MICHIGAN ROSS

Career Services

Finance Technical

Interview Prep Guide

For Students by Students

Section 1: Accounting

Lesson:
While accounting questions are unlikely to be an area in which one can truly add insight, they are nevertheless important for interviews as they demonstrate to a potential employer that you understand the basics and have a solid foundation.

The Income Statement
The Income Statement displays a company's revenue and associated expenses over a period of time (quarter or year), ultimately leading to Net Income at the bottom.

For an item to appear on the income statement it must satisfy two criteria:
1. It must impact the business in the period that is being reported.
2. It must affect taxes. All tax deductible items are reported somewhere on the Income Statement.

As you progress through the income statement, there are four main sections to take note of:
1. Revenue and Cost of Goods Sold (COGS): COGS represents the value of the expenses that are directly linked to the items that were sold.
2. Operating Expenses: These include expenses that are not directly linked to the sale of any items, but rather expenses that were incurred as a result of normal business operations (advertising, marketing, overhead, etc…)
3. Other Expenses: These are expenses that are not related to the normal business activities of the company, but nevertheless occurred during the period being examined (gain or loss on asset sale, impairment, etc…)
4. Taxes and Net Income: Last, but certainly not least, we have Taxes, which will help us get down to Net Income. Net Income = Revenue – Expenses – Taxes

A few more points about the income statement:
1. They do not need to be cash expenses (e.g. Depreciation and Amortization)
2. They do not need to relate to core business operations (e.g. Asset sales, impairment, etc…)
3. Items may be embedded (e.g. D&A within COGS sometimes)

Remember, any item shown on the income statement must impact the taxes that a company pays, and it must correspond to the period depicted by the income statement.

The Balance Sheet
Think of the Balance Sheet as a snapshot in time that depicts the company's Assets, Liabilities, and Equity at a certain point in time.

Golden rule of the Balance Sheet: Assets = Liabilities + Shareholders' Equity (A = L + SE)

The Balance Sheet must always remain balanced. No exceptions. If assets remain constant and equity increase, then one's liabilities must decrease (e.g. paying off a mortgage on a house. As you pay off the mortgage, your debt decreases, while your equity increases.)

There is one easy way to determine if an item is an asset or liability: Will it result in additional cash in the future? Or less cash in the future?
If the line item will result in less future cash, then it is a *liability*. If it results in more cash in the future, it is an *asset*.

While liabilities are often used to help fund a business, *equity* line items usually refer to the company's own internal operations rather than external parties.

On the balance sheet it is common to find it split up into current assets vs. long-term assets (same goes for liabilities). Current assets are assets that are likely to last for less than a year, while long-term assets typically last for more than a year (same for liabilities).

As you likely have seen in Accounting 300, the key assets are as follows: Cash, short-term investments, accounts receivable, prepaid expenses, inventory, Property, Plant, & Equipment, Other intangible assets, Long-term investments, and goodwill.

Key liabilities include: Revolver, Accounts payable, Accrued expenses, Deferred revenue, Deferred tax liability, Long-term debt

Common Equity items include: Common stock and Additional paid in capital (APIC), Treasury stock, Retained earnings, Accumulated Other Comprehensive Income

The Cash Flow Statement
While not truly necessary as its own standalone statement since it can be created by using both the Balance sheet and the Income Statement, the Cash flow statement is very similar to the Income Statement and is arguably the most important of the three statements.

The Statement of Cash Flows tracks a change over time, as does the income statement, but only tracks changes items that affect the cash balance.

On the SCF, you may want to adjust for non-cash revenue or expense items that appeared on the income statement or account for additional cash inflows or outflows that did not appear on the Income Statement.

On the SCF, there are three main sections:

1. Cash Flow from Operations (CFO): This is where you will include all cash items that relate to core business operations. Beginning with Net Income at the top you will proceed to adjust for non-cash expenses and adjust for how *operational* Balance Sheet items have changed over the period.
2. Cash Flow from Investing (CFI): Often this includes anything relating to investments, acquisitions, and PP&E. Remember, purchases use up cash and are therefore a negative cash flow.
3. Cash Flow from Financing (CFF): This section is very specific; it typically only includes debt, dividends, and issuing/repurchasing shares.

If an item is a true cash expense and is already recorded on the income statement, it will not need to be restated on the SCF. This is because we use Net Income as the first line item in the CFO sections.

So how do the three statements link together?

***Questions*:**

1) This is almost guaranteed to come up in an interview scenario. How do all three statements actually link together?
    a) *Always start with the Income Statement. We work our way from Revenue all the way down to Net Income*.
    b) Net Income, fortunately, is the first line item on the SCF in the CFO section. From here we can work our way through CFO, adjusting for any items as necessary (determined by the income statement and balance sheet), and ultimately determine the change in cash over the period.
    c) Now that we have the change in cash, we can use this to determine the new cash balance on the balance sheet. We need to make the other required adjustments (such as depreciation and PP&E or asset sales) throughout the balance sheet.
    d) To make the balance sheet balance, we need to remember to add our Net Income into the Retained Earnings account. This will make the balance sheet balance.

Let's take a look at how $10 of depreciation would flow through the three statements. (Assume 40% tax rate)

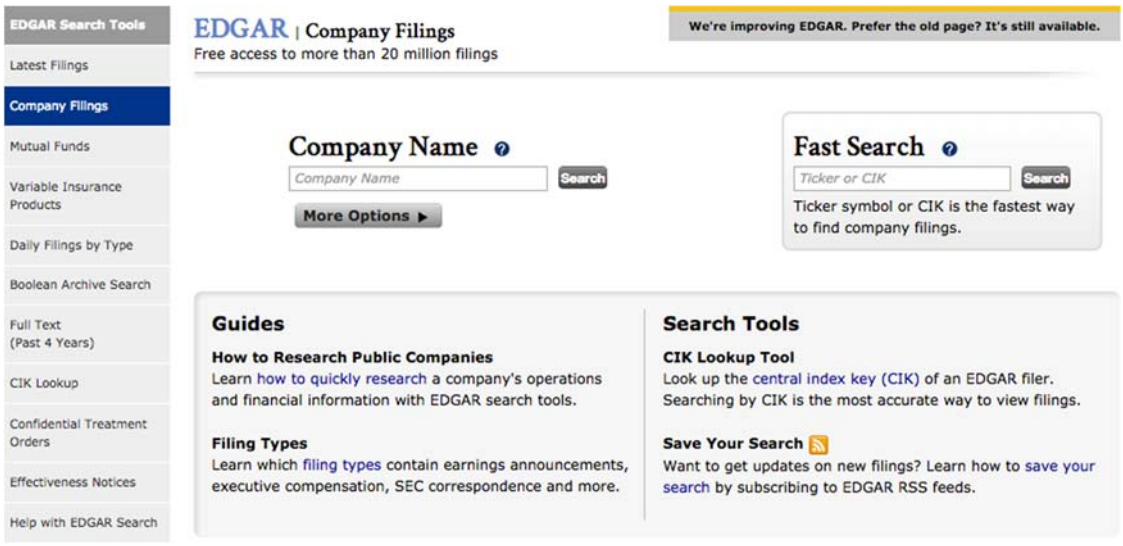
1. Assuming no costs, Pre-tax income will decrease by $10. With the 40% tax rate, we will pay $4 less in taxes and our net income will only be lower by $6.
2. The net income will flow into the CFO section and be lower by $6. Since Depreciation is a non-cash expense, it must be added back ($10) to the SCF. There are no other SCF changes, so Cash is actually up $4.
3. The increase in cash will then transfer to the Balance Sheet. Cash is up $4 and our PP&E is down by $10 (because Accumulated Depreciation increased by $10). Thus our Assets are actually down $6. There are no changes to liabilities.
4. Our assets are down by $6 and we know that A=L+SE. Therefore, Shareholders' Equity must have changed. We need to take our Net Income and add it to Retained Earnings. Since NI is lower by $6, Shareholders' Equity will also be lower by $6. Thus Assets are lower by $6, Liabilities are unchanged, and Shareholders' Equity is lower by $6. The balance sheet balances.

How to actually find financial statements

While most of the financial information one would need is readily available through various data providers (FactSet, Bloomberg, S&P Capital IQ), you can also go to SEC Edgar Database and pull the financial statements from there.

1. Go to http://www.sec.gov/edgar.shtml

2. Click on Company Filings Search on the left side in the 2nd light grey box.
3. Search for a company via the company name or the ticker (ticker is usually easier).
4.



5. From the filings, download the report you need (Often 10-Q or 10-K depending on whether you need quarterly or annual data.
6.

