



Technical Interview Guide

Preparation for Finance Interviews

Second Edition



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Contents

Technical Questions: Introduction	3
General Topics of Study	5
Keeping Current is Key!	5
Financial Report Basics	6
Current Event Related	7
Accounting, Finance and Valuation	10
Basic	10
Intermediate	23
Advanced	30
Stocks	31
Basic	31
Intermediate	34
Advanced	39
Bonds and Interest Rates	40
Basic	40
Intermediate	46
Advanced	51
Currencies	53
Basic	53
Intermediate	54
Advanced	55
Options and Derivatives	56
Basic	56
Intermediate	59
Advanced	61
Mergers and Acquisitions	63
Basic	63
Intermediate	65
Advanced	67
Other	73
Brainteasers	75
Income Statement Basics	78
Balance Sheet Basics	79
Cash Flow Basics	80
Link Between Financial Statements	81



TECHNICAL QUESTIONS: INTRODUCTION

Technical questions are part of almost every finance interview. While the level of difficulty of these questions vary from firm to firm, and will change based on a candidate's background, all interviewees will undoubtedly be quizzed on technical questions in at least one round. This guide is a fairly exhaustive compilation of the most common technical questions in finance interviews. Obviously, you will not encounter every question, however, the interview may also contain variations or new questions altogether. The more detailed and accurate responses you give, the more likely you will impress your interviewer.

The questions in this guide are broken down into the following categories: Current Events, Accounting / Finance / Valuation, Stocks, Bonds / Interest Rates, Currencies, Options / Derivatives, and Mergers & Acquisitions. These categories are then divided into basic, intermediate and advanced concepts. The questions you are most likely to be asked are in **bold**. Obviously, you should focus your studies on the relevant industry you are trying to enter. If you are preparing for a Sales and Trading interview, you should focus on stocks, bonds/interest rates, currencies, and options/derivatives. For Investment Banking positions you should have a general background in all of those categories, but you are more likely to encounter questions from the Accounting/Finance/Valuation and the Mergers and Acquisitions section.

The final category is the brainteasers section. Getting brainteasers can definitely rattle you in an interview. In some cases, an interviewer will give a brain teaser to see how you react under pressure. What is more important than actually getting the answer to the teaser correct is the way you think through the problems -- they want to observe your analytical ability. See the examples for more information.

You will soon find out that interviews are a game. Your interviewer will likely push you to see how far you can go until you don't know an answer -- and that's a good thing. You can have a 4.0 with a double major in finance and econ from Wharton, but you still know little compared to the person on the other side of the table. Remember when studying these questions, you cannot prepare for everything that interviewers may ask. They will always be coming up with new questions and new twists on older concepts so it is important that you try and understand the concepts behind the answers, rather than just memorizing them. If you come to a question you do not understand, try to do some research and develop a deeper understanding. The explanations in this guide are intentionally kept brief.

Your answers to most of these questions should not take more than 30 seconds to a minute. Answer the question and move on. Do not try and guess your way through technical questions. If you do not know the answer, do not waste your interviewer's time and just say that you don't know -- but also do not apologize. Ask them if they can explain it to you. Be confident in what you know and don't know. What is most important is that you prove you have the ability to learn on the job. If you get into questions from the advanced section of this guide, chances are that your interviewer is trying to push you to see how you respond to pressure. The key is to remain calm, cool and collected.

Finally, in most cases you cannot eliminate yourself from contention by failing to answer a technical question. However, you can definitely hurt your chances by answering a fit or behavioral question in an



undesirable manner. Most of the time truly connecting with your interviewer on a personal level and showing you have the drive, passion and ability to learn in this crazy business can outweigh a misstep on a technical question (just don't stumble too much!)

Note: The first few bullets of each question include any pertinent definitions and information about the question. The bullet in italics is a sample response and common follow-up questions are also included in subsequent bullets.



GENERAL TOPICS OF STUDY

KEEPING CURRENT IS KEY!

In the technical portion of an interview, you may encounter questions about current events and the markets in addition to the more standard questions that are listed below. Answering these types of questions to demonstrate your interest in current events and the industry is a key to your success in an interview. While perfecting the answers to the standard technical questions may show your interviewer that you have done your homework, your responses to the current event questions can often shed more light on your ability to think on your feet and express a coherent opinion.

Answering these types of questions without some sort of background on the topic is almost impossible. Your interviewer will likely have a thorough understanding of the topic they are asking you about, and will immediately be able to tell if you try to answer off the cuff. The only way to succeed is to actually know what is going on. Your interviewer isn't going to grill you on some obscure article from the 18th page of the Financial Times from three weeks ago, but you very well may be asked about yesterday's lead story in the Wall Street Journal, especially if it is in any way related to the firm you are interviewing with.

So to prepare, read the headlines of the Wall Street Journal, Financial Times and glance at the online version of The Economist every week. You should give yourself about 30 minutes to an hour of time to prepare every day if you really want to absorb the latest financial news. Holding an intelligent conversation about the latest current events is a fairly easy way to demonstrate your passion for the industry and impress your interviewer.



FINANCIAL REPORTING BASICS

Throughout this guide, we refer to 10-K's and 10-Q's... but what are they? These are financial statements required to be filed with the Securities and Exchange Commission for any publicly traded company in the United States. These documents must follow specific standards and are available for any person to see at any time. The most common documents are 10-Ks (annual reports) and 10-Qs (quarterly reports), but documentation is required essentially any time a public company has a significant financial event.

10-K: The 10-K includes a written synopsis of the company's strategy and results for a given fiscal year. It includes a letter to shareholders, management information and compensation, management discussions and an auditor's statement. It also includes detailed financial statements for the fiscal year, including a Balance Sheet, Income Statement and Cash Flow Statement*. The 10-K also includes a notes section that explains to investors any adjustments made to financial statements in previous reports. It will also include a financial highlights section that is a rather simplified and unregulated summary of the firm's financial performance.

10-Q: The 10-Q is a boiled down 10-K and must be filed by public companies for each fiscal quarter. The 10-Q is focused mainly on financial statements and includes very little narrative information.

Proxy Statement: A proxy statement is a document that a company is required to file when soliciting shareholder votes. These statements are filed with the SEC. A proxy includes information on voting procedures, background information about the company's nominated board of directors, the company's board of directors' and executive compensation, and a breakdown of all fees paid to the auditor.

These reports can be found in numerous locations including sec.gov, the firm's own website, *Yahoo! Finance*, or a database like *CapitalIQ*.

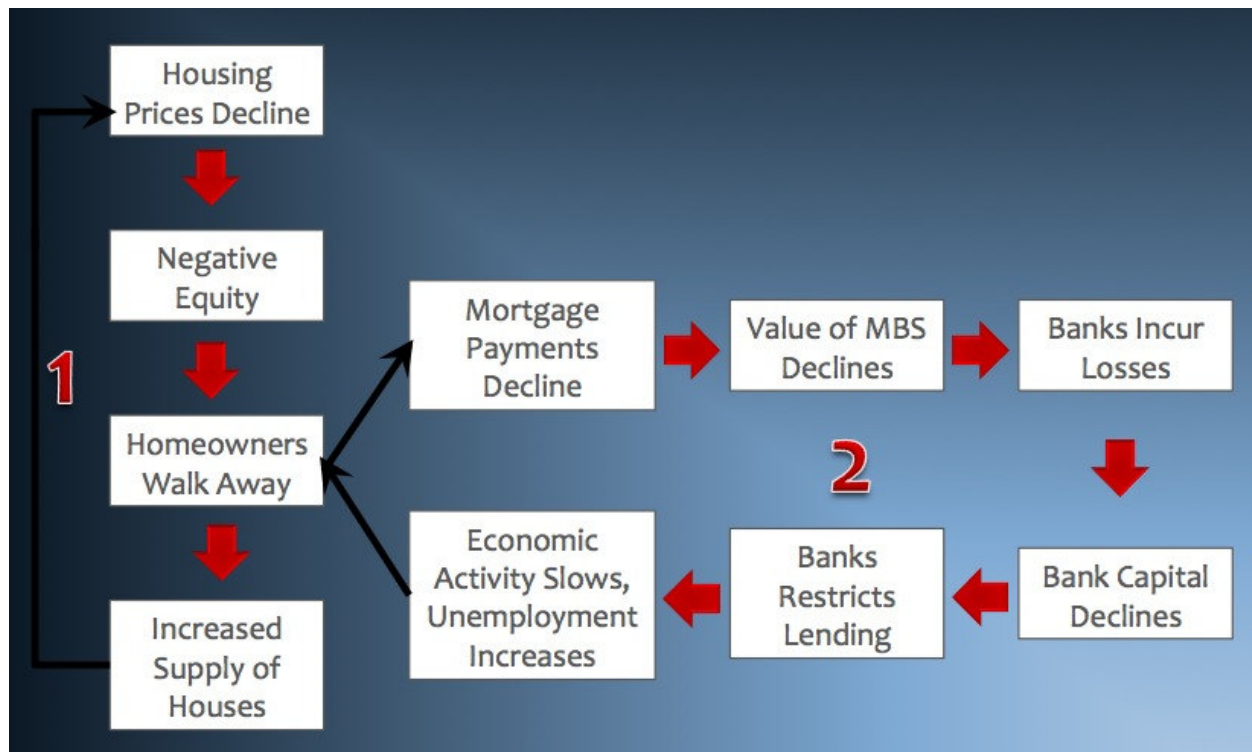
* For more information on the three main financial statements, see the "Statement Basics" section at the end of this guide.



CURRENT EVENT RELATED

Can you explain what happened with the mortgage crisis?

- Over the past few years, the mortgage market in America has created a financial crisis the likes of which we have not seen since the great depression. This is a brief overview of how the crisis occurred.
- Interest rates were very low, and lenders were allowing people to borrow large amounts of money with relatively low credit ratings by historic standards. These borrowers who had less than stellar credit ratings are often referred to as “subprime” borrowers, and these individuals were taking out loans that they really could not afford. Loans were granted with “teaser rates”, no down payment, and no review of a borrower’s income history. Many of these mortgages were adjustable rate mortgages, which meant they would begin with an affordable payment, but down the line, the rate would increase.
- Because of these loans, the demand for houses increased dramatically and home values skyrocketed from 2000 to 2005, creating a massive housing bubble. In 2006, that bubble burst, and total home equity dropped from \$13 trillion to \$8.8 trillion. By January 2009, 20% of the homes in the United States were “underwater” meaning the owner owed more on their mortgage than their home was worth.
- Compounding the problem was the fact that banks making these loans would simply sell off the future mortgage payments to other banks. These other banks would often repackage them and sell them as Mortgage Backed Securities. A mortgage backed security is explained in more depth in the “what is a mortgage backed security question” below.
- The combination of these factors led to a vicious cycle which was largely the catalyst of the recession we are in today. Below is a chart showing the cycle, with a short description below it.



- 🐼 As housing prices declined, due to the bursting of the bubble and lower demand, more and more homeowners found themselves “underwater” with negative equity in their homes. They owed more money on their mortgage than their home was actually worth. Because of this, homeowners did not have an incentive to continue paying their mortgages, so many simply walked away from their homes.
- 🐼 When a homeowner is foreclosed upon or decides to walk away they stop paying their mortgage payments. Since the mortgages were packaged into mortgage-backed securities, the value of these MBS securities declined precipitously. Banks had many of these MBS on their balance sheets as assets, and when they declined in value they had to be written down, causing the bank to take a loss. As the bank’s capital and asset base declined, they were required to restrict lending in order to meet reserve requirements and preserve liquidity.
- 🐼 As the banks restricted lending, economic activity slowed, unemployment increased and the demand for houses continued to wane. Because the supply of houses increased, housing prices continued their decline further, and the cycle started all over again.

What is a Mortgage Backed Security?

- 🐼 A mortgage-backed security is a class of asset-backed security whose cash flows are secured by a package of mortgages.
- 🐼 They will pay periodic payments that are very similar to coupon payments from bonds.
- 🐼 The MBS market essentially allowed the investment community to lend money to homeowners, with banks acting as the middlemen. An investor pays to purchase an MBS, and is paid back over time with the mortgage payments from the homeowners.
- 🐼 Many MBS were rated AAA because they were considered highly diversified, and it was thought that the housing market would not collapse across the board. Unfortunately, we now know that housing values were highly correlated and the AAA rating has proven to be optimistic at best.
- 🐼 *A mortgage-backed security is a security that pays its holder a periodic payment based on the cash flows from the underlying mortgages that fund the security.*

What is a Collateralized Debt Obligation (CDO)?

