding which companies are applicable to use in your analysis
 - Geography: preferably same country
 - Industry: same industry, similar end markets, similar supply chains
 - Financial size: similar revenue (usually under one billion or between 1 20 Billion
- Ex: Oil and Gas Companies in the United States with over 5 billion in Revenue

Finding the Right Multiple

- In service of comparability, use LTM Metrics (Last Twelve Months).
- Sales/Revenue metrics and multiples
 - Revenue, Revenue Growth, EV/Revenue
- Use 1 2 profitability-based metrics
 - EV/EBITDA, EBITDA Growth, Net Income, Price/Earnings
- Make sure you use the proper X / Y multiple
 - If you are calculating equity value, you must use a metric that is only available to equity holders (Net Income and P/E)
 - If you're calculating enterprise value you should use a metric that's available to all investors (EBIT, EBITDA, etc...)

Calculate Metrics and Multiples

- Use simple math to find the metrics
 - For example, an EV/Revenue multiple would just be EV divided by revenue.
- Tips on finding actual figures:
 - Finding equity value: Just use the market cap value
 - Finding enterprise value: equity value + debt + preferred stock + NCI cash

- 5 Benchmarks that you are seeking to find:
 - Maximum, 75th Percentile, Median, 25th Percentile and minimum
- Then you use your firm's metrics to find their valuations at each of these benchmarks and project it against the current share price to find a range of implied valuations
 - To move from Enterprise to Implied Equity Value just add cash and non-core assets then subtract debt and preferred stock

Precedent Transactions Method



Precedent Transactions Method Overview

- 1. Search for Relevant Transactions
- 2. Find the valuation multiples that best fit
- 3. Analyze valuation multiples and find benchmarks

Step 1: Searching for Relevant Transactions

- You want to have a wide scope at first to find as many deals as possible
 - Transactions should be of the same industry (including similar end markets, product mix, and suppliers)
 - Transactions should also be of the same geography and approximate financial size
 - Important considerations to make outside of company fundamentals are how the company's status as a private or public company impacts transaction price, and moreover how the price is impacted by the nature of the acquiror (i.e., are they a sponsor or a strategic acquiror)

- May be dependent on industry...
- Multiples are the exact same as those utilized in a public comps analysis
 - EV/EBITDA
 - EV/Revenue
 - Like Comps, go through and find 5 benchmarks
 - Max, 75th Percentile, Median, 25th Percentile, Min

Apply Benchmarks to the firm in question

Multiply the multiple by the firm's financial metrics and find estimated valuations



Discounted Cash Flow Models



What is a Discounted Cash Flow Model?

A Discounted Cash Flow Model is a theoretical way of valuing a company buy projecting out its' future cash flows and discounting them to find the Present Value

of a firm



Mathematical Overview of a DCF



Calculating Free Cash Flow



ULFCF vs LFCF

Unlevered Free Cash Flow

- Metric that finds available cash to the entire firm (debtholders and equity holders)
- Most relevant to Enterprise Value (remember the balance sheet)

- Levered Free Cash Flow
- Levered Free Cash Flow
- Metric that finds available cash to

only the equity holders of a business

 $ULFCF (Unlevered Free Cash Flow) = EBIT * (1-T) + D \& A - Capex - \Delta NWC$

- Unlevered Free Cash Flow
 - Step 1: Begin with Earnings Before Interest and Taxes (EBIT)
 - Step 2: Subtract Taxes
 - Gov't always takes a portion of EBIT that neither the firm or stakeholders can access
 - Step 3: Add back D&A and other non-cash expenses
 - want to figure out true change in cash
 - Step 4: Subtract Capital Expenditures.
 - CapEx is is a real cash use but not included in EBIT.
 - Step 5: Subtract Increases in Net Working Capital
 - Changes in working capital represent an inflow or outflow of cash to change these assets.

Net Operating Profits After Taxes (NOPAT) = EBIT * (1 - T)

- EBIT stands for "Earnings Before Income and Taxes"
- Net Operating Profit After Taxes represents your post tax operating income
 - Focuses on income that has come directly from operations.