APPLE INC CIK#: 0000320193 (see all company filings)
SIC: 3571 - ELECTRONIC COMPUTERS
State location: CA | State of Inc.: **CA** | Fiscal Year End: 0927
formerly: APPLE COMPUTER INC (filings through 2007-01-04)
formerly: APPLE COMPUTER INC/ FA (filings through 1997-07-28)
(Assistant Director Office: 3)
Get insider transactions for this **issuer**.

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Filings	Format		Description	Filing Date	File/Film Number
8-K	Documents		Current report, items 5.07 and 9.01 Acc-no: 0001104659-15-019336 (34 Act) Size: 207 KB	2015-03-13	001-36743 15697620
SD	Documents		Acc-no: 0001193125-15-045292 (34 Act) Size: 338 KB	2015-02-12	001-36743 15601802
SC 13G	Documents		Statement of acquisition of beneficial ownership by individuals Acc-no: 0000932471-15-003679 (34 Act) Size: 39 KB	2015-02-10	005-33632 15591143
8-K	Documents		Current report, items 8.01 and 9.01 Acc-no: 0001193125-15-039270 (34 Act) Size: 394 KB	2015-02-09	001-36743 15589180
424B2	Documents		Prospectus [Rule 424(b)(2)] Acc-no: 0001193125-15-031599 (33 Act) Size: 435 KB	2015-02-03	333-188191 15571551
FWP	Documents		Filing under Securities Act Rules 163/433 of free writing prospectuses Acc-no: 0001193125-15-030106 (34 Act) Size: 37 KB	2015-02-03	333-188191 15569012
SC 13G/A	Documents		**[Amend]**Statement of acquisition of beneficial ownership by individuals Acc-no: 0001086364-15-001457 (34 Act) Size: 13 KB	2015-02-02	005-33632 15565636
424B2	Documents		Prospectus [Rule 424(b)(2)] Acc-no: 0001193125-15-028777 (33 Act) Size: 412 KB	2015-02-02	333-188191 15564954
8-K	Documents	Interactive Data	Current report, items 8.01 and 9.01 Acc-no: 0001193125-15-023732 (34 Act) Size: 11 MB	2015-01-28	001-36743 15555430
10-Q	Documents	Interactive Data	Quarterly report [Sections 13 or 15(d)] Acc-no: 0001193125-15-023697 (34 Act) Size: 7 MB	2015-01-28	001-36743 15555294
8-K	Documents		Current report, items 2.02 and 9.01 Acc-no: 0001193125-15-021857 (34 Act) Size: 143 KB	2015-01-27	001-36743 15552085

Section 1.1: Time Value of Money (TVM)

Lesson:

"A dollar today is worth more than a dollar tomorrow."

The phrase above is the basis of finance and valuation. In other words, there is an opportunity cost that must be accounted for when money is not received today, i.e. the money *could* have been invested in something else if it was received today. Consider this example:

> A savings account pays 5% annual interest. If Ross put $100 in this savings account, in one year, he would have $105 ($100 principal and $5 interest). If Ross held the $100 in cash, he would still have $100 in one year. Because Ross has the option to invest this money, it suggests that he would rather have the money sooner rather than later.

The example demonstrates that Ross is able to grow the value of his $100 just by putting it in a savings account rather than holding it in cash. This trade-off is pivotal to financial decisions because it allows us to calculate the opportunity cost of not receiving money today. This trade-off can be calculated with the basic discount equation:

$$\textbf{Present Value} = \textbf{Cash Flow}_t / (1 + r)^t$$

The basic discount equation can help make financial decisions while considering the time value of money. However, many investment vehicles or projects have different types of risks.

> Now consider, Ross has the option to lend his friend, Jeff, the $100. Jeff says he will pay Ross back in one year, but Ross is worried that Jeff won't be able to pay him back. How much interest should Ross charge Jeff?

The question above reflects the many investment vehicles available to someone who has money. Calculating the appropriate opportunity cost is commonly quantified by other investments with comparable risk. This risk is measured by "r", or the discount rate in the basic finance equation. For example, if Ross's $105 one year from now is put in the basic finance equation, with a discount rate of 5% (the savings account interest rate), the present value calculated is $100.

[Perhaps have a discussion about NPV of projects vs. holding cash, etc.]

Section 1.2: Cost of Capital

Lesson:

In the prior lesson (TVM), the basic discount equation was discussed. In this equation, the discount rate, "r", was described as the opportunity cost of not investing cash because it was not received today. With regards to financial valuation, which we will build upon in later chapters, the discount rate is a critical piece of information that varies from company to company. Each company's discount rate is an investor's opportunity cost of not investing (and not earning a return) in a specific company's securities. This opportunity cost, and therefore the discount rate of a specific company, is equivalent to the rate of return that could be generated by investing in a security of comparable risk. Another way to think about the discount rate is as a benchmark required return that a company has to meet in order to satisfy its stakeholders. In this section, we will dig deeper into this discount rate, and ultimately, determine a method to calculate it.

To begin, it is important to understand why using different types of capital (debt or equity) have different costs:

The Pecking Order Theory of corporate finance provides some detail on how capital is prioritized within a company; however, it is easiest to simplify this by saying that the three different sources of funding: cash, debt, and equity, have varying costs of capital. Cash has the lowest cost of capital; equity has the highest cost of capital, and debt's cost of capital falls between the two. The theory states that managers, when looking to finance a new project or acquisition, prioritize these three sources in the order of cash, debt, and lastly equity. The basis for this theory is that the cost of capital increases as the information asymmetry between the public and private increases. Company managers are believed to have the most information on the internal projects and status of the company, and prefer to use the financing method with the lowest cost. Because of this, cash is the most preferred source of financing. Once cash is depleted, managers must look to external sources of capital in order to finance. Given the information asymmetry that exists between managers and investors, the manager's choice of external financing method (debt vs. equity) sends a message to the investing public. By issuing debt over equity, the manager is signaling that the project is expected to be profitable and that the stock is undervalued. By issuing equity over debt, the manager is signaling that the stock price is overvalued, leading to a decline in share price, and making equity the most expensive source of financing. Thus by choosing debt or equity to finance a project, the managers could be signaling asymmetric information. In other words, if managers can use cash on hand to finance a project it is believed to be the least costly and preferable.

Investors' required returns might also help explain the different costs of capital. Investors are compensated for risk taken on any given investment. For example, the return on a U.S. treasury bond will be lower than the return of a corporate bond since it is assumed that the risk of default for the U.S. government is less than that of any corporation. In addition, the return of a corporate bond is lower than that of the same corporation's equity because the bond has seniority in payout in the event of bankruptcy. The different risks of each investment imply different costs. Since equity is riskier than debt the cost of equity is higher than the cost of debt.

Determining the Cost of Capital:

Cost of Debt (r_d)
When a firm borrows money there is a cost associated with the borrowing, commonly referred to as an interest expense. Lenders typically determine the interest rate based on the current risk-free rate plus an additional premium for risk. Thus the *pre-tax* cost of debt is equal to **r_f + risk premium**. Since the risk of default is assumed to increase as the amount of debt a firm has increases, the risk premium will also increase as the amount of debt increases (i.e. the same firm will have a higher cost of debt if it is 50% debt versus 20% debt). Thus the *pre-tax cost of debt* is:

$$\textbf{Pre-tax } r_d = (r_f + \text{risk premium}) \times (1\text{-Tax rate})$$

It is important to consider, however, that the interest expense from debt for corporations is tax deductible per IRS guidelines. Since earnings given to shareholders are taxed, it is important to consider the *after-tax* cost of debt. Thus, the equation to calculate the *after-tax cost of debt* is:

$$\textbf{After- tax } r_d = (r_f + \text{risk premium}) \times (1\text{-Tax rate})$$

Cost of Equity (r_e)

Firms typically raise equity to finance a business at its early stages. Later on, firms have the option to raise more equity in order to finance individual projects. The cost of raising equity in either scenario is commonly calculated based on the risk of similar investment opportunities, i.e. investments with similar risk. There are several theories to estimate this cost; however, the Capital Asset Pricing Model (CAPM) is one of the most common in practice. The equation for CAPM is:

$$\text{Required return} = r_f + ß\,(M_p)$$

r_f = risk-free rate – typically estimated as either the 5, 10 or 30 year U.S. Treasury bills

ß = levered beta – an estimate of the risk of a given asset with respect to the movement of all assets. For equity beta, this can be calculated as the covariance between one stock and the entire market of stocks. In other words, Ford's [NYSE:F] beta can be calculated by measuring its covariance with the S&P 500 over the past several years.

M_p = Market Risk Premium – often calculated as the historical average return of the market minus the historical average risk-free rate ($R_M - R_f$). This measures how much an investor should be compensated for the equity of a specific company relative to the risk of all other companies in the market.