- 🐼 A CDO is the broad asset class in which a number of interest paying assets are packaged together (securitized) and sold in the form of bonds.
- 🐼 An investor pays the market value for the CDO, and then has the rights to the interest payments in the form of coupon payments over time.
- 🐼 *A Collateralized Debt Obligation is a type of security that pools together a number of interest paying assets, and pays “coupon payments” based on those assets future cash flows.*

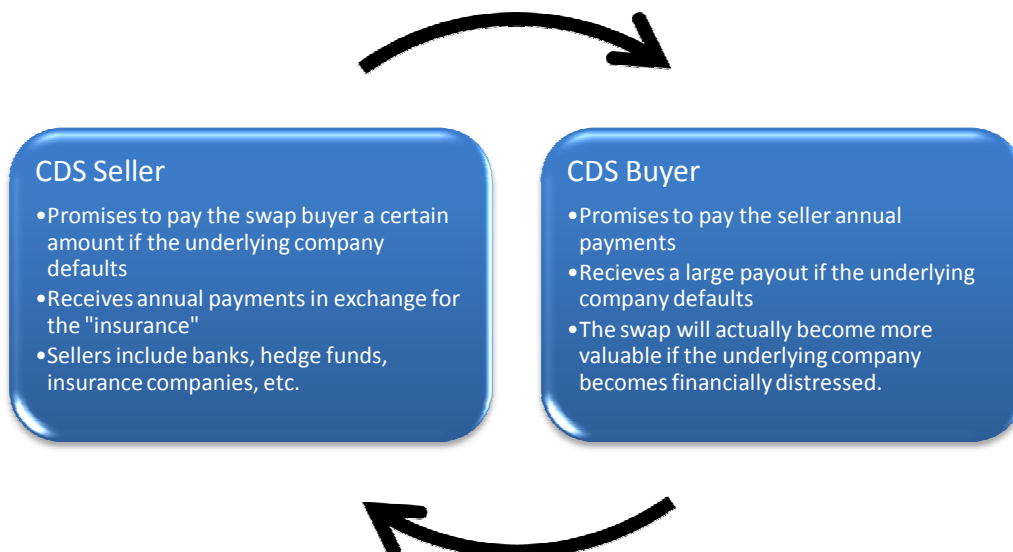


Why would a company like Facebook/Twitter receive billion dollar valuations when they have very low revenues and profit margins?

- 🦊 The key here is that investors are anticipating extremely high future earnings of these businesses due to their reach and growth trajectory, and are less focused on the present revenues and margin
- 🦊 Their belief is that Facebook or Twitter will, in the future, be able to tap into the earning power of their millions of users in some way they aren't currently doing
- 🦊 *With the social media giant Facebook, investors are banking on the fact that in the future, the company will find a better way to monetize their massive user base. With over 200 million members, if Facebook can find a better way to charge higher rates for advertising, their earnings could be astronomical! Another reason a company like Facebook may receive a valuation in the billions is because companies like Microsoft are willing to pay astronomical premiums for a small equity stake in the business in order to try and catch the wave of the future and establish a closer partnership. For example, in 2007 Microsoft invested in Facebook at a valuation of \$15 billion*

What is a Credit Default Swap?

- 🦊 A credit default swap is essentially insurance on a company's debt and is a way to insure that an investor will not be hurt in the event of a default.
- 🦊 They are sold over the counter in a completely unregulated market.
- 🦊 The credit default swap market is estimated at \$62 trillion.
- 🦊 Essentially, if you own the bond of company X and you purchase a CDS of that bond, and company X defaults, the party that sold you the CDS is responsible for paying you a certain amount of what you lost because of the default.
- 🦊 Can be used for hedging (as an insurance policy against the bond defaulting) or speculating (purchase the swap with the thought that the bond will become distressed, and more investors will desire the insurance, raising the value of the swap which can be sold).



ACCOUNTING, FINANCE AND VALUATION

BASIC

What are the three main financial statements?

- 🐼 Income Statement
 - $\text{Revenues} - \text{COGS} - \text{Expenses} = \text{Net Income}$
- 🐼 Balance Sheet
 - $\text{Assets} = \text{Liabilities} + \text{Shareholder Equity}$
- 🐼 Statement of Cash Flows
 - $\text{Beginning Cash} + \text{CF from Operations} + \text{CF from Investing} + \text{CF from Financing} = \text{Ending Cash}$
- 🐼 *The three main financial statements are the income statement, the balance sheet, and the statement of cash flows.*

How are the three main financial statements connected?

- 🐼 See the last page of this guide for a visual
- 🐼 *There are many links between the three financial statements. Starting with the income statement, the last line item is net income. Net income is added to cash flow from operations on the cash flow statement. Beginning cash balance is cash from the balance sheet in the prior period. After making adjustments to Net Income for non-cash items, the cash flow from operations, investing and financing, the ending cash balance becomes the cash on the current period's balance sheet under assets. Net income (minus any dividends paid) flows from the income statement onto the retained earnings column (shareholder's equity) of the balance sheet, causing the balance sheet to balance.*
- 🐼 Some other connections are as follows
 - Interest expense on the income statement is calculated from the long term debt on the balance sheet
 - Depreciation on both the income statement and cash flow statement is calculated based on property, plant and equipment, from the balance sheet
 - Change in working capital on the cash flow statement is calculated from changes in current assets and current liabilities on the balance sheet



Walk me through the major line items of an Income Statement.

Revenues
- Cost of Goods Sold
Gross Margin
-Operating Expenses
Operating Income
-Other Expenses
-Income Taxes
Net Income

- 🐿 *The first line of the income statement would be revenues or sales. From that you subtract cost of goods sold which leaves you with your gross margin. Then you subtract your operating expenses, leaving you with your operating income. From operating income you subtract any other expenses, and your income taxes, which leaves you with your net income.*

What are the three components of the Statement of Cash Flows?

- 🐿 Cash from Operations
- 🐿 Cash from Investing
- 🐿 Cash from Financing
- 🐿 *The three components of the statement of cash flows are cash from operations, cash from investing and cash from financing.*

What is EBITDA?

- 🐿 EBITDA stands for Earnings before interest, taxes, depreciation, and amortization and is a good metric to evaluate a company's profitability
- 🐿 $EBITDA = \text{Revenues} - \text{Expenses (Excluding tax, interest, depreciation and amortization)}$
- *EBITDA stands for Earnings Before Interest Taxes Depreciation and Amortization and is an indicator of a company's financial performance. It is a good way of comparing the performance of different companies because it removes the effects of financing and accounting decisions like interest and depreciation. It is also considered a rough estimate of free cash flow.*



What is Enterprise Value?

- 🦉 Enterprise value is the value of an entire firm, both debt and equity. The equation is below.
- 🦉 *Enterprise Value = Market Value of Equity + Debt + Preferred Stock + Minority Interest – Cash*
- 🦉 *Enterprise value is the value of a firm as a whole, to both debt and equity holders. In order to calculate enterprise value you take the market value of equity (AKA the company's market cap), add the debt, add the value of the outstanding preferred stock, add the value of any minority interests the company owns and then subtract the cash the company currently holds.*

If enterprise value is 150, and equity value is 100, what is net debt?

- 🦉 *Enterprise Value = Equity Value + Net Debt + Preferred Stock + Minority Interest so Net Debt is 50*

Why do you subtract cash from Enterprise Value?

- 🦉 *There are a few reasons for subtracting cash from Enterprise Value. First off, cash is already accounted for within the market value of equity. You also subtract cash because you can either use that cash to pay off some of the debt, or pay yourself a dividend, effectively reducing the purchase price of the company.*

What is Valuation?

- 🦉 Valuation is the procedure of calculating the worth of an asset, security, company, etc.
- 🦉 This is one of the primary tasks that investment bankers do for their clients. Value their company, or value a company they are thinking about purchasing or divesting.
- 🦉 *Valuation is the procedure of calculating the worth of an asset, security or company*



What are some ways you can value a company?

🦁 Comparable Companies (To calculate either Enterprise Value or Equity Value)

- Average multiple from comparable companies (based on size, industry, etc), multiplied by the operating metric of the company you are valuing
- Most common multiple is Enterprise Value/EBITDA
- Others include Price/Earnings, PEG, EV/EBIT, Price/Book, EV/Sales
- Different multiples may be more or less appropriate for specific industries
- For example, if comparable company A is trading at an EV/EBITDA multiple of 6.0x, and the company you are valuing has EBITDA of \$100 million, their EV would be valued at \$600 million based on this valuation technique.

🦁 Market Valuation / Market Capitalization

- The market value of equity is only for publicly traded companies and is calculated by multiplying the number of shares outstanding by the current share price.

🦁 Precedent Transactions

- With this valuation technique you need to find historical transactions that are similar to the transaction in question. This includes the size of the company, the industry they are in, the economic situation, etc. Once you have found transactions that are comparable, look at how those companies were valued. What were the EV/EBITDA and EV/Sales multiples paid? Calculate a valuation multiple based on the sale prices in those transactions, and apply the multiple to the appropriate metric of the company in question. Most of the time this valuation technique will result in the highest valuation due to the inclusion of the “control premium” that a company will pay for the assumed “synergies” that they hope will occur after the purchase.

🦁 Discounted Cash Flow Analysis

- See “Walk me through a DCF” question for more information on the discounted cash flow method of valuation

🦁 LBO Valuation

- Essentially an LBO (leveraged buyout) is when a firm uses a higher than normal amount of debt to finance the purchase of a company, then uses the cash flows from the company to pay off the debt over time. Many times they use the assets of the company being acquired as collateral for the loan. When they are ready to sell the company, ideally the debt has been partially or fully paid off, and they can collect most of the profits from the sale as the sole equity owners of the company. Since a smaller equity check was needed up front due to the higher level of debt used to purchase the company, this can result in higher returns to the original investors than if they had paid for the company with all their own equity (ie without any debt). For more detailed information on LBO's, see the LBO analysis in the advanced section.



- 🐼 Below is the general answer to this question, but be ready to give the brief description of any of the methodologies as described above if they ask.
- 🐼 *There are a number of ways to value a company. The most simple would be the market valuation, which is just the equity value of the company based on the public markets – this is simply the market capitalization of the company plus the net debt on its books to get to total enterprise value. You can also use comparable company analysis, precedent transactions analysis, discounted cash flow analysis as well as a leverage buyout valuation.*
- 🐼 Please note the “Common Valuation Techniques” chart on the following page



Common Valuation Techniques

Comparable Companies

- Calculates either Enterprise Value or Equity Value
- Average multiple from comparable companies (based on size, industry, etc.) multiplied by the operating metric of the company you are valuing
- Most common multiple is Enterprise Value/EBITDA, but also used are P/E, EV/EBIT, Price/Book, EV/Sales
- Different multiples may be more or less important in different industries
- Example: If a similar company is trading at an EV/EBITDA multiple of 6x, and the company you are valuing has EBITDA of \$100 million, their EV would be \$600 million based on a comparable companies analysis.

Market Valuation

- The market value of equity is only for publicly traded company and is the easiest valuation technique.
- It is calculated by simply multiplying the number of shares outstanding by the current stock price.
- This is also known as Market Cap, and is the Equity Value of the firm.

Precedent Transaction

- First, you need to find historical transactions that are similar to the transaction in question, including size of the company, industry they are in, the economic situation, etc.
- Once you have found a transaction/transactions, look at how that company was valued. What metrics (EBIT, EBITDA, etc) did they use? Calculate a valuation multiple based on the sale price in that transaction, and apply the multiple to the appropriate metric of the company in question.
- Most of the time this valuation technique will result in the highest valuation due to the inclusion of the "control premium" that a company will pay for the assumed "synergies" that they hope will occur after the purchase.

Discounted Cash Flow

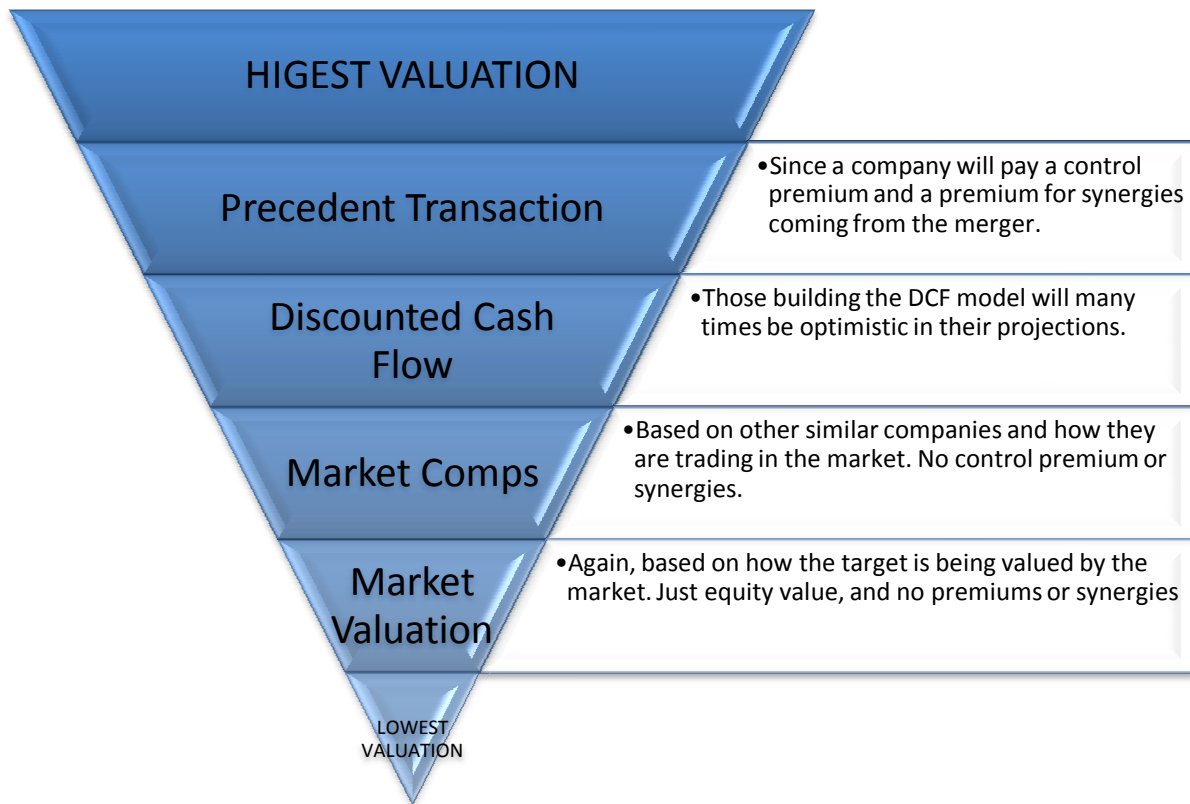
- See the "Walk me through a DCF" for more information on this valuation technique.