D&A and Capital Expenditures

+ Depreciation & Amortization – Capital Expenditures

- Found on the Cash Flow Statement
 - D&A -> Cash Flow From Operations
 - Capital Expenditures -> Cash Flow From Investing
- Capital Expenditures are a real use of cash
- D&A are non-cash expenses that are included in EBIT Value (must add-back)

NWC=(*Current Assets*-*Cash*-*Short Term Securities*)-(*Current Liabilities*-*Short Term Debt*)

- Changes in Net Working Capital are found on the Balance Sheet
 - Take Current Assets and subtract cash and Short-Term Securities
 - Take Current Liabilities and Subtract Short Term Debt
 - ΔNWC = NWC Current Year NWC Previous Year
 - Best to think of in terms of the cash a firm needs to have on hand in order to continue running the business for the next year

More on Changes in Net Working Capital

We subtract increases to net working capital

Current Assets	Current Liabilities	
• (Current Assets – Cash –	• (Current Liabilities–Short Term	
Short Term Securities)	Debt)	
• If this side of the equation increases, it means	• An increase of current liabilities means	

the company used cash to acquire assets

• Represents a decrease in Free Cash Flows

- An increase of current liabilities means an inflow of cash that has not been paid yet.
- Represents an increase in Free Cash Flows

Putting Unlevered Free Cash Flow in Perspective

Advantages of ULFCF

- Good baseline metric that is hard to be manipulated
 - Hard to be shaken through aggressive accounting
- Shows the cash available to both

debt and equity holders

 Can be hard to predict, specifically Net Working Capital

Disadvantages of ULFCF

• Assets and Liabilities can be volatile

The Discount Rate



Apply the Discount Rate to future values due to the time value of money

- 1000 dollars today is worth more than 1000 dollars tomorrow
 - Opportunity Cost
- The discount rate is the return demanded on an asset with similar risk profile
- You could invest 1000 dollars into a substitute investment with similar risk and get a x% return.

Discount Rate Examples

Discount rates apply to equity-based metrics and firm-based metrics

Cost of Equity

- Discount rate applied to equity metrics
 - ex: Levered Free Cash Flow
- Calculated with the Capital Asset
 Pricing Model

 Cost of Capital or Weighted Average Cost Of Capital (WACC)

Cost of Capital

- Uses proportionality of equity and debt to find the average opportunity cost of investing capital (both debt and equity) into the business
- Cost of Capital matches up to risk profile of a firm
 - A startup will have a higher cost of capital than a legacy car brand

Weighted Average Cost of Capital =
$$R_d * \frac{D}{(D+E)} * (1-T) + R_e * \frac{E}{(D+E)}$$

- $R_d = Cost of Debt = Risk Free Rate + Credit Premium + Risk Premium$
- D = Debt
- E = Equity
- T = Tax Rate
- $R_e = Cost of Equity = Risk Free Rate + \beta eta * Equity Risk Premium$

What is a Discount Rate? (Cost of Capital)

Weighted Average Cost of Capital =
$$R_d * \frac{D}{(D+E)} * (1-T) + R_e * \frac{E}{(D+E)}$$



Cost of Debt = Risk Free Rate + Credit Premium + Risk Premium

- Risk Free Rate: The rate that investors expect no matter the investment. Represents the minimum return an investor demands. Think of the return from buying a U.S. Treasury
- Credit Premium: What an investor demands in exchange for providing credit to a firm. Fundamentally, it represents the amount of basis points an investor demand over the yield of the US Treasury in order to compensating for the risk of the investment.
- Risk Premium: What an investor demands in collateral for adding risk to their portfolio by investing in debt. Varies based on the risk profile of the asset
- Cost of Debt separates in to 2 main sections:
 - Risk Free Rate: Bottom line Return demanded (general market)
 - Credit Spread: Credit Premium and Risk Premium (company specific)

How do we find these numbers?

Credit Spread

- Identify the Credit Rating for the firm and think through a logical credit spread based off both the Credit Rating and Risk profile
 - Use a table to tell you what the credit spread should be and then add the riskfree rate

- Weighted Average Interest
- Find the weighted average of yields and interest for the debt the firm holds
 - Usually, a page in a company 10 K, that will give you a layout of the yields the firm is paying on debt

Identifying a Credit Rating and Credit Spread

- Say you identify a firm with an A+ credit rating
 - and a 4% Risk Free Rate
 - Go to the table and find what the credit spread for A+ firms are
 - Credit Spread for A1/A + = 1.03%
 - Recall Cost of Debt Formula
 - Risk Free Rate + Credit Spread
 - 4% + 1.03% = 5.03% Cost of Debt