Thus, the cost of equity using CAPM can be simplified to: $\mathbf{r_e = r_f + ß_e\,(R_M - R_f)}$

Weighted Average Cost of Capital (r_{wacc})

Most companies are not financed solely by equity; therefore, it is not practical to only use the cost of equity when finding firm value, but rather a combination of the costs of both debt and equity. In order to do this, the weight of debt and equity in the firm must be determined using the ratio of debt and equity used in a given project or the estimated financing proportion of a current company. For example, if Company A has $500M in debt and a market capitalization of $1,000M. Its weight of debt is equal to $500M/($500M + $1,000M) = 33%. Its weight of equity would be equal to one minus the weight of debt or 66%. The equation for r_{wacc} is:

$$\mathbf{WACC = r_w = w_d \times r_d \times (1\text{-Tax rate}) + w_e \times r_e}$$

Where, w_d = weight of debt, w_e = weight of equity, and r_d = pre-tax cost of debt

Other concerns:

Illiquidity discount – private or wholly owned companies

***Questions*:**

1) Can the Capital Asset Pricing Model be used for estimating the cost of debt?
    a. *Yes, CAPM can be used to estimate the cost of debt, but the inputs will need to be altered slightly. Instead of looking at the levered Beta, one would need the debt Beta, which measures the systematic risk of a certain company's debt. In addition, instead of looking at the market risk premium in terms of equity market performance over the risk free rare, one would look at debt market performance over the risk free rate. In practice, this method is not used as often as assigning a risk premium to a specific debt issuance.*
2) Can the cost of equity ever be lower than the cost of debt?
    a. *There is very rarely a case in which the cost of equity will be lower than the cost of debt. This is simply due to the priority of each security in the capital structure of a company. In the event of bankruptcy, debt holders will always be paid out before equity holders. Even in a case in which a company is so highly levered that the lowest debt tranches have a very small chance of being paid in full, they will still receive money before equity holders. Equity holders are compensated with higher returns because of the higher degree of bankruptcy risk they assume, meaning that the cost of equity is always higher than the cost of debt.*
3) How can you estimate the cost of financing with cash?
    a. *The cost of financing with cash is calculated by looking at the foregone interest revenue earned by the cash used. When companies hold 'cash and equivalents' on their balance sheet, they do not simply hold it under one big mattress, but rather invest it in short-term, highly-liquid securities such as the money markets. These investments earn an annual return, so the cost of using the cash to finance a project is the foregone interest revenue earned from these short term investments. Thus, the cost of financing with cash as a percentage is: r_c = (foregone interest revenue / cash used).*
4) What happens to the present value of future cash flows as WACC increases?
    a. *The present value of future cash flows and WACC have an inverse relationship, meaning that as WACC increases, the cost of capital increases, and the present value of future cash flows decreases. For example, the present value of $100 received one year from now at WACC = 5% is equal to [100 / (1+.05)] = 95.24. However, the present value of $100 received one year from now at WACC = 10% is equal to [100 / (1+.10)] = 90.91, showing the inverse relationship.*

Section 2.1: Discounted Cash Flow Analysis

Lesson:
Discounted Cash Flow Analysis (often referred to as "DCF") is an intrinsic method of valuation. Simply put, the goal is to value a company based purely on its own operational cash flow. In order to do this, the cash flow to all stakeholders in the business must be determined, and then, it must be discounted back to present value similar to NPV analysis.

How to determine **Unlevered Free Cash Flow**:

EBIT ("Operating Income")
Less: Taxes
Plus: Depreciation & Amortization
Less: Capital Expenditures
Less: Increase in Net Working Capital
Unlevered Free Cash Flow ("UFCF")

Next, UFCF needs to be forecasted for a specified period of time, usually 5-10 years (see below). In order to do so, some assumptions have to be made with respect to EBIT growth, tax rates, etc.

		Projected			
Year	**1**	**2**	**3**	**4**	**5**
EBIT ("Operating Income")	100	105	110	116	122
Less: Taxes	(40)	(42)	(44)	(46)	(49)
Plus: Depreciation & Amortization	10	11	11	12	12
Less: Capital Expenditures	(12)	(13)	(13)	(14)	(15)
Less: Increase in Net Working Capital	(5)	(5)	(6)	(6)	(6)
Unlevered Free Cash Flow ("UFCF")	53	56	58	61	64

Finally, the projected UFCF needs to be discounted back using WACC in order to find their present values. The equation used to do so is: $\mathbf{PV = UFCF_t / (1 + WACC)^t}$. The table below calculates a discount factor using the denominator of the equation above. The UFCF can then be simply divided by the discount factor to find the present value. In the example below, we assume a WACC of 10.0%.

		Projected			
Year	**1**	**2**	**3**	**4**	**5**
EBIT ("Operating Income")	100	105	110	116	122
Less: Taxes	(40)	(42)	(44)	(46)	(49)
Plus: Depreciation & Amortization	10	11	11	12	12
Less: Capital Expenditures	(12)	(13)	(13)	(14)	(15)
Less: Increase in Net Working Capital	(5)	(5)	(6)	(6)	(6)
Unlevered Free Cash Flow ("UFCF")	53	56	58	61	64
Discount Factor	1.10	1.21	1.33	1.46	1.61
PV of UFCF	**48**	**46**	**44**	**42**	**40**

The first part of the DCF has been completed (PV of projected cash flows). However, many companies operate for longer than 5 years. In order to account for operations beyond the projected period, a Terminal Value must be calculated. Terminal Value refers to all cash flows from the business for the rest of its lifetime. There are two main methodologies to calculate this value: **the Perpetuity Method or Multiple Method.**

Perpetuity Method – often referred to as the Gordon Growth equation, the infinite future cash flows of a business can be calculated from an equation derived from the basic discounting formula used above. This formula is: **Terminal Year Cash Flow / (WACC – Terminal Growth Rate).** The unfamiliar assumption here is the terminal growth rate.
However, UFCF in the terminal year needs to be adjusted from short-term projections. The two most important adjustments are to Capital Expenditures and Net Working Capital.

Since the terminal year assumes the company is at a "steady state", Capital Expenditures ("CapEx") should be set equal to Depreciation & Amortization ("D&A"). This is done because when CapEx is greater than D&A, as in the projected years example, the business is assumed to be growing its assets. However, most companies will not grow its assets forever. In order to account for this, CapEx is set equal to the value of D&A each year. All CapEx, after our projection period, is said to be only maintenance CapEx, or the amount of investment required to maintain revenues.

In addition, Net Working Capital ("NWC") needs to be adjusted. In the projected years, NWC is usually presumed to be a percentage of sales. However, in the terminal year, it is often reliable to assume that NWC will be zero. This assumption can be made since it is also assumed that the business is in a steady state. In other words, a company's management has become more efficient with the use of firm capital, and there should not be an imbalance between Current Asset and Current Liability growth.

	Terminal Year
EBIT ("Operating Income")	128
Less: Taxes	(51)
Plus: Depreciation & Amortization	13
Less: Capital Expenditures	(13)
Less: Increase in Net Working Capital	0
Unlevered Free Cash Flow ("UFCF")	77
Perpetuity Method	
Terminal Value (UFCF / (WACC - Growth Rate)	*957*
Discount Factor	*1.61*
PV of Terminal Value	594

Multiple Method – as an alternative to assuming a terminal growth rate, assuming a terminal valuation multiple can also be done. This method can be helpful since fewer adjustments need to be made with respect to terminal free cash flow. For example, if a terminal "Enterprise Value to EBITDA" multiple is selected, the only line-item that needs to be adjusted is the terminal D&A. Often times, selecting a multiple is useful for companies with irregular Capital Expenditures such as Oil and Gas Exploration companies.

	Terminal Year
EBIT ("Operating Income")	128
Less: Taxes	(51)
Plus: Depreciation & Amortization	13
Less: Capital Expenditures	(13)
Less: Increase in Net Working Capital	0
Unlevered Free Cash Flow ("UFCF")	77
Multiple Method	
EBITDA	*140*
EV / EBITDA Multiple	*7.0x*
Terminal Value (EBITDA X Multiple)	983
Discount Factor	*1.61*
PV of Terminal Value	610

Finally, Enterprise Value can be found by adding together the **discounted UFCFs and the discounted Terminal Value**. To find the share price, subtract net debt from the enterprise value (which is the equity value) and divide by shares outstanding.