LBO Valuation

- Essentially an LBO (leveraged buyout) is when a firm uses a higher than normal amount of debt to finance the purchase of a company, then uses the cash flows from the company to pay off the debt over time. Many times they use the assets of the company being acquired as collateral for the loan. When they are ready to sell the company, ideally the debt has been partially or fully paid off, and they can collect most of the profits from the sale as the sole equity owners of the company. Since a smaller equity check was needed up front due to the higher level of debt used to purchase the company, this can result in higher returns to the original investors than if they had paid for the company with all their own equity (ie without any debt). For more detailed information on LBO's, see the LBO analysis in the advanced section.



Which of the valuation methodologies will result in the highest valuation?



☛ *Of the four main valuation techniques (Market Value, Market Comps, Precedent Transactions and DCF) the highest valuation will normally come from the Precedent Transactions technique because a company will pay a premium for the synergies coming from the merger. A DCF will normally give you the next highest valuation simply because those building the DCF tend to be somewhat optimistic in the assumptions and projections going into their model. Market comps and market value will normally give the lowest valuation.*

What does spreading comps mean?

- ☛ “Spreading comps” is the task of collecting and calculating relevant multiples for comparable companies.
- ☛ Many times, an analyst can simply pull the relevant multiples from a resource like CapitalIQ. However, sometimes the analyst will research the company’s data and financial information in their 10-K/10-Q to make sure they have adjusted for non-recurring charges or irregular accounting across an industry which can skew multiples across comparable companies.
- ☛ These adjustments will be detailed in the footnotes section of the financial statements.
- ☛ *Spreading comps is the process of calculating relevant multiples from a number of different comparable companies and summarizing them for easy analysis/comparison.*



Walk me through a Discounted Cash Flow model.

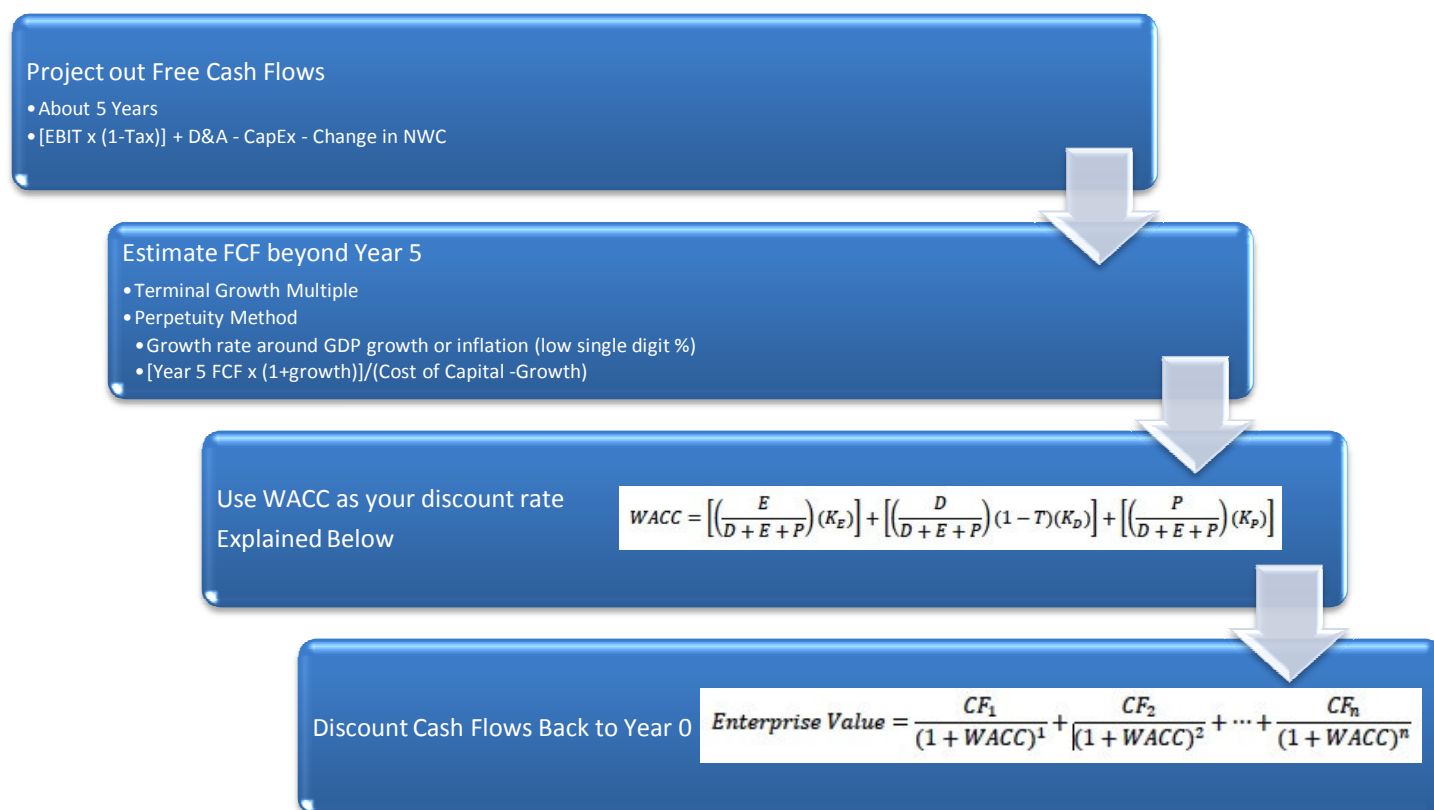
- 🐼 This is one of the most common questions you may receive in an interview.
- 🐼 To begin, we need to first project free cash flows for a period of time, usually five to ten years. Free cash flow is equal to EBIT times (1- the tax rate) plus Depreciation and Amortization minus Capital Expenditures minus the Change in Net Working Capital.
- 🐼 Next we must predict the free cash flows for the years beyond the 5 or 10 years we have projected. To do this we must establish a terminal value, as is detailed in the next question below.
- 🐼 Now that we have established our future cash flows, we must come up with the present value of those cash flows. To do this we must establish an appropriate discount rate. This discount rate is the Weighted Average Cost of Capital, or WACC. The calculation of WACC is discussed two questions below.
- 🐼 To find the present values of the cash flows (which is equal to the company's enterprise value), we discount them by the WACC, as follows.

$$\text{Enterprise Value} = \frac{CF_1}{(1 + WACC)^1} + \frac{CF_2}{(1 + WACC)^2} + \dots + \frac{CF_n}{(1 + WACC)^n}$$

- 🐼 The final cash flow in the analysis will be the sum of the terminal value calculation and the final year's free cash flow
- 🐼 For a much more in depth description of a Discounted Cash Flow analysis, view the DCF tutorial at Investopedia at <http://www.investopedia.com/university/dcf/default.asp>.
- 🐼 *To begin we would project the free cash flows of the company for about 5 years. Free cash flow is EBIT times 1 minus the tax rate, plus Depreciation and Amortization, minus CapEx, minus the Change in Net Working Capital. Then you must predict the free cash flows beyond 5 years which is done either using a terminal value multiple or the using the perpetuity method. To calculate the perpetuity you must establish a terminal growth rate which is usually around the rate of inflation or GDP growth (low single digit percentage). Then multiply the year 5 cash flow by 1 plus the growth rate and divide it by your discount rate minus the growth rate. Now, in order to do this you must have established a discount rate. For a discounted cash flow you use WACC, which is the Weighted Average Cost of Capital as your discount rate, and discount all your cash flows back to year zero using that rate. The sum of the present values of all those cash flows is the value of the firm.*



Discounted Cash Flow Summary Chart



How do you calculate a firm's terminal value?

$$Terminal\ Value = \frac{FCF_{10}(1+g)}{(WACC-g)}$$

- 🦊 To establish a terminal value, you can either use the formula above which is the perpetuity growth methodology, or you can use the terminal multiple method.
- 🦊 In the terminal multiple method, you assign a valuation multiple (such as EV/EBITDA) to the final year's projection, and use that as your "terminal value" of the firm.
- 🦊 In either case, you must remember to still discount this "cash flow" back to year zero as you have with all other cash flows in the DCF model.
- 🦊 *There are two ways to calculate terminal value. The first is the terminal multiple method. To use this method, you choose an operation metric (most common is EBITDA) and apply a comparable company's multiple to that number from the final year of projections. The second method is the perpetuity growth method. To use this method you choose a modest growth rate, usually just a bit higher than the inflation rate or GDP growth rate, in order to assume that the company can grow at this rate infinitely. We then multiply the FCF from the final year by 1 plus the growth rate, and divide that number by the discount rate (WACC) minus the assumed growth rate.*



What is WACC and how do you calculate it?

- WACC stands for Weighted Average Cost of Capital. It is used as the discount rate in a discounted cash flow analysis to present value the company's cash flows and terminal value and reflects the risk of the company.
- WACC represents the blended cost to both debt holders and equity holders of a firm based on the cost of debt and cost of equity for that specific firm.

$$WACC = \left[\left(\frac{E}{D + E + P} \right) (K_E) \right] + \left[\left(\frac{D}{D + E + P} \right) (1 - T)(K_D) \right] + \left[\left(\frac{P}{D + E + P} \right) (K_P) \right]$$

$E = \text{Equity}$

$D = \text{Debt}$

$P = \text{Preferred Stock}$

$K_E = \text{Cost of Equity}$

$K_D = \text{Cost of Debt}$

$K_P = \text{Cost of Preferred Stock}$

$T = \text{Corporate Tax Rate}$

- WACC is the percentage of equity in the capital structure times the cost of equity (which is calculated using the Capital Assets Pricing Model) plus the percentage of debt in the capital structure times one minus the corporate tax rate times the cost of debt (which is the current yield on their outstanding debt) plus the percentage of preferred stock in their capital structure times the cost of preferred stock (if there is any preferred stock outstanding).

How do you calculate Free Cash Flow?

$$EBIT(1 - T) + \text{Depreciation \& Amortization} - \Delta NWC - \text{Capital Expenditure}$$

- Free cash flow is EBIT (Earnings Before Interest and Taxes) times 1 minus the tax rate plus Depreciation and Amortization minus Capital Expenditures minus the Change in Net Working Capital

Why do you project out free cash flows for the DCF model?

- The reason you project FCF for the DCF is because FCF is the amount of actual cash that could hypothetically be paid out to lenders and investors from the earnings of a company.



What is Net Working Capital?

🦁 *Net Working Capital = Current Assets – Current Liabilities*

🦁 *Net Working Capital is equal to Current Assets minus Current Liabilities. It is a measure of how able a company is able to pay off its short term liabilities with its short term assets. A positive number means they can cover their short term liabilities with their short term assets. If the number is negative, the company may run into trouble paying off their creditors which could result in bankruptcy if their cash reserves are low enough.*

What happens to Free Cash Flow if New Working Capital increases?

🦁 Intuitively, you can think of working capital as the net dollars tied up to run the business. As more cash is tied up (either in Account Receivable, Inventory, etc.), there will be less free cash flow generated.

🦁 *Since you subtract the Change in Net Working Capital in the calculation of Free Cash Flow, if Net Working Capital increases, your Free Cash Flow will decrease.*

What are the components of each of the items on the statement of cash flows?

🦁 Operations:

- Cash generated from the normal operations of a company

🦁 Investing:

- Change in cash from activities outside normal scope of the business
- This may include the purchase of property, plant and equipment, and other investments not reflected on the income statement

🦁 Financing:

- Cash from changes in liabilities and shareholders' equity including any dividends that were paid out to investors. For example the issuance of any debt or equity, or the repurchase of debt or equity would be reflected here.

🦁 *Cash flow from operations is the cash generated from the normal operations of a company. The cash flow from investing is the change in cash due to outside occurrences such as the purchase or sale of Property, Plant and Equipment, or any other investments. Cash flow from financing involves the increase or decrease in cash due to the issuance or repurchase/repayment of equity and debt.*

What is the difference between the income statement and statement of cash flows?