If interest coverage	e ratio is		
greater than	≤ to	Rating is	Spread is
-100000	0.499999	D2/D	14.34%
0.5	0.799999	C2/C	10.76%
0.8	1.249999	Ca2/CC	8.80%
1.25	1.499999	Caa/CCC	7.78%
1.5	1.999999	B3/B-	4.62%
2	2.499999	B2/B	3.78%
2.5	2.999999	B1/B+	3.15%
3	3.499999	Ba2/BB	2.15%
3.5	3.9999999	Ba1/BB+	1.93%
4	4.499999	Baa2/BBB	1.59%
4.5	5.999999	A3/A-	1.29%
6	7.499999	A2/A	1.14%
7.5	9.499999	A1/A+	1.03%
9.5	12.499999	Aa2/AA	0.82%
12.5	100000	Aaa/AAA	0.67%

Defining the Cost of Equity (CAPM)

Capital Asset Pricing model gives the expected excess return of any asset given its risk related to the market

Capital Asset Pricing Model = $R_f + \beta$ (Market Risk Premium)

- Risk Free Rate (R_f) : The rate that investors expect no matter the investment. Represents the minimum return an investor demands. Think of the return from buying a U.S. Treasury
- Beta Sensitivity(β) : Non-diversifiable risk correlated to the overall market
 - $\beta > 1$ means that the investment is riskier than the market, $\beta < 1$ means the investment has less risk
- Market Risk Premium: Expected excess return of the market over the risk-free rate
 - Expected return of the market Risk Free Rate

- Risk free rate (R_f) : The minimum rate that the investor demands from any money he would put into the market, again usually compared to T-Bill returns
- Beta (β) : Beta is a measurement of systematic, not idiosyncratic risk
 - If beta were 1.4, then you should expect the asset to be 40% more volatile than the market
 - If beta were -.8, then you should expect the asset to be 20% <u>less</u> volatile than the market
- Beta is then multiplied by the Market Risk Premium
 - Market Risk Premium: Expected Return of the Market Risk Free Rate
 - Since Market Risk Premium gives an expected return of money on average in the market, you need to multiple by Beta in order to account for the volatility/risk of the profile

Capital Structure and WACC:

More Debt is Not Always Better!



Two reasons for this:

- 1) Increasing leverage results in an increasingly higher cost of debt
- 2) The levered beta component of WACC increases

Terminal Value



- We can only *accurately* project cash flows of a business out for a couple of years with confidence (usually 5-10 years)
- The business continues to operate and generate cash flows beyond the projected period

How do we find that number?

- 1. Gordon Growth Formula
- 2. Exit Multiple Formula

Remembering the Math



CF_t = Cash Flow in Year "t" r = Discount Rate g = Terminal Growth Rate n = Last year of projections

Terminal Value =
$$\frac{CF_n(1+g)}{r-g}$$

- Gives the value of the firm's cash flows into perpetuity
- Cash flows grow at a constant rate (g) into perpetuity
- Typically, this value is between inflation rate and GDP growth rate
- Terminal Value can't be greater than GDP growth (theoretically) because the firm will eventually be larger than the entire economy

Theoretically not a good way to value because it turns the valuation into relative valuation

- Relies on using relative valuation to find a terminal value
- Find a financial metric such as EBITDA, EBIT, etc...
 - Find a way to multiple to find terminal value
 - Usually rely on an industry standard
 - Lastly Discount to PV

Overview of the Discounted Cash Flow Process

Step 1: Forecasting free cash flows (choose levered or unlevered)

• Free Cash Flow = EBIT $*(1 - T) + D&A - Capex - \Delta NWC$

Step 2: Finding a terminal value

• Either use the Gordon Growth Method (Intrinsic) or the Exit Multiple Method (Relative)

Step 3: Find and calculate the Weighted Average Cost of Capital (WACC)

Step 4: Apply the discount rate (WACC) to the free cash flows and the terminal value

Step 5: Sum both the discounted free cash flows and the discounted terminal value to find enterprise value

Step 6: To find Implied Equity Value subtract Net Debt

Step 7: Divide Implied Equity by Outstanding Shares in order to find Implied Share Price

DCF in Practice

When to Use DCF:

- Mature Company
- Stable Cash Flows
- Public Companies
 - You can for private and use comparable companies to estimate Beta/WACC

When Not to Use DCF:

- Variable Cash Flows
- A company that is sharply free cash flow negative. It is difficult to project cash flows far into the future
- Companies which should not be valued using free cash flow generation (usually do to how debt is utilized, i.e., financial institutions)

- Revenue & Cash Flow growth rates should decline near end of projection. The goal of the projection period is to have FCF growth rates meet your terminal growth rate
- ROE and ROIC should not be increasing near end of period
 - Remember Mean Reversion
- Typically, don't project beyond 5-10 years as it becomes more unreliable
- Make sure Cash Flows are stable