		Projected				Terminal Year
Year	**1**	**2**	**3**	**4**	**5**	**6**
EBIT ("Operating Income")	100	105	110	116	122	128
Less: Taxes	(40)	(42)	(44)	(46)	(49)	(51)
Plus: Depreciation & Amortization	10	11	11	12	12	13
Less: Capital Expenditures	(12)	(13)	(13)	(14)	(15)	(13)
Less: Increase in Net Working Capital	(5)	(5)	(6)	(6)	(6)	0
Unlevered Free Cash Flow ("UFCF")	53	56	58	61	64	77
Discount Factor	1.10	1.21	1.33	1.46	1.61	
PV of UFCF	**48**	**46**	**44**	**42**	**40**	
WACC	10.0%					
Terminal Growth Rate	2%					
Terminal Value - Perpetuity Method						957
Discount Factor						1.61
PV of Terminal Value						**594**

Enterprise Value	**814**
Less: Net Debt	100
Equity Value	714
Shares Outstanding	150
Share Price	*$4.76*

***Questions*:**

1) Why are unlevered free cash flows only projected for 5-10 years?
2) How is unlevered free cash flow calculated?
3) What is net working capital comprised of?
4) What are some advantages of using a terminal multiple over perpetuity value?

Section 2.2: Comparable Companies Analysis

Lesson:
There are 2 main ways to value a company: relative valuation – comparing a company to what similar companies are worth – and intrinsic valuation – estimating the net present value of the future cash flows or making an estimate of the value of the company's Net Assets.

Comparable Companies Analysis and Precedent Transactions Analysis are examples of relative valuation - they use relative valuation metrics such as multiples (we will touch more on this later) from comparable companies to estimate the value of your company. A Discounted Cash Flow Analysis is the best example of an intrinsic valuation methodology - it uses little benchmarking to other public companies; rather, it is based on the financial forecasts of the company being analyzed.

You will almost always use some method of relative valuation to value a company in any industry, mainly because this method tends to be universally applicable. For example, if you are looking to sell your house, you are likely to look at what similar houses have sold for in the surrounding area in order to determine the approximate value of your own home. This comparison is a simplified form of relative valuation.

Comparable Companies Analysis (also referred to as "public comps" or "trading comps") tend to work best when there is a vast amount of public information available and there are many companies with similar underlying business functions to the one you are analyzing. Public comparables may not be as relevant when analyzing a niche industry or if there are a limited number of public companies in a certain space.

As with any valuation methodology, there is no "correct" number that you are looking for. The valuation process is inherently subjective. Often you will use the valuation methodologies to give you a valuation range (e.g. $1.5 billion to 1.7 billion) rather than a precise value (e.g. $1.614 billion).

There are several key steps in determining this valuation range for your desired company:

1. Determine a list of comparable public companies
2. Identify metrics and multiples you will use for your analysis
3. Calculate the appropriate industry median valuation multiples
4. Multiply this median multiple by the respective financial metric of your company

1. When picking your own comparable public companies you should consider the following criteria:

a. Geography: Where is your target company located? Do they operate internationally? It would not make sense to use a European company as a comparable for a business that only operates in the U.S. Geographic diversification is critical to consider as companies may be valued differently based on breadth of operations (may be considered higher or lower risk to diversify into other countries).
b. Industry: What industry does your target company belong to? (e.g. Healthcare) Are there any subindustries with public comparables? (e.g. Healthcare providers, Medical devices, Pharmaceuticals, Biotechnology) The more detailed you can get with your industry and subindustry classification, the more likely you are to find companies that have similar operations and operational characteristics.
c. Financials: How big is your target company? (Usually determined by market capitalization, revenue, or EBITDA) Larger companies tend to be considered less risky as they often have more diversification both geographically and in terms of product lines. Smaller companies tend to be considered as more risky, and thus this will be reflected in the market valuation of each company.

2. Once you have your comps picked, it is important to identify the metrics and multiples that you will use for your analysis. The most important thing to acknowledge when using a multiple is the concept of value in both the numerator and denominator of a multiple. If you are using enterprise value, which measures value to all stakeholders (both debt and equity), you must make sure the denominator to the ratio also measures value to the entire firm (such as revenue, EBITDA, or EBIT).

Similarly, if you use a multiple that measures value to only equity holders, both parts of the multiple must be consistent. A common example is Price / Earnings. The value of the price of a share (the numerator) and net income (the denominator) are attributed only to equity holders.

Common multiples include:

- Enterprise Value Multiples:
  - Enterprise Value / Revenue
  - Enterprise Value / EBIT
  - Enterprise Value / EBITDA
- Equity Value Multiples:
  - Price / Earnings
  - Price / Book Value

EBITDA and EBIT multiples tend to be the most common due to convenience, comparability, and relative accuracy. When you move up the income statement, the metric you use tends to be a more accurate measure of value (fewer distortions in revenue than in net income), but the metric is less relevant to valuation (revenue is often less relevant than net income or cash flow). As you move down the income statement, the metrics are much more relevant for valuation, but there are significantly more possibilities for distortions to numbers, thereby impacting your valuation estimate. EBIT and EBITDA are relatively standardized figures (often will be comparable across firms with limited distortions).

There are several industry specific metrics that may be relevant to know:

- Enterprise Value / EBITDAR (R is for "rent", this can be used to compare retail / consumer companies as some firms depending on their decision to own vs. rent building space)
- Enterprise Value / EBITDAX (X is for "exploration", some oil and gas companies capitalize exploration while others will expense it on their income statement)
- Price / Funds From Operation (or Price / Adjusted Funds From Operation). This is a real estate specific metric that adds back depreciation and tends to be more accurate for REITs
- For other companies, you can pretty much make a multiple out of any numbers. Common metrics for technology startups may include Enterprise Value / Unique Visitors or Enterprise Value / Users. Note the use of enterprise value for these metrics for startups. As many of these companies are not public yet, it may be hard to assess the value of equity and thus assessing the entire firm value may be easier.

The most important thing to understand about the multiples is that it does not give you an exact value; rather you use the multiples to derive a range of possible values for the company.

As you will learn in the section about Precedent Transactions Analysis, Precedent Transactions tend to provide a higher valuation due to the control premium the bidder must pay in order to acquire the seller. However, this is not always the case as the precedent transactions may be based on a time period in which valuations are lower than the current state of the market.

Generally, there is a relationship between growth rates and relevant multiples. In certain circumstances, there may also be a relationship between margins and multiples. All else equal, a company with higher revenue growth is likely to have a higher multiple than a company that does not grow as quickly.

One last thing to keep in mind is that a company may be valued at a premium or discount for many reasons, including its market position, competitive advantages that are not reflected in the financial statements (certain employees, intellectual property, legal rulings, product benefits, etc…), and recent news and announcements.

***Questions*:**

1) Walk me through how you use Public Comparables Analysis in valuation.
    a. *See steps one through four listed in the lesson above.*

2) How do you select Comparable Companies?
    a. *See step one in the lesson above. The key criteria are geography, industry, and financials.*

3) How would you value an apple tree?
4) What are the most common Valuation multiples? What do they mean?
5) How are key operating metrics and valuation multiples correlated? What might explain a higher or lower EV / EBITDA multiple?
6) Which multiple would you use, Equity Value / EBITDA or Enterprise Value / EBITDA?
    a. *As instructed in the above lesson, the stakeholders represented in the numerator and denominator must match. Since EBITDA contains earnings before interest, it represents an approximate measure of cash flow available to both equity and debt holders. Because of this, the numerator must similarly represent value to both the equity and debt holders, so the correct answer is Enterprise Value / EBITDA.*

7) What multiples would you use with Unlevered Free Cash Flow?
    a. *Unlevered free cash flow, which is the metric typically used to project cash flows in a DCF, represents the cash available to all stakeholders of a company. Since this metric includes cash available to both debt and equity holders, the numerator must as well. The most common multiple used with unlevered free cash flow is therefore Enterprise Value / Unlevered Free Cash Flow.*

8) What is the difference between EV / EBIT, EV / EBITDA, and P / E?

9) What are the flaws with Public Comparables?
    a. *While there are many flaws, the main one revolves around the fact that relative valuation is an imprecise methodology. It may not be possible to find appropriate comparable firms, the market may be overinflating the proper valuation of companies due to irregular conditions, or the idiosyncratic traits of comparables may be misappropriated to the desired company. In addition, trading comps may be difficult to use if the firm you are valuing does not have substantial earnings or even revenue, such as a start-up tech company.*

10) If you have two companies with identical balance sheets, income statements, and statements of cash flows, what may account for the P/E multiple of one company to be higher than the other?
    a. *The main factors that account for differences in multiples of financially identical companies are expected growth and risk. In its simplest form, a multiple represents the market's willingness to pay for one dollar of the companies' earnings / cash flow. If two companies have identical earnings today, but one is expected to release a revolutionary new product in the future then will substantially grow its earnings, investors would be willing to pay a higher multiple today. On the other hand, if two companies are financially identical but one has a big pending lawsuit, the future earnings carry higher risk, and investors would be willing to pay a lower multiple today.*

11) Assuming all other financials are the same, would you pay a higher multiple for a company that has operating leases or depreciable assets?
    a. *It is easiest to think about this questions in terms of the most common valuation multiple, EV/EBITDA. If the companies are identical, they will both have the same EV's, meaning the numerator of the multiple is the same, and any difference must come from the denominator, EBITDA. Now to break down the asset-related expenditures. The company with operating leases will report expenses related to these assets as "rent expense", while the company with depreciable assets on their balance sheet will report expenses as "depreciation". We know that depreciation is added back to operated income before arriving at EBITDA while rent expense is not, meaning the EBITDA of the company with depreciable assets will be larger. Given the denominator is larger for the company with depreciable assets; the multiple will be lower, meaning you will be willing to pay a higher multiple for the company with operating leases.*

Section 2.3: Precedent Transactions

Lesson:

Often referred to as "transaction comps", this valuation technique is seemingly one of the most intuitive. In the simplest language, precedent transactions allow businesses to be valued relative to other businesses bought/sold in the recent past. Precedent transactions take a multiple method approach to find the implied valuation much like comparable companies.