- 🐼 *A company's sales and expenses are recorded on their income statement. The statement of cash flows records what cash is actually being used and where it is being spent by the company during that time period*

What is the link between the Balance Sheet and the Income Statement?

- 🐼 The profits generated on the income statement after any payment of dividends are added to shareholder's equity on the balance sheet under retained earnings
- 🐼 Debt on the balance sheet is used to calculate interest expense on the income statement
- 🐼 Property, Plant and Equipment on the balance sheet is used to calculate depreciation expense on the income statement
- 🐼 *There are many links between the balance sheet and the income statement. The major link is that any net income from the income statement, after the payment of any dividends, is added to retained earnings. In addition, debt on the balance sheet is used to calculate the interest expense on the income statement, and property plant and equipment will be used to calculate any depreciation expense.*

What is the link between the Balance Sheet and the Statement of Cash flows?

- 🐼 Beginning cash on cash flow comes from the prior time period's balance sheet
- 🐼 Cash from operations is calculated from changes in balance sheet accounts -- Net Working Capital (Current Assets-Current Liabilities)
- 🐼 Depreciation comes from Property, Plant & Equipment on the balance sheet
- 🐼 Investments in PP&E come from the balance sheet and are accounted for under cash flow from investing
- 🐼 Ending cash goes back onto the balance sheet
- 🐼 *Well, the beginning cash on the statement of cash flows comes from the previous period's balance sheet. The cash from operations is impacted by the change in net working capital which is Current Assets minus Current Liabilities. Depreciation comes from property, plant and equipment which affects cash from operations. Any change in property, plant and equipment due to the purchase or sale of that equipment will affect cash from investing. Finally, ending cash balance from the cash flow statement is the cash balance on the new balance sheet.*



Why might there be multiple valuations of a single company?

- ☛ *Each method of valuation will each give a different value of a given company. The reason for these differences is due to different assumptions, different multiples, or different comparable companies and/or transactions. Generally, the precedent transaction methodology and discounted cash flow methodology will give a higher valuation than the comparable companies analysis or market valuation. This is because a prior transaction will include a “control premium” over the company’s market value to entice shareholders to sell, and will account for the “synergies” that may occur when the two companies become one. The DCF will also normally produce a higher valuation than the comparable companies due to the fact that when an analyst makes their projections and assumptions for a company’s future cash flows, they are usually somewhat optimistic.*

How do you determine which of the valuation methodologies to use?

- ☛ *The best way to determine the value of a company is to use a combination of all the methodologies and zero in on an appropriate valuation. If you have a precedent transaction you feel is extremely accurate, you can give that more weight, if you are extremely confident in your DCF you can give that more weight. Valuing a company is as much an art as it is a science.*

What is an Initial Public Offering (IPO)?

- ☛ An IPO is the first sale of stock in a previously private company to the public markets.
- ☛ This is known as “going public.”
- ☛ The IPO process is incredibly complex and investment banks charge large fees to lead companies through it.
- ☛ Companies IPO for a number of reasons including raising capital, cashing out for the original owners and investors, and employee compensation.
- ☛ Some negatives for “going public” include sharing future profits with the public investors, loss of confidentiality, loss of control, IPO expenses to investment banks, legal liabilities, etc.
- ☛ *An IPO occurs the first time a company sells shares of stock to the public market. Most times the company will either go public to raise capital in order to grow the business, or to allow the original owners and investors to cash out some of their investment.*

What is a primary market and what is a secondary market?

- ☛ The primary market is the market an investment bank will go to in order to sell new securities before they go to market. With an IPO or Bond issuance, the majority of these buyers are institutional investors who purchase large amounts of the security.
- ☛ The secondary market is the market on which a stock or bond trades after the primary offering.
- ☛ *The primary market is the market that a firm sells a new stock or bond issuance to the first time it comes to market. The secondary market is the market that the security will trade on after the initial offering (NYSE, Nasdaq, Etc.)*



INTERMEDIATE

What is the Capital Assets Pricing Model?

- Used to calculate the required/expected return on investment (ROE), or the Cost of Equity of a company
- $Re = Rf + B(Rm - Rf)$
- The Capital Assets Pricing Model is used to calculate the required return on equity or the cost of equity. The return on equity is equal to the risk free rate (which is usually the yield on a 10-year US government bond) plus the company's beta (which is a measure of how volatile the stock is in relation to the stock market) times the market risk premium.*

Where do you find the risk free rate?

- The risk free rate is usually the current yield on the 10 year government treasury which can be found on the front page of The Wall Street Journal, on Yahoo! Finance, etc.
- This is considered "risk free" because the US Government is considered to be a risk-free borrower.

What is Beta?

- Represents relative volatility or risk of a given investment with respect to the market
- $\beta < 1$ means less volatile than market (lower risk, lower reward)
- $\beta > 1$ means more volatile than market (higher risk, higher reward)
- A beta of 1.2 means that an investment will theoretically be 20% more volatile than the market. If the market goes up 10%, that investment should go up 12%.
- Beta is a measure of the volatility of an investment compared with the market as a whole. The market has a beta of 1, while investments that are more volatile than the market have a beta greater than 1 and those that are less volatile have a beta of less than 1.*

$\beta < 1$

Consumer Staples

Healthcare

Utilities

Tobacco

Petroleum Production

$\beta > 1$

Wireless Networking

Biotechnology

Computer Software/Services/Hardware

E-Commerce

Entertainment Technology



From the three main financial statements, if you had to choose two, which would you choose and why?

- 🐼 The key to this question is the fact that if you have the beginning and ending Balance Sheets for the period, and you have the ending Income Statement, you can generate a Cash Flow Statement. Therefore the answer to this question is that you would want the beginning and ending Balance Sheets and the Income Statement.
- 🐼 *If I had to choose two financial statements, I would choose the Balance Sheet and the Income Statement. As long as I had the Balance Sheets from the beginning and end of the period, as well as the end of period Income Statement, I would be able to generate a Cash Flow Statement.*

How would a \$10 increase in depreciation expense affect the three financial statements?

- 🐼 Break this question down into pieces
- 🐼 Start with the income statement
 - A \$10 increase in depreciation is an expense, which therefore lowers your operating profit by \$10 and you will pay less taxes
 - Your taxes will decrease by $(\$10 \times T)$ and therefore your net income will decrease by $(\$10 \times (1 - T))$
 - Assuming a 40% tax rate, the drop in net income will be \$6
- 🐼 Then move to the statement of cash flows
 - The reduction in net income reduces cash from operations by \$6
 - However, since the depreciation is a non-cash item so it will *increase* cash from operations by \$10 since you add back depreciation
 - Ending cash is therefore increased by \$4
- 🐼 Then to the balance sheet
 - Cash increases by \$4
 - PP&E by \$10 because of the depreciation
 - Overall assets fall by \$6
 - This needs to balance with the other side of the balance sheet. In order to balance the balance sheet, retained earnings will fall by \$6 due to the drop in Net Income.
- 🐼 *Let's start with the income statement. The \$10 increase in depreciation will be an expense, and will therefore reduce net income by \$10 times (1-T). Assuming a 40% tax rate, this will mean a reduction in net income of \$6. This will flow to cash from operations where net income will be reduced by \$6, but depreciation increases by \$10, resulting in an increase of ending cash by \$4. Cash then flows onto the balance sheet. Where cash increases by \$4, PP&E decreases by \$10, and retained earnings decreases by \$6, causing everything to balance.*
- 🐼 Note: See the chart on the next page to help you follow the flow.



On the Income Statement

- \$10 Depreciation Expense, 40% Tax Rate
- Reduction in Net Income of $\$10 \times (1 - 40\%) = \6

Reduction in net income flows to cash from operations

- Net income reduced by \$6
- Depreciation increases by \$10
- Net increase in cash from operations of \$4
- Ending cash increases by \$4

Ending cash flows onto the balance sheet

- Cash increases by \$4
- Property, Plant and Equipment lose \$10 in value
- Net decrease in assets of \$6, matches the net drop in shareholder equity due to reduction of retained earnings from the \$6 drop in net income

How would you calculate the discount rate for an all equity firm?

- ☛ *If a firm is all equity, then you would use CAPM to calculate the cost of equity, and that would be the discount rate.*

What is the market risk premium?

- ☛ *The market risk premium is the required return that investors require for investing in stocks over investing in “risk free” securities. It is calculated as the average return on the market (around 12-13%) - the risk free rate (current yield on a 10 year treasury)*

What kind of an investment would have a negative beta?

- ☛ *Gold is a type of investment that would have a negative beta. When the stock market goes up, the price of gold drops as people flee from the “safe haven” of gold. The opposite happens when the market goes down, implying a negative correlation.*

How much would you pay for a company with \$50 million in revenue and \$5 million in profit?

- ☛ *To value this company, you must use multiples or a precedent transactions analysis. For more information about these types of valuation techniques, refer to the “how would you value a company” question above.*



How would you value a company with no revenue?

- ☛ *In order to value a company with no revenue, such as a start up, you must project the company's cash flows for future years and then do a discounted cash flow model of those cash flows using an appropriate discount rate. Alternatively, you could use other operating metrics to value the company as well. If you took a start-up website with 50,000 subscribers, but no revenue, you could look at a similar website's value per subscriber and apply that multiple to the website you are valuing.*

What is the difference between APV and WACC?

- ☛ WACC incorporates effect of interest tax shields into the discount rate
 - Typically calculated from actual data from balance sheets and used for a company with a consistent capital structure over the period of the valuation.
- ☛ APV adds present value of financing effects to NPV assuming all-equity value
 - Useful where costs of financing are complex and if capital structure is changing
 - Use for Leveraged Buyouts

Describe a company's typical capital structure.

- ☛ *A company's capital structure is made up of debt and equity, but there are different levels of each. Debt can be broken down into senior, mezzanine and subordinated, with senior being paid off first in the event of bankruptcy, then mezzanine, then subordinated. Since senior is paid off first, it will have a lower interest rate. Equity can also be broken down into preferred stock and common stock. Preferred stock is like a combination of debt and equity in that it has the opportunity for some appreciation in value, but more importantly pays out a consistent dividend, that is not tied to the market price of the stock. Common stock is the final piece of the capital structure, and is the stock that is traded on the exchanges. In the event of bankruptcy, the common stockholders will have the last right to assets in the event of liquidation, and therefore are bearing the highest level of risk. Due to this they will demand the highest return on their investment.*

When should a company issue stock rather than debt to fund its operations?

- ☛ *There are a number of reasons a company may issue stock rather than debt to fund its operations. First, if it believes its stock price is inflated, it can issue stock and receive a high price for the shares. If the projects for which the money is being raised may not generate predictable cash flows in the immediate future, the company may have a difficult time paying the consistent coupon payments required by the issuance of debt. The company could also choose to issue stock if they want to adjust the debt/equity ratio of their capital structure.*



When should an investor buy preferred stock?

- 🐼 *An investor should buy preferred who wants the upside of potential of equity, but wants to limit risk in the form of a dividend. The investor would receive steady interest-like payments (dividends) that are more secure than the dividends from common stock. Preferred Stock owners also get a superior right to the company's assets should the company go bankrupt (although less rights than debtholders).*

Why would a company distribute its earnings through dividends to common stockholders?

- 🐼 *The distribution of a dividend signals to the public that a company is healthy and profitable and it can also attract more investors, potentially driving up the company's stock price.*

What is operating leverage?

- 🐼 *Operating leverage is the percentage of costs that are fixed versus variable.*
- 🐼 *A company whose costs are mostly fixed has a high level of operating leverage.*
- 🐼 *Operating leverage is the relationship between a company's fixed and variable costs. A company whose costs are mostly fixed has a high level of operating leverage.*

How would a \$10 increase in depreciation in year 4 affect the DCF valuation of a company?

- 🐼 *A \$10 increase in depreciation decreases EBIT by \$10, therefore reducing $EBIT(1-T)$ by $\$10(1-T)$. Assuming a 40% tax rate, it drops $EBIT(1-T)$ by \$6, but you must add back the \$10 depreciation in the calculation of Free Cash Flow. Therefore your FCF increases by \$4 and your valuation will increase by the present value of that \$4, the equation for PV is below.*

$$PV \text{ of the } \$4 \text{ increase in year 4} = \frac{\$4}{(1 + WACC)^4}$$



If you have two companies that are exactly the same in terms of revenue, growth, risk, etc. but one is private and one is public, which company's shares would be higher priced?

- 🐼 Public company will be priced higher due to the liquidity premium one would pay to be able to quickly and easily buy and sell the shares in the public capital markets.
- 🐼 Another reason the public will be priced higher would be the transparency the firm is required to have in order to be listed on a public exchange.
- 🐼 *The public company will be priced higher for a few reasons. The main reason is the liquidity premium an investor would be willing to pay for the ability to quickly and easily trade their stock on the public exchanges. A second reason would be a sort of "transparency premium" an investor would pay since the public company is required to file their financial documents publicly.*

What could a company do with excess cash on its balance sheet?

- 🐼 Many people would think that having excess cash on hand is not a bad thing. While it is good to have a cash buffer, holding too much cash means you are giving up potential earnings from investing that cash elsewhere.
- 🐼 The firm needs to be aware of its cash needs, and keep enough cash to cover itself in the event of a downturn, but the rest of the cash should be used or invested in one way or another.
- 🐼 A growing company will normally reinvest its cash into the operations of the business itself. This allows the company to expand and grow. This could be an investment in equipment, new employees, new offices, marketing, etc.
- 🐼 A company could also pay out the excess earnings as additional salary or bonuses to its employees.
- 🐼 An option to preserve some sense of liquidity would be investing in short-term CD's which allows you to earn interest, while only locking up the investment for a short amount of time.
- 🐼 Oftentimes a company will choose to pay out a dividend to its shareholders.
- 🐼 Other options include investing in other companies, buying out a competitor, supplier or distributor, paying off debt, a stock repurchase, expand to new markets, etc.
- 🐼 *While at first you may think having a lot of cash on hand would be a good thing, especially in this economy, there is an opportunity cost to holding cash on the balance sheet. A company should have enough cash to protect itself from bankruptcy in a downturn, but above that level the cash should be used in one way or another. The main ways a company could use its cash would be to either reinvest into the firm (whether it be equipment, employees, marketing, etc) or the company could pay out the excess earnings/cash in the form of a dividend to its equity holders. A growing company will tend to reinvest rather than paying a dividend. Other ways the cash could be spent would include paying off debt, repurchasing equity, or buying out a competitor/supplier/distributor.*



What is goodwill and how does it affect net income?

- 🐼 Goodwill is a line item that is found on a company's balance sheet.
- 🐼 Many times, goodwill occurs in the event of an acquisition, where the price paid for the firm being acquired is higher than the tangible assets being purchased. The difference in the price paid and the firm's book value would be accounted for in the "goodwill" section of the balance sheet.
- 🐼 Goodwill represents intangible assets such as brand name, good customer relations, intellectual property, etc.
- 🐼 If something happens which impairs the goodwill of the firm at some point (such as a patent running out, an event hurting the brand name, etc.) goodwill must be "written down" to account for this event.
- 🐼 Impairment of goodwill affects net income in much the same way depreciation does. It is accounted for as an expense, just like depreciation is an expense, even though the company is not physically paying out cash to cover this expense.
- 🐼 *Goodwill is an intangible asset found on a company's balance sheet. Goodwill may include things like intellectual property rights, a brand name, etc. Usually goodwill is acquired when purchasing a firm, in that the acquirer pays a higher amount for the firm than the book value of its assets. If an event occurs that diminishes the value of these intangible assets, the assets must be "written down" in a process much like depreciation. Goodwill is then subtracted as a non-cash expense and therefore reduces net income.*



ADVANCED

How/why do you lever/unlever Beta?

$$\beta_{unlevered} = \frac{\beta_{levered}}{[1 + (1 - T) \left(\frac{Debt}{Equity} \right)]}$$

$$\beta_{levered} = \beta_{unlevered} \left[1 + \left((1 - T) \left(\frac{Debt}{Equity} \right) \right) \right]$$

- 🐼 The levered beta will be the beta you get from a website like yahoo finance.
- 🐼 *By unlevering the beta, you are removing the financial effects from leverage (debt in the capital structure). This unlevered beta shows you how much risk a firm's equity has compared to the market. Comparing unlevered betas allows an investor to see how much risk they will be taking by investing in a company's equity (ie buying stock in the public market). When you have a Company A that doesn't have a beta, you can find comparable Company B, take their levered beta, unlever it, and then relever it using the Company A's capital structure to come up with their beta.*

How would you calculate an equity beta?

- 🐼 *In order to calculate an equity beta you must perform a regression of the return of the stock versus the return of the market as a whole (the S&P 500). The slope of the regression line is the beta.*



STOCKS

BASIC

Name three stocks/companies that you think are undervalued and why?

- 🐼 This question is unique to you. Do some research and find a few stocks that you believe are good buys at their current market price. Have a good reason behind each of your picks. The best way to find these stocks are to use equity research reports if you have access to them. If not, you can use sites like Jim Cramer's thestreet.com, or motleyfool.com to look at articles and their stock picks and reasons behind them. Generally, you are better off picking a less known company so your interviewer doesn't have to opportunity to cross-examine you on your reasoning if they know the stock well. You could go through the process of valuing them yourself using any of the valuation techniques if you are feeling ambitious.
- 🐼 Variations of this question include "Pitch me a stock" or "What stocks would you short right now?"

What did the S&P 500/Dow Jones Industrial Average/Nasdaq close at yesterday?

- 🐼 This is a question used to gauge your general interest in the financial markets. You probably will not be expected to know the number to the penny, but knowing the levels of the three major exchanges, as well as if they were up or down and why they were up or down will show your interviewer that you keep track of what is going on in the world of finance.
- 🐼 *Yesterday the XXXX closed at XXXX, up/down XXX from the open. I also noticed that it was up XXX on the day before I came into my interviews due to _____.*

Company XYZ released increased quarterly earnings yesterday, but their stock price still dropped, why?

- 🐼 *There are two main reasons that this could occur. First, the entire market could have been down on the day (or the industry to which XYZ belongs), which had more of an impact than the company's positive earnings. More likely however, is that even though they released increased earnings, the figures were not as high as the Wall Street analyst estimates.*



What does it mean to short a stock?

- 🦊 Short selling is selling a stock that you don't actually own.
- 🦊 An investor that short-sells a stock is taking the position that they will be able to purchase that stock at a lower price in the future.
- 🦊 Normally a short-seller will borrow the stock from another investor, and then sell it. Naked short selling occurs when an investor sells the stock without having any of the stock actually borrowed.
- 🦊 *Short selling a stock is essentially the opposite of going long in a stock. When an investor buys a stock, they believe they will be able to sell the stock for a higher price in the future. When short-selling, the investor sells a stock they don't actually own, under the belief they will be able to purchase it for a lower price in the future.*

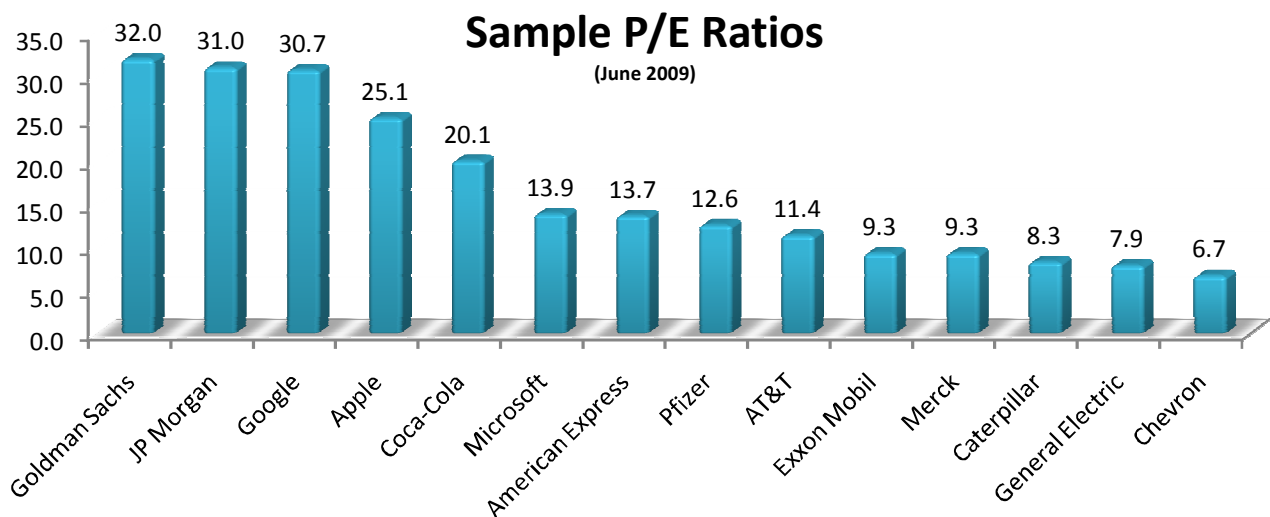
What is liquidity?

- 🦊 Liquidity is how freely an asset or security can be bought and sold on the open markets by an investor
 - Money market accounts are very liquid, publicly traded large cap stocks are also very liquid
 - Micro-cap stocks could be relatively low liquid due to the limited market demand for them
- 🦊 It also is how quickly an asset can be converted into cash
 - Cash itself is obviously the most liquid asset
 - A larger pharmaceutical production plant is *not* a very liquid asset
- 🦊 A more liquid investment is relatively safer, all else equal, since the investor can sell it at any time
- 🦊 *Liquidity is how easily an asset can be bought and sold by an investor. Some examples of liquid assets include money market accounts, large-cap stocks, etc. Some non-liquid assets include many micro-cap stocks, or in the example of a large corporation a large, specialized factory or production plant which could take years to convert into cash.*



Is 15 a high P/E ratio?

- ☛ This is not a yes or no question. A firm's P/E ratio is important in comparison with other companies in their industry. P/E can be thought of how many dollars an investor is willing to pay for one dollar of earnings. A high P/E represents high anticipated growth in earnings. In high growth industries, such as technology, a P/E ratio of 15 may be considered relatively low, since the company is expected to grow their earnings at a high rate, and therefore deserve a higher valuation relative to their earnings. For a large pharmaceutical company, however, a P/E of 15 may be considered high, since their earnings growth may be expected to slow in future years.
- ☛ *It depends on the industry of the company you are looking at. A P/E ratio of 15 in an industry like basic materials is a bit high, but if this company is a high growth tech company, 15 may be considered rather low.*



INTERMEDIATE

Where do you think the stock market will be in 3/6/12 months?

- 🐼 This is another question that you can use to show your interest in the markets. It is not a right or wrong question; everyone has different opinions on where the market is going.
- 🐼 You need to have an opinion and a well thought out reasoning for that opinion.
- 🐼 If you think the market is going to drop in the next three months, hit a bottom and then begin to bounce back, *have a reason* why you think it is going to drop, why it is going to bottom out, and why it will begin to rise.
- 🐼 It is more important you display logical reasoning than whether or not your prediction turns out to be true.
- 🐼 Also, remember to stick to your reasoning. Your interviewer may try to challenge you and challenge your reasoning. If you have come up with a solid response, you should be confident in your answer and confident in your reasoning. Do not change your opinion just to agree with your interviewer.

Can you tell me about a recent IPO you have followed?

- 🐼 Again, this is a question you need to do some research for around the time of your interview. You can find an IPO which is written about in the Wall Street Journal or Financial Times. Another option is to go to dealbook.blogs.nytimes.com and click on the IPO/Offerings tab to see what recent IPOs have occurred. Know the company that went public, a little information about the company, what the offer price was, which banks completed the IPO, etc.
- 🐼 Note that IPO activity in 2009 has been very slow compared to recent years

If you read that a given mutual fund has achieved 50% returns last year, would you invest in it?

- 🐼 *You should do more research because past performance is not an indicator of future results. A mutual fund full of Mortgage Backed Securities could have been up 50% a few years ago and then been down 90% last year due to the market for MBS's collapsing. To make an investment decision you need to research more in depth into the fund's holdings.*

If a company's stock has gone up 20% in the last 12 months, is the company's stock in fact doing well?

- 🐼 *This depends on a number of different factors including the beta of the company and the performance of the market. If the stock's beta is 1 (meaning it should be as volatile as the market and therefore produce market returns) and the market was up 30% over the past 12 months, then the stock is doing relatively poorly.*



What is insider trading and why is it illegal?

- ☛ *Insider trading is the action of buying or selling stock in a company based on information that is not publicly available. For example, if a CEO of a pharmaceutical company knows that a drug is going to be pulled from the shelves by the FDA, he cannot sell his stock until that information has been released to the public.*

Who is a more senior creditor, a bondholder or stockholder?

- ☛ *A bondholder is always a more senior creditor than a stockholder. In the event of bankruptcy/liquidation the bondholder will be paid first. Additionally, interest payments are paid to bondholders before equity holders receive any profits in the form of dividends.*

How can a company raise its stock price?

- ☛ *A company could repurchase stock which lowers the number of shares outstanding. It could also produce higher earnings, causing its EPS to be higher than anticipated by industry analysts which would send a positive signal to the market.*
- ☛ *They could announce a change to their organizational structure such as cost-cutting or consolidation.*
- ☛ *They could also announce an accretive merger or an acquisition that will increase their earnings per share.*
- ☛ *Any type of positive news about the company could potentially raise the stock price. If the company repurchases stock, it lowers the shares outstanding, raises the EPS which will raise the stock price. A repurchase is also seen as a positive signal in the market. A company could also announce a change to its organizational structure like cost-cuts or consolidations or they could announce an accretive merger or acquisition that will increase their earnings per share. Any of these occurrences would most likely raise the company's stock price.*

A stock is trading at \$5 and a stock is trading at \$50, which has greater growth potential?