This lesson will follow many of the same guidelines laid out in the comparable companies (6.2.3). The first step is to narrow down the universe of possible transactions to only those that fit the same characteristics as the company you are valuing. The most basic initial filters include industry, time and size.

Time is an important filter due to the constant changes in markets and company valuations. For example, a technology company may have been worth 2-3x higher during the dotcom boom; however, it would not be meaningful to use those same valuations today. Because of this, only transactions within the last several years should be used. There are some exceptions to this. For instance, some industries are extremely mature and consolidated. In these cases, transactions from longer than two years ago can be used.

Size of the target company also plays a role in screening out undesirable transactions. This is primarily because of advantages or disadvantages that may come with size. For example, a paper manufacturing company may achieve much larger economies of scale if it is $20bn in market capitalization versus a small local paper manufacturer who is only $100mm large. Filtering by size can help eliminate these differences in economies of scale or scope.

							Enterprise Value Multiples			Equity Value Multiples	
	Announcement Date	Target Name	Acquirer Name	Equity Value	Net Debt	EV	Sales	EBITDA	EBIT	Net Income	Book Value
1	12-Nov-2014	A	W	5,210	815	6,025	1.10x	7.00x	8.40x	19.10x	2.10x
2	23-Sep-2014	B	X	1,150	230	1,380	1.60x	8.90x	10.68x	27.20x	1.90x
3	15-Jul-2014	C	Y	2,345	357	2,702	1.40x	8.20x	9.84x	18.40x	2.40x
4	18-Oct-2013	D	Z	3,140	790	3,930	1.20x	7.60x	9.12x	20.20x	2.15x
						High	1.60x	8.90x	10.68x	27.20x	2.40x
						Median	1.30x	7.90x	9.48x	19.65x	2.13x
						Low	1.10x	7.00x	8.40x	18.40x	1.90x

Often times, Precedent Transactions implied valuation would be higher than that of comparable companies. The cause of the higher valuation is typically the premium paid by an acquirer to gain control of the target company. This additional some paid is referred to as the "control premium".

***Questions*:**

1) What is a control premium?
2) What are some limitations to Precedent transactions?

Section 2.4: Leveraged Buyout Analysis (LBO)

Lesson:

Leveraged Buyout Analysis ("LBO") is a technical valuation of a company on the basis that the transaction is financed primarily through debt. This analysis is less common in interviews than the prior techniques in Section 2; however, LBO's are worthwhile to understand since they are done from the perspective of a financial sponsor (e.g. Blackstone, KKR or TPG).

To begin, let us go over how an LBO transaction is structured at a high level, and then we will dig deeper into each step of the valuation process. As the name suggests, leverage is a key part of the transaction. In general, LBO transactions assume debt equivalent to over 50% of the transaction value. By assuming so much debt, the financial sponsor is able to minimize the required equity contribution while also enhancing returns. Over the ownership period, the financial sponsor pays down debt in order to grow the value of its equity. Ultimately, the financial sponsor will exit the transaction through a sale of the business to another interested party or by taking it public. [Please take a look at examples such as Burger King 2010, Hertz 2005, Kinder Morgan 2006, and Hilton Hotels 2007]

Step 1: Sources and Uses

As in other valuation methodologies, you will need to know the equity value of the target company (since you will be acquiring all of the outstanding shares of a public company). Depending on the circumstances, you may want to know enterprise value as well (e.g. If you need to repay the current outstanding debt).

The percentages of debt and equity used in the LBO will likely depend on what similar deals have used, and whatever the lenders will go for. Certain combinations may be seen as very conservative or overly aggressive. Interest rates will often depend on the type of debt used and how much is used.

Types of Debt:

- Revolver: essentially a credit card for businesses. Not every company wants to pay for normal business expenses with cash, thus they will dip into their revolver.
- Bank Debt: generally lower interest rates and include principal repayment. Often viewed as less risky since it is secured by collateral. Has maintenance covenants (must maintain certain ratios)
- High-Yield Debt: Higher interest rates with no annual principal repayment. Obviously is much riskier, and thus requires a higher interest rate. Has incurrence covenants (cannot do certain things such as selling assets or acquiring another company)

Normally, you will look at a few different combinations of debt to assess what actually makes the most sense for the company that you're acquiring. How do the leverage (Debt / EBITDA) and Interest Coverage (EBITDA/ Interest Expense) ratios compare to other transactions? Are there any expansion plans that may limit current debt capacity?

Ultimately, all of this flows into a sources and uses table (see below). The point of this is to show where funding is coming from, and then ultimately, where it is going. If existing debt is repaid in a transaction, then you can expect to see it in the uses section, thus increasing the funds required for the transaction. If the Private Equity firm assumes the debt, then it will likely be in both the sources and uses section.

Sources:			Uses:		
Excess Cash	$0	0.0x	Cash	$100	0.4x
Revolver	125	0.5	Debt Refinance	500	2.0
Term Loan A	625	2.5	Equity	1,628	6.5
Term Loan B	750	3.0	Fees	23	0.1
Sponsor Equity	750	3.0			0.0
Total	$2,250	9.0x	**Total**	$2,250	9.0x

If you assume the existing debt, then the effective purchase price will more closely reflect Equity Value. If you repay the existing debt, then the effective purchase price will be closer to Enterprise Value.

Step 2: Determining Free Cash Flow

In an LBO, you will want to use the existing financial statemtents that you already built for the company in your other valuation methodologies. Once you have the key financial statemtent line items projected, you can then use these numbers to calculate how much debt the company pays off each year.

In an LBO model, "Free Cash Flow" typically refers to Cash Flow from Operations minus CapEx. Essentially what you want to know is, "How much cash do we have available to repay debt principal each year, after we've already paid for our normal expenses and for the interest expense on that debt?"

You almost always want to try and pay down as much principal as possible, as early as you can. The more you pay down the principal balance, the less future interest expense you will have. However, you want to be careful not to stunt future growth at the expense of paying down debt. There needs to be a delicate balance between the funds that get reinvested back into the company, and the excess cash that can be used to pay down debt.

Step 3: Debt Waterfall

Once you calculated this new free cash flow, the logic to repay debt is rather straightforward.

1. Make any mandatory payments first. This comes before anything else.
2. Then, make optional repayments with any excess cash that is available. E.g. If you make all of the mandatory payments and have $50 million left, then repay the additional debt principal with that $50 million.

While this sounds very easy, it is actually a bit more complicated than this.

Most companies have a minimum cash balance that needs to be maintained at all times, thus, not 100% of the cash flow can be used to repay debt. Only the EXCESS cash flow can be tapped.

Not all types of debt can be repaid early. Almost all high-yield debt will not allow repayment over time, but will rather require a bullet payment at the end. Most bank debt can be repaid with principal.

The company may not have enough cash flow for the mandatory debt repayments, in which case it would need to borrow even more! This additional amount may be expensed on the revolver, but can be a bad sign for creditors.

As you model the debt paydown, note that interest expense is by nature a function of how much debt is outstanding, which, in turn, is a function of how much cash is generated to pay down the debt. From here, you should start to see the circularity (and beauty) of a comprehensive financial model. You need all of the components working together to avoid circularity issues.

When everything is working, you can then move on to the returns analysis.

Step 4: Returns Analysis

When looking to analyze LBO returns, you will need to find the IRR of an investment. Essentially you are looking for the compounded effective interest rate on this investment over whatever time period is specified.

As you can expect, if the PE firm receives any dividends over the course of the investment, you can expect the IRR to increase (based on time value of money).

To determine the exit assumptions, your upfront payment is rather straightforward, as is comes straight from the Sources and Uses schedule.

But how do you determine the value of the business at the end of the period? Often, an exit EBITDA multiple is assumed (similar to a DCF). This will help you calculate Enterprise Value. From here, you can work backwards to reverse engineer the equity value and thus determine an IRR based on your assumptions.