- ☛ *It depends. The stock with the higher growth potential is most likely the stock with the lower market cap, so if the \$5 stock has 1 billion shares outstanding and the \$50 stock has 10,000 shares outstanding, the \$50 stock would actually most likely have higher growth potential.*



If you bought a Stock X a year ago for \$10, sold it today for \$15, and received \$5 in dividends over the year, what would your overall return be?

🐼 $\text{Return on Stock} = \frac{\text{Sale Price} + \text{Dividends} - \text{Purchase Price}}{\text{Purchase Price}}$

🐼 So... $\text{Return on Stock X} = \frac{\$15 + \$5 - \$10}{\$10} = 100\%$

🐼 *Since the return on a stock is the sale price plus dividends minus the purchase price, all divided by the purchase price, for stock X it would be 15 plus 5 minus 10, which is 10, divided by 10, meaning I would have made 100% return on my investment.*

What is correlation?

🐼 Correlation is how two stocks will move in relation to each other.

🐼 If two stocks have a strong positive correlation, when one moves up the other should move up as well and vice versa.

🐼 If two stocks have a strong negative correlation, when one moves up, the other should move down and vice versa.

🐼 Correlation ranges between -1 and 1.

🐼 *Correlation is the way that two investments move in relation to one another. If two investments have a strong positive correlation, they will have a correlation near 1 and when one goes up, the other will go up. When you have two with a strong negative correlation, they will have a correlation near -1 and when one investment moves up in value, the other should move down.*

Correlation of -1

Strong Negative
Correlation

When one investment
goes up in value, the
other goes down

Example: Oil prices
and Airline Stocks

Correlation of 0

No Correlation

Investments move
independently

Example: A large
railway company and
a small software co.

Correlation of 1

Strong Positive
Correlation

When one investment
goes up in value, the
other goes up

Example: Two high
end hotel chains



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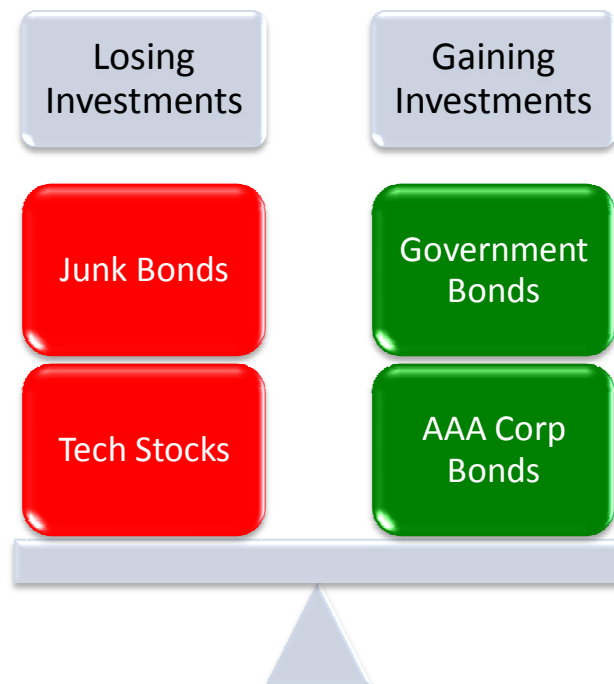
What is diversification?

🐭 Diversification is mixing a wide variety of investments in your portfolio. The goal being a higher return with a lower risk than putting all your capital into only one or a few investments.

🐭 To diversify your portfolio you want to pick investments that have a low correlation so that when economic conditions push one investment to have a good period, the other will be having its down period and vice versa.

🐭 Systematic risk is the risk that affects the entire market while unsystematic risk affects only specific industries. If properly diversified, an investor can essentially eliminate all unsystematic risk from their portfolio.

🐭 *Diversification is the process of creating a portfolio of different types of investments. It means investing in stocks, bonds, alternative investments etc. It also means investing across different industries. If an investor is properly diversified, they can essentially eliminate all unsystematic risk from their portfolio, meaning that they can limit the risk associated with one individual stock and their portfolio will only be affected by factors affecting the entire market.*



If you add a risky stock to a portfolio, what happens to the overall risk of your portfolio?

- ☛ *It depends on the correlation of the new investment to the portfolio. It could potentially lower the overall risk of the portfolio.*

What is the difference between technical analysis and fundamental analysis?

- ☛ *Technical analysis is the process of picking stocks based on historical trends and stock movements mainly based on charts. Fundamental analysis is examining a company's fundamentals, financial statements, industry, etc and picking stocks that are "undervalued."*



ADVANCED

What do you think is going on with XYZ company/industry?

- 🦉 This is another question to gauge your general interest in the financial markets. You cannot prepare for this question in any other way than to keep up with reading the Wall Street Journal, Financial Times, The Economist and/or watching CNBC. Chances are they would ask you about a company or industry that has been in the news recently, or something that you have shown interest in on your resume, rather than a completely arbitrary company or industry.

When should a company buy back stock?

- 🦉 *A company will buy back its own stock for a number of reasons. When it believes the stock is undervalued, when it has extra cash, when it believes it can make money by investing in itself, or when it wants to increase its stock price by increasing its EPS due to a reduction in shares outstanding or send a positive signal to the market.*

Why do some stocks rise so much on the first day of trading after their IPO and others don't? How is that "money left on the table"?

- 🦉 *Money left on the table means the company could have completed the offering at a higher price, and that difference in valuation goes to the initial investors in the stock, rather than the company raising the money. This means the company could have sold the same stock in its IPO at a higher price than it actually offered it at. This happened a lot during the .com boom. Company's stock would skyrocket on the first day of trading due to the huge hype over the stock.*

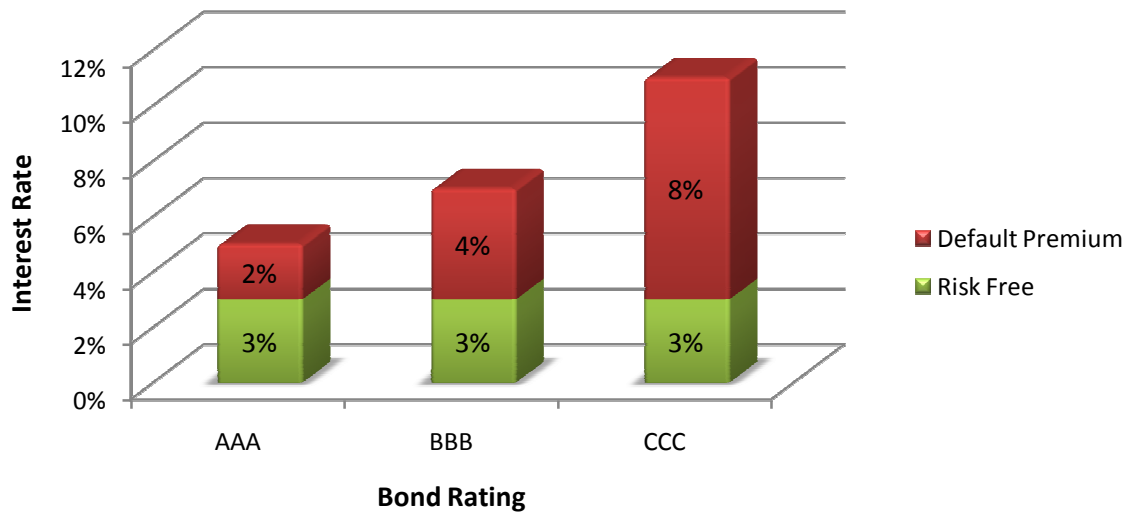


BONDS AND INTEREST RATES

BASIC

What is the default premium?

- 🐼 *The default premium is the difference between the yield on a corporate bond and the yield on a government bond with the same time to maturity to compensate the investor for the default risk of the corporation, compared with the “risk-free” comparable government security.*



What is the default risk?

- 🐼 *The default risk is the risk of a given company going bankrupt.*

What is “face value”?

- 🐼 *Face value or par value of a bond is the amount the bond issuer must pay back at the time of maturity. Bonds are usually issued with a \$1,000 face value.*

What is the coupon payment?

- 🐼 *The coupon payment is the amount that a company will pay to a bondholder normally on an annual or semi-annual basis. It is the coupon rate \times the face value of the bond. For example, the coupon payment on an annual 10% bond with a \$1,000 face value is \$100.*



What is the difference between an investment grade bond and a “junk bond”?

- 🐘 An investment grade bond is one that has a good credit rating, a low risk of bankruptcy and therefore pays a low interest rate.
- 🐘 A “junk bond” is a bond that has a poor credit rating and a relatively high risk of bankruptcy and is therefore required to pay investors a higher interest rate.
- 🐘 *An investment grade bond is a bond issued by a company that has a relatively low risk of bankruptcy and therefore has a low interest payment. A “junk bond” is one issued by a company that has a high risk of bankruptcy but is paying high interest payments.*

What is the difference between a bond and a loan?

- 🐘 In theory, a bond and a loan are similar. The “issuer” of a bond is like the borrower on a loan, and the “holder” of the bond is like the creditor.
- 🐘 Let’s draw a parallel between a bond issuance from General Electric and a home loan taken out by John Smith. GE and John Smith are both looking to borrow money. GE is looking to borrow quite a bit more, so they need to go to the public markets and borrow money from lots of different sources, John Smith can just go to his local bank. GE structures a bond issuance for X dollars, with a term (say 10 years) and an interest rate (say 5%), which will be paid in a “coupon” payment each year. John Smith goes to the local bank, borrows Y dollars, agreeing to pay it back over a term (say 30 years) at an agreed upon interest rate (say 7%), which will be paid every year. Both loans and bonds have additional terms built into them.
- 🐘 As you can see, the similarities are numerous. However, in order to raise the money, John simply borrows all his money from the bank. GE’s process is a bit more complicated in that they must go out and market their bonds to the public, selling them to individuals and institutional investors across the globe, with the help of their investment bank of choice.
- 🐘 *The main difference between a bond and a loan is the market that it is traded on. A bond issuance is usually for a larger amount of capital, is sold in the public market and can be traded. A loan is issued by a bank, and is not traded on a public market.*

How do you determine the discount rate on a bond?

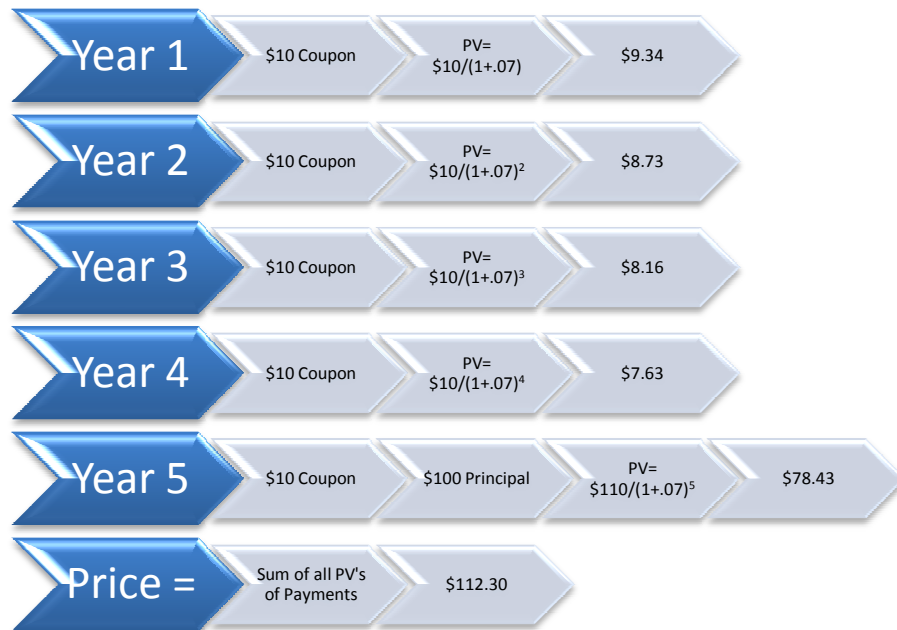
- 🐘 *The discount rate is determined by the company’s default risk. Some of the factors that influence the discount rate include a company’s credit rating, the volatility of their cash flows, the interest rate on comparable U.S. Bonds, and the amount of current debt outstanding.*



How do you price a bond?

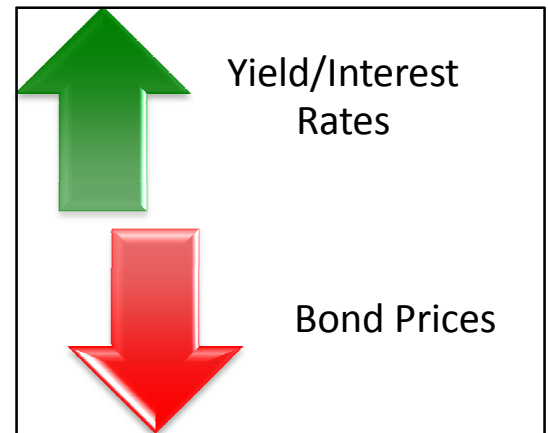
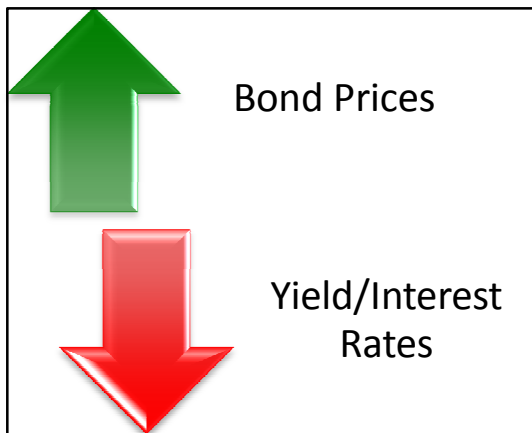
$$Price = \sum_{t=1}^T \frac{Coupon_t}{(1+r)^t} + \frac{Par\ Value}{(1+r)^t}$$

- 🐭 The price of a bond is the net present value of all future cash flows (coupon payments and par value) expected from the bond using the current interest rate.
- 🐭 In the example below assume the current interest rate is 7%



If the price of a bond goes up, what happens to the yield?

- 🐭 The price and yield of a bond move inversely to one another. Therefore, when the price of a bond goes up the yield goes down.



If you believe interest rates will fall, and are looking to make money due to the capital appreciation on bonds, should you buy them or short sell them?

🐼 *Since price moves inversely to interest rates, if you believe interest rates will fall, bond prices will rise, and therefore you should buy bonds.*

What is the current yield on the 10-year Treasury note?

🐼 This information changes daily and is available in the Wall Street Journal or any financial website.

If the price of the 10-year Treasury note rises, what happens to the notes yield?

🐼 *The price and yield are inversely related, so when the price goes up, the yield goes down.*

What would cause the price of a treasury note to rise?

🐼 *If the stock market is extremely volatile, and investors are fearful of losing money, they will desire risk free securities, which are government bonds. The increase in demand for these securities will drive the price up, and therefore the yield will fall.*

If you believe interest rates will fall, should you buy bonds or sell bonds?

🐼 *If interest rates fall, bonds prices will rise, so you should buy bonds.*

How many basis points equal 0.5 percent?

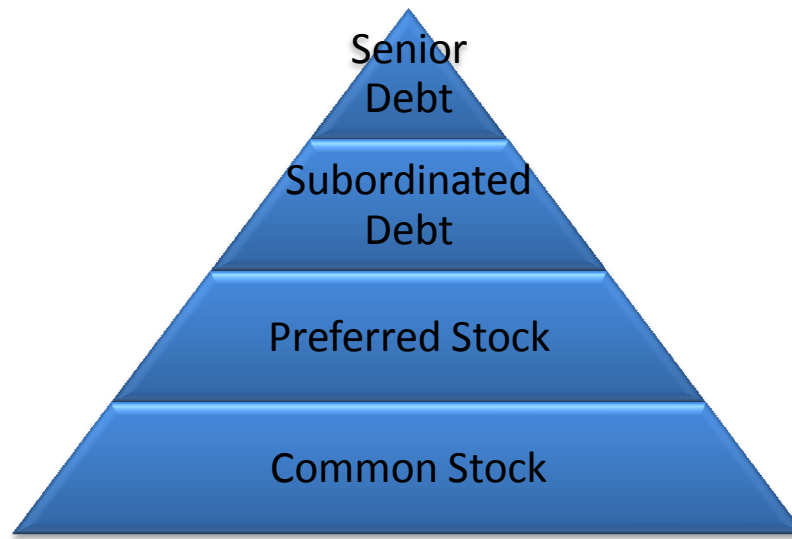
🐼 One basis point = .01 percent. Therefore 0.5 percent = 50 basis points

🐼 *Since one basis point is equal to one-hundredth of a percent, one-half of a percent is equal to fifty basis points.*



What is the order of creditor preference in the event of a company's bankruptcy?

- 🦊 The order of preference is shown in the chart below. Those at the top of the pyramid have rights to the firm's assets in the event of a liquidation before those below them.



- 🦊 *The first creditors to get paid in the event of liquidation would be the senior debt holders. These are usually banks, or senior bondholders. Usually they have some of the firm's assets as collateral. Then comes those holding subordinated debt, followed by preferred stockholders. Common stockholders have the absolute last rights to any assets in the event of liquidation or bankruptcy.*

Why could two bonds with the same maturity, same coupon, from the same issuer be trading at different prices?

- 🦊 One of the bonds could be callable
- 🦊 One of the bonds could be putable
- 🦊 One of the bonds could be convertible
- 🦊 *There are a few reasons why they could be trading at different prices. A bond that is putable or convertible demands a premium, and a callable bond will trade at a discount.*



What are bond ratings?

- 🐼 A bond rating is a grade that is given to a bond depending on their risk of defaulting.
- 🐼 The three most well known and trusted ratings agencies are Standard & Poor's, Moody's and Fitch.
- 🐼 The lower the grade, the more speculative the stock, and all else equal, the higher the yield.
- 🐼 *Bond ratings are a grade given to a bond based on its risk of defaulting. These ratings are issued by independent firms and are updated over the life of the bond. They range from AAA which are highly rated "investment grade" bonds with a low default risk, to C, which means the bond is "non-investment grade" or "junk" or even D which means the bond is actually in default and not making payments.*

Investment Grade

- AAA - AA (S&P)
- Aaa, Aa1-Aa2 (Moody's)
- AAA - AA (Fitch)

Medium Grade

- AA - BBB (S&P)
- Aa3 - Baa2 (Moody's)
- AA - BBB (Fitch)

Non-Investment "Junk"

- BBB - CCC- (S&P)
- Baa3 - Ca (Moody's)
- BBB- - CCC (Fitch)

In Default

- D (S&P)
- C (Moody's)
- DDD - D (Fitch)



INTERMEDIATE

What is the yield to maturity on a bond?

- 🐼 The yield to maturity is the rate of return on a bond if it is purchased today for its current price and held through its maturity date.
- 🐼 Normally, the yield to maturity is expressed at an annual rate.
- 🐼 The calculation of YTM includes the current market price, the par value, the coupon payments and the time to maturity. In calculating YTM you also assume that the coupon payments are reinvested at the same rate.
- 🐼 If the coupon yield of a bond (coupon/face) is lower than its current yield (coupon/price) it is selling at a discount.
- 🐼 If the coupon yield of a bond (coupon/face) is higher than its current yield (coupon/price) it is selling at a premium.
- 🐼 *The yield to maturity on a bond is the rate of return on a bond if it is held through its maturity date based on its current price, coupon payments, face value and maturity date.*

What will happen to the price of a bond if the fed raises interest rates?

- 🐼 *If interest rates rise, newly issued bonds offer higher yields to keep pace. Therefore, existing bonds with lower coupon payments are less attractive, and the price must fall to raise the yield to match the new bonds.*

What is a Eurodollar bond?

- 🐼 Note that a Eurodollar bond does not have to be issued by a company in Europe, it can be any foreign company.
- 🐼 *A Eurodollar bond is a bond issued by a foreign company, but issued in US Dollars rather than their home currency.*

What is a Callable Bond?

- 🐼 *A callable bond is a bond that allows the issuer of the bond to redeem the bond prior to its maturity date, therefore ending their coupon payments. However, a premium is usually paid by the issuer to redeem the bond early.*

What is a Put Bond?

- 🐼 *A put bond is essentially the opposite of a callable bond. A put bond gives the owner of bond the right to force the issuer to buy back the security from them at face value, prior to the maturity date.*



What is a Convertible bond?

- ☛ *A convertible bond can be “converted” into equity over the course of the life of the bond. Therefore, a bondholder can decide that equity in the company is worth more to them than the bond, and the company can essentially buy back their debt by issuing new equity.*

What is a Perpetual Bond?

- ☛ *A perpetual bond is a bond that simply pays a coupon payment indefinitely (or the company goes into default) and doesn’t ever pay back a principle amount.*

How would you value a perpetual bond that pays a \$1,000 coupon per year?

$$\text{Value of Perpetual Bond} = \frac{\text{Coupon Payment}}{\text{Current Interest Rate on Comparable Bonds}}$$

- ☛ *Well, a perpetual bond is one that pays coupon payments every period for eternity, with no repayment of principal (par value). If it is a perpetual bond, then the value of the bond will be coupon payment divided by the current interest rate.*

When should a company issue debt instead of issuing equity?

- ☛ *A company will normally prefer to issue debt since it is cheaper than issuing equity. In addition, interest payments are tax deductible and therefore provide interest tax shields. However, a company needs to have a steady cash flow in order to be able to pay the coupon payments every year, whereas that is not necessary when issuing equity. It may also try to raise debt if it feels its stock is particularly undervalued and would not raise the capital needed from an equity offering.*

If you believe interest rates will fall, which should you buy: a 10-year coupon bond or a 10-year zero coupon bond?

- ☛ *Since a zero-coupon bond is more sensitive to fluctuations in interest rates, when the interest rates fall, the price of the zero-coupon bond will rise more than the price of the coupon bond. Therefore, if they believe interest rates will fall, they should purchase the zero-coupon bond.*



Which is riskier: a 30 year coupon bond or a 30 year zero coupon bond?

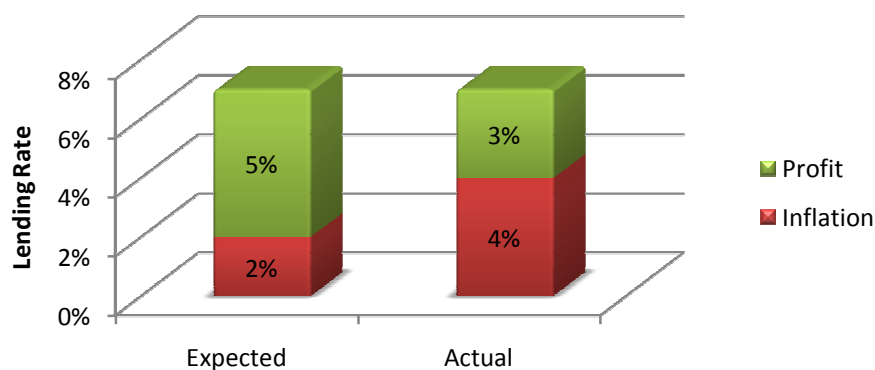
- 🐭 A zero coupon bond is riskier since you will receive no payments until the final redemption date, whereas on a coupon bond you will receive payments over the life of the bond.
- 🐭 The price of a zero-coupon bond is also more sensitive to interest rate fluctuations, increasing its level of risk.
- 🐭 *A zero coupon bond will yield \$0 until its date of maturity, while a coupon bond will pay out some cash every year. This makes the coupon bond less risky since even if the company defaults on its debt prior to its maturity date, you will have received some payments with the coupon bond.*

Year	Zero Coupon Bond (More Risk, Lower Yield, Lower Price)	5 Year 10% Coupon Bond (Less Risk, Higher Yield, Higher Price)
1	\$0	\$10
2	\$0	\$10
3	\$0	\$10
4	\$0	\$10
5	\$100	\$110



Why can inflation hurt creditors?

- 🦊 Inflation cuts into the real percentage return that creditors make when they lend out money at a fixed rate.
- 🦊 For example, if a bank lends at 7%, expecting 2% inflation, they expect to make a 5% real gain. However, if inflation increases to 4%, they are only making 3% on their loan.
- 🦊 *Inflation can definitely hurt creditors. Creditors assign their interest rates based on the risk of default as well as the expected inflation rate. If a creditor lends at 7% and inflation is expected at 2% they are expecting to make 5%. But if inflation actually increases to 4%, they are only making 3%.*



How would you value a zero-coupon perpetual bond?

- 🦊 This is a trick question. A perpetual bond has no maturity date and is not redeemable; therefore it pays only coupon payments. If it pays only coupon payments, and the coupon is zero, than it actually pays nothing, and has no value.
- 🦊 *Since a zero coupon bond doesn't have any interest payments, and a perpetual bond has no par value, the value of the bond is zero since it will pay out nothing.*

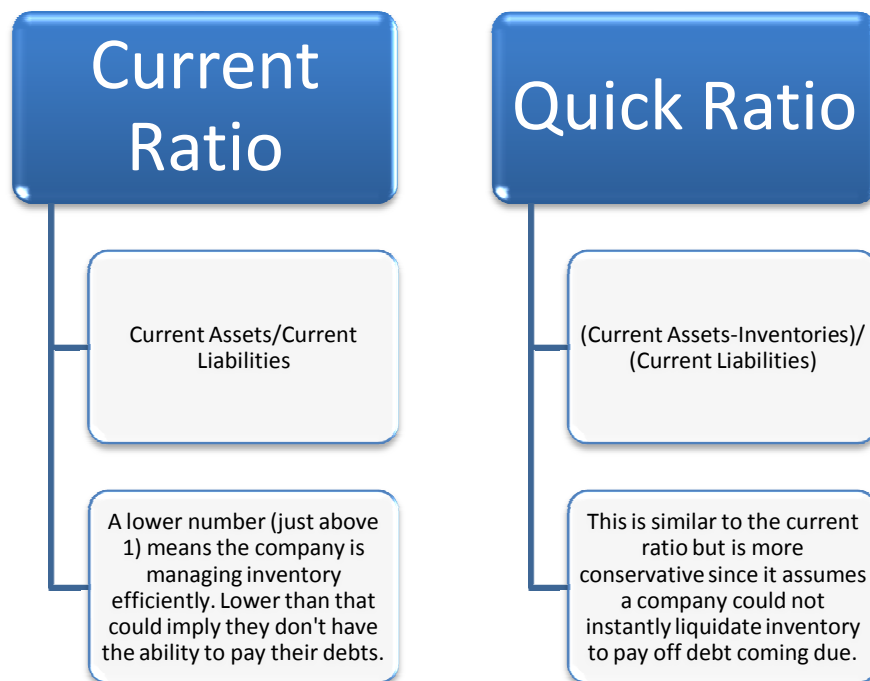
If the stock market falls, what would you expect to happen to bond prices and interest rates?