There are three variables that make the greatest impact on IRR in an LBO:

1. Purchase Price
2. % Debt and % Equity Used
3. Exit Price

Other factors that impact cash flow will also have an impact, but these three are by far the most important factors.

***Questions*:**

1) Walk me through a basic LBO model
2) Why would you use leverage when buying a company?
3) What variables impact an LBO model the most?
4) What is an ideal candidate for an LBO?
5) Can you name any recent LBOs in the market?

Section 3: Enterprise Value

Lesson:
In order to value companies, it is essential to understand Equity Value and Enterprise Value first. The concepts in this section are crucial for the sections to come on valuation.

Equity Value, or Market Capitalization (Market Cap.), is just the Share Price x Total Number of Shares Outstanding. Equity value will tell you how much a particular company is worth.

Equity Value is similar to a "sticker price" on a house. If the Equity Value of a company is $1 billion, that is not the *true* cost to buy the company. There are additional items and terms that may push the effective price *either up or down*. The actual cost of buying a company may differ due to debt that must be repaid, excess cash that the buyer can claim for themselves, and unfunded pension obligations or liabilities that will need to be repaid in the future.

Thus, when we take into account these other factors, we get to Enterprise Value.

Enterprise Value = Equity Value + Debt (and debt like items) + Other obligations – Cash - Anything that will save us money

We want to add anything that we will have to set aside money for to pay back in the future, and then subtract anything that will save us money in the future.

A more precise Enterprise Value Definition is as follows:
Enterprise Value = Equity Value + Debt + Preferred Stock + Non controlling Interests – Cash & Cash Equivalents

In order to accurately assess the value of a company we need to know the total number of shares outstanding. This includes both common stock and other dilutive securities. A security is considered "dilutive" if it could potentially create more shares.

The best example of a dilutive security is a call option, which gives someone the ability to pay the company money and get a newly created share in return. Call options have a strike price, or exercise price, which is the amount one would need to pay the company for a single share. If the current price of the stock is greater than the strike price, the option is considered to be "in-the-money". On the other hand, if the strike price is greater than the current market price, the option is "out-of-the-money".

Employees may wait to exercise in-the-money options due to expectations of future value or other restrictions that are in place. However, the potential for additional dilutive securities remains and thus must be accounted for when calculating diluted shares for a company.

We use the Treasury Stock Method to calculate the impact of dilutive securities. We assume that the new shares get created when options are exercised, and that the company then buys back some of those new shares with the funds it receives.

Example: A company has a share price of $10 and 100 options outstanding with a $5 exercise price. The option holders exercise their options and the company gets $500 in cash as a result. The company can therefore repurchase 50 shares on the market with this $500. However, the company must give the former option holders 100 shares in total, thus they will issue an additional 50 shares. In conclusion, the diluted share count will increase by 50, not by 100, since the company was able to use the proceeds from option exercise to repurchase some shares from the market.

With the Treasury Stock Method, you assume that **all** in—the-money options contribute to dilution.

While options are the most common dilutive securities, others include:

- Warrants
- Convertible Bonds
- Convertible Preferred Stock
- Restricted Stock Units
- Performance Shares

We need to calculate dilutes shares outstanding to have the most accurate picture of the true cost to acquire a company. Upon acquisition, most in-the-money dilutive securities get converted or cashed out, thus adding to the cost of the acquisition.

Now that we know how to calculate diluted shares, how do we know what goes into Enterprise Value? Anything that will save you money in the long term can be subtracted, while anything that must be paid either immediately or in the future should be added back. Note: You also want to add back certain items for comparability purposes (e.g. Non controlling Interests)

Examples of items you would subtract:

- Cash: technically excess cash (the amount over the minimum you need to operate)
- Short-Term, Long-Term, and Equity Investments: Can sell these and get cash
- Net Operating Losses: These could potentially save you cash in the future as tax deductions

Examples of Items you would add:

- Debt: Typically needs to be repaid upon completion of acquisition
- Preferred Stock: very similar to debt and also typically must be repaid upon acquisition

The following items get added because they must be repaid in the future:

- Unfunded Pension obligations: If there is not enough cash flow from normal business activities, the additional cash must come from somewhere
- Capital Leases: These “Debt-like Items” may need to be repaid upon an acquisition
- Restructuring Liabilities: These must be paid in the future to cover obligations that the company owes, but normal cash flow probably won’t be enough to cover them

Add the following item back for comparability purposes:

- Non controlling Interests (AKA Minority Interests): You add these because when you own over 50% of another company, you consolidate 100% of its financial statements with your own. However, Equity Value only reflects the value of the percentage that you own, not 100%. So you need to reflect 100% of that other company in Enterprise Value – if you did not add Non controlling Interests, you would only be reflecting 60%, or 70%, or however much you own

With Minority Interest, the Equity Value of a business will only reflect the % of ownership of the other company that you own. But Revenue will account for 100% of the revenue of the other company. Thus, when calculating an Enterprise Value / Revenue multiple, we must make sure we have the same measure of value in both the numerator and the denominator.

You will almost always calculate both Equity Value and Enterprise Value for a company. The real question is not "which is more useful?" but rather "what do they mean? And "when do you use each one?"

Remember, when calculating a multiple, the measure of value must be consistent in both the numerator and the denominator.

***Questions*:**

1) Why do we look at both Enterprise Value and Equity Value?
2) What is the formula for Enterprise Value?
    a. *The most commonly used formula for enterprise value is:* ***[EV = market capitalization + market value of debt - cash and equivalents + preferred stock + non controlling interests]****. This definition is sufficient to use in interview questions, but if desired, it can be expanded to: [EV = market capitalization + market value of debt - cash and equivalents - short term investments + preferred stock + non controlling interests + capital leases + pension liability].*

3) Why do you need to add Non controlling Interests to Enterprise Value
4) How do you calculate diluted shares and diluted equity value?
    a. *The most common way to calculate the diluted shares outstanding is via the Treasury Stock Method, which assumes that any proceeds from exercised options will be used to repurchase stock. To use the TSM, you must analyze all options and warrants outstanding and determine which are "in the money". After doing so, you must calculate how many additional common shares would be issued if the "in the money" options were all exercised. After calculating this value, you must subtract from it the number of shares that could be repurchased from the company from the proceeds of exercised options. This difference must then be added to the reported basic shares outstanding.*

        Diluted shares outstanding = basic shares outstanding + shares issued for exercisable options - shares repurchased via options proceeds

    Once this number of diluted shares is calculated, diluted equity value is simply:

        Diluted equity value = [diluted shares outstanding * share price]

5) Why do we calculate share dilution?
6) Why do we subtract Cash and add debt to calculate Enterprise Value?
7) Can a company have a negative Enterprise Value? Negative Equity Value?
    a. *While it is very unlikely to have a negative enterprise value, it is possible. When calculating enterprise value, cash and cash equivalents must be subtracted from the sum of debt and market cap, so the only case in which this could be negative is if (cash + equivalents) > (debt + market cap). Equity value, on the other hand, cannot be negative. Intuitively, it does not make sense that (shares outstanding * share price) could lead to a negative number, because there will never be a negative number of shares outstanding and no company will ever pay you to take their stock (have a negative share price).*

8) Should we use book value or market value of each line item when calculating Enterprise Value?
    a. *Always use the market value of each line item to calculate Enterprise Value. This is especially important for equity value, as the value represented on the balance sheet under "shareholder's equity" will almost always highly understate the true market cap of the company on the public market. For most companies, using the book value of debt is an appropriate proxy for the market value, since prices fluctuate much less than in the equity market. This may not be the case for distressed companies however, where the debt may be valued far below face value.*

Section 4: Merger Models

Lesson:
Why would a company want to acquire another company? A company will pursue an acquisition if it will earn more from the acquisition than it will spend to complete the acquisition. As all topics in finance do, it comes down to return on investment.

While the potential return on investment helps to explain the company's perspective for an acquisition, analysts and investors tend to focus on Earnings Per Share accretion / dilution (accretion = buyer's EPS increases, dilution = buyer's EPS decreases).

So what would cause a buyer to earn a good return on investment and boost its Earnings Per Share?
Financial Reasons:

- Consolidation: Two smaller players combine to form a larger player in a particular market
- Geography: Two players in different geographic regions may merge to expand by growing geographically
- Valuation: Sometimes the company in question might be undervalued – or at least be viewed as undervalued – in which case the buyer might also be interested
- Customers: The buyer may hope to cross-sell products, which would result in higher revenue.

Other Reasons:

- Ego
- Intellectual Property
- Threat to buyer
- Employees / talent

The key takeaway is that the buyer will only pursue an acquisition if it feels that it will gain something from the deal. The buyer should believe that they would earn more from the acquisition than they will spend.

Merger vs. Acquisition: Realistically, there is no major difference. In a "merger" the two firms tend to be approximately the same size. In an "acquisition" the acquiring firm is usually significantly bigger. Mechanically, they work the same way regardless of the name assigned to the transaction.

So how does a merger model work?

1. Determine the purchase price

   This is no different than how you would value any other company: a combination of Public Comps, Precedent Transactions, and DCF (and possibly others, e.g. Sum of the Parts) to come up with a reasonable price.

   If it's a public company you come up with a per-share purchase price; if it's a private company you might assume an Implied Equity Value based on the valuation.
2. Determine the purchase method

   Once you've determined the price for the seller, you need to figure out how to pay for it. There are three main options: cash, debt, and stock.

   Cash: Just like normal cash in your bank account; money that you can immediately withdraw and use to pay for something. The downside is that you give up interest that you could have earned on that cash, which is known as the foregone interest on cash.

Debt: Similar to debt in real life: you take out a loan and pay interest on that loan, also repaying the principal to the lenders over time.

Stock: You're using the value of an existing asset – your company – to buy something else. The downside is that you'll get additional shares outstanding, which will reduce your Earnings Per Share and may upset investors.

Some deals will involve just one of these, but many deals use 2 or 3 of these methods. The method you use depends on how much of each type you can afford to use, the structure of recent deals in the market, and the company's upcoming plans.

You determine the interest rates for cash and debt based on the market and prevailing interest rates at the time of the deal.

Buyers generally prefer to pay with 100% cash, if possible – since it's the cheapest option as the interest rate on cash is lower than the interest rate on debt. The "cost" of issuing equity depends on the P/E multiples of the buyer and seller (see below), but it is *almost* always more expensive than cash or debt.

3. Project the financial profiles and statements of the buyer and seller

This one comes straight from the 3-statement models that you've created for the buyer and seller. Here's what you need at the bare minimum:

- Valuation – Share Price, Shares Outstanding, and Equity Value and Enterprise Value.
- Tax Rates – You'll need the buyer's tax rate when combining the Income Statements.
- Income Statement Line Items:
    - Revenue
    - Operating Income
    - Interest Income / (Expense)
    - Pre-Tax Income and Net Income
    - Shares Outstanding and EPS – You need these to calculate EPS and accretion / dilution at the end.

You don't "need" projections for the Balance Sheet and Cash Flow Statement, but you should at least have the Balance Sheets for the buyer and seller from just before the acquisition closes. As always, more information is better. So if you have the B/S and SCF, it won't hurt.

4. Combine the buyer and seller's income statements

Add together everything on the Income Statements down to the Pre-Tax Income line. Then, multiply the Combined Pre- Tax Income by (1 – *Buyer's* Tax Rate) to get to the Combined Net Income.

Lastly, you must consider the additional shares issued. Add the new shares issues to the prior outstanding amount to determine the new number of shares outstanding. From here, we can divide the combined Net Income by the new share count to determine the new EPS.

Note: The seller's shares are wiped out in the acquisition, thus we do not need to consider these as they go away.

5. Calculate goodwill and allocate the purchase price

When a buyer acquires a seller, the seller's shares outstanding disappear completely and its Shareholders' Equity goes to $0 – because it is no longer an independent entity.

However, that creates a problem when we combine the Balance Sheets of the buyer and seller – consider the following scenario:

• The buyer has $10,000 in Assets, $8,000 in Liabilities, and $2,000 in Shareholders' Equity.
• The seller has $1,000 in Assets, $800 in Liabilities, and $200 in Shareholders' Equity.
• The buyer pays $500 for the seller, using 100% cash.

We add the Liabilities, so the combined total is $8,800, and we wipe out the sellers' Shareholders' Equity so the total is still $2,000. Liabilities & Equity = $10,800.

Now, on the other side, we add Assets from both companies, which gets us to $11,000... except the buyer has used $500 in cash to purchase the seller, so its Assets side is only $10,500. The Balance Sheet is out of balance!

When this happens, we need to create an Asset called Goodwill (and a related Asset called Other Intangible Assets) to account for the premium that a buyer has paid above the seller's Shareholders' Equity.

In this case, the purchase price is $500 but the seller's Shareholders' Equity is only $200 – so we would create $300 in Goodwill (and/or Other Intangible Assets) to account for that premium, and we would add that new $300 Asset to the combined Balance Sheet on the Assets side.

Now the Balance Sheet would balance properly since the Assets side is $10,800, which matches the Liabilities & Equity side.

There are other effects in an acquisition as well – for example:

- We often adjust the value of the seller's PP&E and possibly other Assets.
- We usually "reset" the seller's existing Goodwill and write it down to $0.
- We create Deferred Tax Liabilities due to the adjustments to PP&E and other Assets, and we may write off the seller's existing Deferred Tax Liabilities and the list goes on – we cover this in more detail in the Advanced Questions and Answers section below.

Here's the key takeaway: you adjust a bunch of items on the Balance Sheet in a merger model, and you need to create Goodwill (and Other Intangible Assets) to plug the holes and represent the premium that a buyer pays over a seller's Shareholders' Equity.

The difference between Goodwill and Other Intangible Assets is that Goodwill is not amortized and therefore doesn't change unless there's an Impairment charge, whereas Other Intangible Assets amortize over time, reflecting how they "expire."

6. Combine the balance sheets and adjust for acquisition effects

   This is fairly straightforward because you are mostly just adding together all the relevant line items. Here's what you do in each section:

   - Current Assets: Add most of these items, and subtract any Cash used to acquire the seller.
   - Long-Term Assets: Adjust the PP&E value up or down, and also adjust the values of Goodwill and Other Intangible Assets depending on the previous step.
   - Current Liabilities: Add everything here, perhaps adding or subtracting Debt if the buyer uses Debt to acquire the seller or pays off the seller's Debt.
   - Long-Term Liabilities: Add most items here, but you add or subtract Debt if the buyer uses Debt to acquire the seller or pays off the seller's Debt; you may also adjust the Deferred Tax Liability.
   - Shareholders' Equity: Wipe out the seller's Shareholders' Equity, but add the dollar value of new shares issued by the buyer.

7. Adjust the combined income statements for acquisition effects

   Here are the key items that you adjust for on the Income Statement:

   - Synergies: If you've assumed revenue or expense synergies, you need to reflect them here.
   - Depreciation & Amortization: If you've assumed changes to PP&E or you've created Other Intangible Assets, you need to reflect the new D&A expense on the combined Income Statement.

- Foregone Interest on Cash: If the buyer uses cash to acquire the seller, this equals Cash Used * Interest Rate.
- Interest Paid on New Debt: If the buyer uses debt to acquire the seller, this equals Debt Used * Interest Rate.
- Shares Outstanding: If the buyer issues shares to raise the funds to acquire the seller, the new number here equals Old Buyer Shares Outstanding + Number of Shares Issued in Deal.

8. Calculate accretion / dilution and sensitize

   To calculate Accretion / Dilution, you compare the new, Combined Earnings Per Share (EPS) number to the buyer's old, projected EPS number from before the acquisition.

   - If the buyer was projected to have an EPS of $1.00 prior to the acquisition, but the combined company, post-acquisition, is projected to have $1.10 EPS, that's 10% accretion. If they only have $0.90 EPS post-acquisition, that's 10% dilution.
   - You will also want to create sensitivity tables to analyze the change in EPS at different purchase prices, transaction structures, and purchase methods.
   - For example, you might see how the EPS changes when you buy a company with 30% cash, 40% cash, 50% cash, and 60% cash, at purchase prices ranging from $500 million to $600 million.

   This type of table lets you better assess whether or not the deal still "works" under different assumptions.

Now that we understand how to finance an acquisition, we must note the tradeoffs behind the different methods of financing the acquisition.

Obviously, if a buyer pays more, the acquisition will be less accretive (assuming the mix of cash/debt/stock is constant).

Generally, a deal will be dilutive if the amount of extra Pre-Tax Income the seller contributes is not enough to offset the foregone interest on cash, the cash paid on Debt, and the effects of issuing shares.

The buyer almost always prefers to use 100% cash when acquiring a seller because cash is cheaper than debt – and unlike issuing stock, it doesn't require the buyer to give up any ownership to the seller. Sellers also tend to prefer cash because it's less risky than equity (the buyer's share price might plummet immediately after the deal is announced, reducing the purchase price).

However, the buyer is constrained because it may not have enough cash available to complete the purchase; it might have also earmarked the cash for other purposes, such as hiring more employees. So if it needs to use debt and/or stock, it has to assess how much it can reasonably use. On the debt side, it will look at the percentages of debt used in recent, similar deals, as well as what its Leverage Ratio (Total Debt / EBITDA) will be, and whether or not it can reasonably meet its interest payments.

For stock issuances, it will look at how much ownership it's giving up and how much it's diluting existing shareholders. For example, if it currently has 90 million shares outstanding but it's issuing 30 million shares to acquire another company, that's bound to make investors question whether they want to give up 25% of the company to the seller.

Share price is also a factor when issuing stock. A buyer will always prefer to issue stock when its shares are trading at high levels. If its share price were $100, for example, it only has to issue half as many shares as it would if its share price were $50 – and issuing half as many shares results in less dilution.

Rules of Thumb for Merger Models
Here are 2 rules of thumb that you can use to estimate accretion / dilution for all scenarios.

Rule #1: 100% Stock Deals and P / E Multiples
This one is simple: in an all-stock deal, if the buyer has a higher P / E than the seller, the deal will be accretive; if the buyer has a lower P / E, it will be dilutive.
Think of it like this: P / E = Equity Value / Net Income.
If the buyer's Equity Value is $100 and its Net Income is $10, its P / E is 10x. If you bought it, you'd be getting $0.10 in earnings for each dollar you pay for it (flip the P / E, so 1 / 10 = 10%).
If the seller's Equity Value is $80 and its Net Income is $10, its P / E is 8x. There, you'd be getting $0.125 in earnings for each dollar you pay for the seller (flip the P / E, so 1 / 8 = 12.5%).

You get "more for your money" with the seller because its P / E multiple is lower. Since the buyer would get more for each dollar invested in the seller than what it's currently earning for each dollar invested in itself, this acquisition is accretive. Note: This is a simplification and assumes that the buyer and seller have the same tax rates, that there's no premium paid for the seller over its current share price, and that there are no other acquisition effects such as Depreciation & Amortization from Asset Write-Ups.

So this rule rarely holds up in the real world. However, if the seller's P / E is higher than the buyer's P / E, you can be almost 100% certain that the deal will be dilutive.

Rule #2: How to Determine Accretion / Dilution for All Deals
Now we'll show you a cool trick for determining accretion / dilution in all scenarios. First, let's define a few key variables:

- Cost of Cash = Foregone Interest Rate on Cash * (1 – Buyer Tax Rate)
- Cost of Debt = Interest Rate on Debt * (1 – Buyer Tax Rate)
- Cost of Stock = Reciprocal of the Buyer's P / E multiple, i.e. E / P or Net Income / Equity Value
- Yield of Seller = Reciprocal of the Seller's P / E multiple (ideally, the P /E multiple at the purchase price for the deal)

To determine whether a deal is accretive or dilutive, simply calculate the weighted "cost" for the buyer and compare it to the Yield of the Seller. If the Buyer's Cost exceeds the Seller's Yield, it's dilutive. Otherwise, it's accretive.

One interesting implication of this rule: cash is not necessarily the cheapest way to acquire a company.
For example, if the buyer has an extremely high P / E multiple of 100x, the reciprocal would be 1%. And that 1% might very well be lower than the after-tax cost of cash for them (ex: 4% * (1 – 40%) = 2.4%).

The only problem with this shortcut is that it doesn't account for other acquisition effects – synergies, new D&A, and so on. Use it to quickly estimate what a deal will look like on a non-synergy, cash-only basis, rather

than as a universal law. Another big problem is that this doesn't account for the premium paid for the seller, unless you use the purchase price for the Seller's Yield rather than its current share price.

What happens after an acquisition is equally as important as how you acquire a company in the first place.

Basic Acquisition Effects

Here are the 5 key acquisition effects that you need to know:

1. Foregone Interest on Cash – The buyer loses the Interest it would have otherwise earned if it uses cash for the acquisition – so that reduces its Pre-Tax Income, Net Income, and EPS.
2. Additional Interest on Debt – The buyer pays additional Interest Expense if it uses debt, which reduces its Pre-Tax Income, Net Income, and EPS.
3. Additional Shares Outstanding – If the buyer pays with stock, it must issue additional shares, which will reduce its EPS.
4. Combined Financial Statements – After the acquisition, the seller's financial statements are added to the buyer's, with a few adjustments.
5. Creation of Goodwill & Other Intangibles – These Balance Sheet items represent the premium that the buyer paid over the seller's Shareholder's Equity, and are required to ensure that the Balance Sheet balances.

You can calculate the impact of the first 3 effects using the rule outlined above: for the first two, multiply the interest rate by (1 – Buyer's Tax Rate), and for the impact of issuing stock, flip the P / E multiple of the buyer.

More Advanced Acquisition Effects

Then there are a few additional effects that you see in more advanced merger models:

- PP&E and Fixed Asset Write-Ups – You may write up the values of these Assets in an acquisition, under the assumption that the market values exceed the book values.
- Deferred Tax Liabilities – Normally you write off the seller's existing DTLs, and then create new ones based on Buyer's Tax Rate * (PP&E and Fixed Asset Write-Up and Newly Created Intangibles).
- Deferred Tax Assets – In most deals, you write these off completely, depending on the seller's tax situation.
- Transaction and Financing Fees – You expense legal and advisory fees and deduct them from Cash and Retained Earnings at the time of the transaction, but you capitalize financing fees and then amortize them 5-10 years, or as long as newly issued Debt remains on the Balance Sheet.
- Inter-Company Accounts Receivable and Accounts Payable – You may eliminate some of the combined AR and AP balances because the buyer might owe the seller money and vice versa. Once they're the same company, this no longer makes sense.
- Deferred Revenue Write-Down – Accounting rules state that you can only recognize the profit portion of the seller's Deferred Revenue post- acquisition. So you often write down the expense portion of the seller's Deferred Revenue over several years in a merger model.

Another important feature in more advanced merger models is the treatment Net Operating Losses (NOLs) and book vs. cash taxes.

Revenue and Expense Synergies

By combining forces, two companies may earn more revenue than if they simply added together their separate revenues, or they may pay fewer expenses as a result of consolidation.

You could model revenue synergies by assuming a price increase or by assuming additional volume sold. Revenue synergies are rarely taken seriously in practice because it's impossible to predict how successful these types of up-sell / cross-sell efforts will be.

Expense synergies are much more grounded in reality, and are easier to estimate. The two most common expense synergies:

- Reduction in Force: This is a nice way of saying, "Lay off employees." Often, two companies will have redundant employees in administrative functions – accounting, bookkeeping, marketing, and so on, and they can reduce expenses by eliminating redundant positions.
- Building Consolidation: If the buyer and seller both lease buildings in the same city, it makes sense to consolidate into one larger space and save on rent – or in the case of owned buildings, save on loan payments and property taxes.
- You might estimate expense synergies by finding, for example, that each employee costs $100,000 per year, including salary, benefits, and other compensation, and then assuming that 5% of the workforce can be cut. 5% represents 30 employees, so that is a savings of $3 million per year.

Now you need to grasp how merger models work in real life and how bankers and other financiers actually use them.

First off, realize that no deal ever happens because of the output of an Excel model. Financial modeling gives you an idea of whether a deal might be viable, or whether a company might be undervalued or overvalued, for example, but no one would ever say, "Aha! This deal is 12% accretive according to my Excel model! Let's do it!" Merger models are used more for supporting evidence in negotiations and M&A discussions – not as a way to make decisions in the first place.

Acquisitions Gone Bad
Why would an acquisition fail?

- Integration Difficulties – On paper it might have seemed like a great move, but in practice integrating two separate employee bases, supply chains, retail networks, and so on can prove incredibly difficult. And if companies can't integrate properly, the deal will fail.
- Cultural Differences – While bankers like to think otherwise, a company is more than just revenue and profit in Excel. If two companies have radically different cultures (e.g. one is very relaxed and casual and one is stuffy and uptight), it will be challenging, if not impossible, for employees to work together successfully.
- Poor Rationale – Perhaps the original reason that the buyer gave to justify the acquisition made no sense in the first place. It sounds crazy, but huge deals really do happen for poor-to-nonexistent reasons. And when it becomes clear that the original reasoning made no sense, the deal works out poorly for everyone.
- Synergy Failures – Maybe the buyer acquired the seller to access its wonderfully lucrative customer base... only to find that the customer base does not, in fact, want any of its products. Whoops.
- Overpaying for Companies – Another common "failure" scenario happens when the buyer overpays for the seller.

Moral of the Story: There are many ways for M&A deals to fail and to have disastrous consequences after the fact.

This is why it's so important to use sensitivities to analyze deal scenarios such as different purchase prices, synergy levels, cash/stock/debt combinations, and more. You want to ensure that even in the worst case scenario, the deal won't be a complete disaster.

***Questions*:**

1) How do you know if an acquisition is accretive or dilutive?
2) What factors can lead to EPS dilution in an acquisition?
3) How do you calculate Goodwill?
4) What are a few key reasons a firm would want to acquire another?