- 🦊 *When the stock market falls, investors flee to safer securities, like bonds, which causes the demand for those securities to rise and therefore the price. Since prices and yields move inversely, if bond prices rise, yields will fall. The government may lower interest rates in an attempt to stimulate the economy.*



What are some ways to determine if a company poses a credit risk?

- 🦊 The easiest way to determine a company's credit risk is to look at their credit rating which is provided both Standard & Poors and Moody's.
- 🦊 If one wanted to perform their own analysis, some metrics to look at would be the Current Ratio, and Quick Ratio.



- 🦊 Compare these ratios to other similar companies in their industry.
- 🦊 One can also look at longer term measures like the long term debt ratio, debt/equity and interest coverage ratio (EBIT/Interest Expense) which shows the company's ability to pay its interest expense with its earnings and again compare these to industry averages.
- 🦊 *Determining the credit risk of a company takes an incredible amount of work and research. However, some quick things to look at would be their credit ratings from Moody's or Standard and Poor's, their current ratio, their quick ratio, their debt to equity ratio, and their interest coverage ratio, and compare those ratios to the ratios of similar companies.*

Why is a firm's credit rating important?

- 🦊 *The lower a firm's credit rating, the higher its risk of bankruptcy and therefore the higher the cost of borrowing capital.*



ADVANCED

What steps can the Fed take to influence the economy?

Open Market Operations

- Open market operations are the fed buying and selling securities (government bonds) to change the money supply. Buying government securities increases the money supply and stimulates expansion, selling securities shrinks the money supply and slows the economy.

Raise or lower interest rates

- The discount rate is the interest rate The Fed charges banks on short-term loans.
- The federal funds rate is the rate banks charge each other on short-term loans.
- When The Fed lowers these rates, it signals an expansionary monetary policy.

Manipulate the reserve requirements

- The reserve requirement is the amount of cash a bank must keep on hand to cover its deposits (money not loaned out). When this requirement is lowered, more cash is loaned out and is pumped into the economy, and is therefore expansionary policy.

What does X-economic event effect inflation/interest rates/bond prices?

 Below is a chart of economic events and their impacts.

Economic Event	Inflation	Interest Rates	Bond Prices
Unemployment figures low	Up	Up	Down
Dollar weakens against Yen	Up	Up	Down
Consumer confidence low	Down	Down	Up
Stock market drops	Down	Down	Up
Companies report healthy earnings	Up	Up	Down

 Below is a chart of economic indicators and what is considered a positive/negative event.

Indicator	Positive Economic Event	Negative Economic Event
GDP	Up	Down
Unemployment	Down	Up
Inflation	Down	Up
Interest Rate	Down	Up
New Home Sales	Up	Down
Existing Home Sales	Up	Down



How would the follow scenario affect the interest rates: the president is impeached and convicted?

- 🐼 Any negative news about the country as a whole will lead to fears that the economy may decline, so the Fed would most likely lower interest rates to stimulate economic expansion.

What is duration?

- 🐼 Duration is how sensitive a bond is to changes in interest rates.
- 🐼 The cash flows at the beginning of a bond's life (the coupon payments) are "worth more" in present value terms since they do not have to be discounted for as many years.
- 🐼 When interest rates rise, the PV of the future cash flows go down more than those earlier in the bond's life cycle. Duration is a measure of how sensitive the bond price is due to fluctuations in interest rates.
- 🐼 *Duration is a measure of the sensitivity of the price of a bond to a change in interest rates. Duration is expressed as a number of years. When interest rates rise, bond prices fall, and falling interest rates mean rising bond prices. Formally, it is the "weighted average maturity of cash flows". In simple terms, it is the price sensitivity to changes in interest rates. If your cash flows occur faster or sooner your duration is lower and vice versa. In other words, a 4 year bond with semi-annual coupons will have a lower duration than a 10 year zero-coupon bond. The larger the duration number, the greater the impact of interest-rate fluctuations on bond prices.*

What does the government do when there is a fear of hyperinflation?

- 🐼 The government can do a number of things to slow the economy and defuse hyperinflation. They can use taxation and government spending to regulate the level of economic activity.
 - Increasing taxes and decreasing government spending slows down growth in the economy and fights inflation.
 - Additionally, raising key interest rates will slow the economy; reduce the money supply and slow inflation.

Let's say a report release today showed that inflation last month was very low. However, bond prices closed lower. Why might this happen?

- 🐼 *This would occur because bond prices are based on expectations of future inflation. Bond traders may expect future inflation to be higher, and therefore the demand for bonds today will be lower, increasing the yields to match the increased inflation expectations.*



CURRENCIES

BASIC

What is the spot exchange rate?

- 🦁 *The spot exchange rate is the rate of a foreign-exchange contract for immediate delivery. Spot rates are the price that a buyer will pay for a foreign currency.*

What is the forward exchange rate?

- 🦁 The forward rate is the price at which currencies will be exchanged for at some given date in the future.
- 🦁 The forward rate is used by speculators as well as companies looking to hedge their foreign exchange risk.
- 🦁 *The forward exchange rate is the price that a foreign currency will cost at some time in the future. A company can enter into a forward contract on exchange rates to help hedge against exchange rate fluctuations in the future.*

What factors affect foreign exchange rates?

- 🦁 Interest Rates
- 🦁 Inflation
- 🦁 Capital market equilibrium

What is the difference between a “strong” and a “weak” currency?

- 🦁 *A strong currency is one whose value is rising. A weak currency is one whose value is falling*



INTERMEDIATE

How is the market exchange rate between two country's currencies determined?

🦊 The interest rates in the two countries

- If the interest rate of a foreign country relative to the home country goes up, the home currency weakens
- When interest rates in a country rise, investments held in that country's currency will earn a higher rate of return and the demand for that country's currency will rise because people will want to invest in that country (all else equal). The rise in demand will cause the currency to strengthen.

🦊 Also the rates of inflation in the two countries will affect the exchange rate. If inflation in Country A is expected to be higher than in Country B, Country A's currency will be devalued and will be worth less.

🦊 *The exchange rate between two country's currencies is determined by a few factors. First is the interest rates in the two countries. If the interest rate in the home country increases relative to the foreign country, the demand for the home country's currency increases and therefore the home currency strengthens. Also impacting the exchange rate is the expected inflation rates in the two countries.*

If the U.S. dollar weakens, should interest rates generally rise, fall, or stay the same?

🦊 Generally speaking, when the US dollar weakens, the interest rates in the US will rise.

🦊 A weak dollar means the price of imported good will rise, which means higher inflation. Higher inflation will put pressure on the FED to raise interest rates.

🦊 *Most times, when the US Dollar weakens, the price of imported goods will rise which causes higher inflation, which in turn will put pressure on the FED to increase interest rates.*

If inflation rates in The United States fall relative to Great Britain, what happens to the exchange rate?

🦊 If inflation rates in The U.S. are lower than in Great Britain, this means moving forward there will be more pounds in circulation than dollars.

🦊 When this occurs, one dollar is worth more pounds.

🦊 This means the dollar will strengthen compared to pound.

🦊 *If the United States' inflation rate is expected to fall relative to Great Britain, relatively more pounds will be in circulation and dollars will be worth more pounds. This means that dollars will strengthen relative to pounds.*



ADVANCED

Below is a chart which explains the effect of changes in the exchange rate on the earnings of US Multinational companies.

Economic Event	Effect on Earnings of U.S. Multinational Companies
U.S. Dollar Strengthens	Negative
U.S. Dollar Weakens	Positive

Below is a chart of the effects of changes in interest rates and inflation rates on the exchange rate of the US Dollar.

Economic Event	Effect on Dollar
U.S. Interest Rates Rise	Strengthens
U.S. Inflation Rates Rise	Weakens

What is the difference between currency devaluation and currency depreciation?

- 🦉 *Currency devaluation occurs in a fixed-exchange rate system like China, when the government changes the exchange rate of its currency. Currency depreciation occurs when a country allows its currency to move according with the currency exchange market, and the country's currency loses value.*

If the spot exchange rate of dollars to pounds is \$1.60/£1 and the one-year forward rate is \$1.50/£1, would we say the dollar is forecast to be strong or weak relative to the pound?

- 🦉 When the spot exchange rate is higher than the forward exchange rate, the dollar is expected to strengthen relative to the pound in the coming year.
- 🦉 *Since 1 pound costs more dollars now than it will in the future, the dollar is expected to strengthen in the next year.*



OPTIONS AND DERIVATIVES

BASIC

What is a derivative?

- 🐼 *A derivative is a type of investment that derives its value from the value of other assets like stocks, bonds, commodity prices or market index values. Some derivatives are futures contracts, forwards contracts, calls, puts, etc.*

What are options?

- 🐼 Call Option: Gives the holder the right to purchase an asset for a specified exercise price on or before a specified expiration date.
- 🐼 Put Option: Gives the holder the right to sell an asset for a specified exercise price on or before a specified expiration date.
- 🐼 *Options are a type of derivative that gives the bearer the "option" to buy or sell a security at a given date, without the obligation to do so. The buyer of the option pays an amount less of the actual value of the stock and has the OPTION to buy or sell the stock for a set price on or before a set date.*

Call Option

Gives owner the "Option" to purchase an asset at a set price before a certain date

Write or sell a call option if you believe the asset will decline in value

Buy a call option if you believe the asset will increase in value

Put Option

Gives owner the "Option" to sell an asset at a set price before a certain date

Write or sell a put option if you believe the asset will increase in value

Buy a put option if you believe the asset will decrease in value



What is hedging?

- ☛ *Hedging is a financial strategy designed to reduce risk by balancing a position in the market. For example, an investor that owns a stock could hedge the risk of the stock going down by buying put options on that security or other related businesses in the industry.*

What are forwards contracts?

- ☛ Forwards are an agreement that calls for future delivery of an asset at an agreed-upon price.
- ☛ No money is changed initially. They are designed to protect each party from future price fluctuations.
- ☛ *A forward contract is a type of derivative that arranges for the future delivery of an asset (oil, grain, currencies, etc) on a specific date at a specific price.*

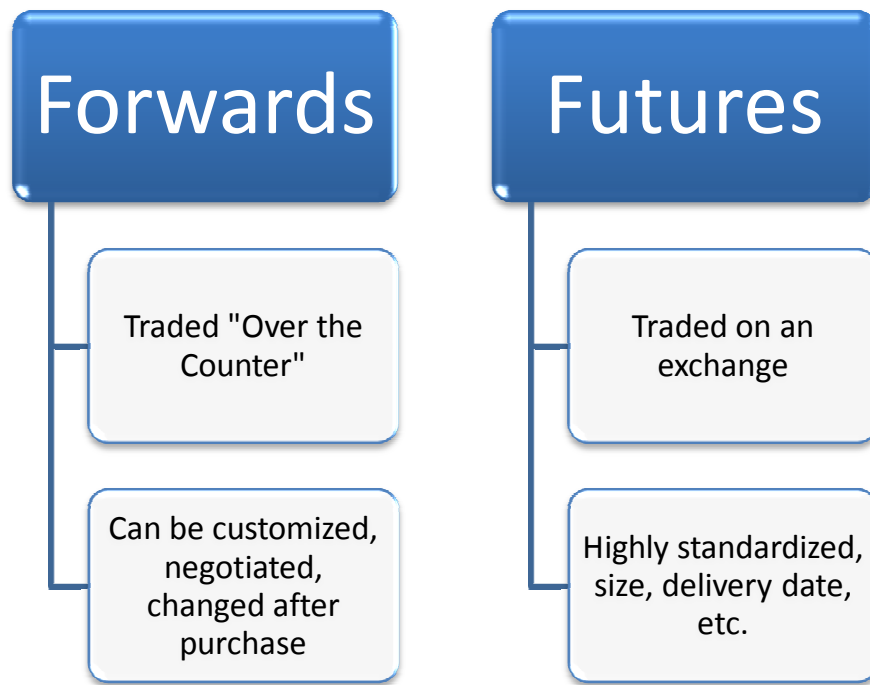
What are futures contracts?

- ☛ *Futures are a financial contract obligating the buyer to purchase an asset like a commodity or another financial instrument at a specified price on a specified date. Futures are very strictly defined in their terms and are traded publicly on exchanges.*



What is the main difference between futures contracts and forward contracts?

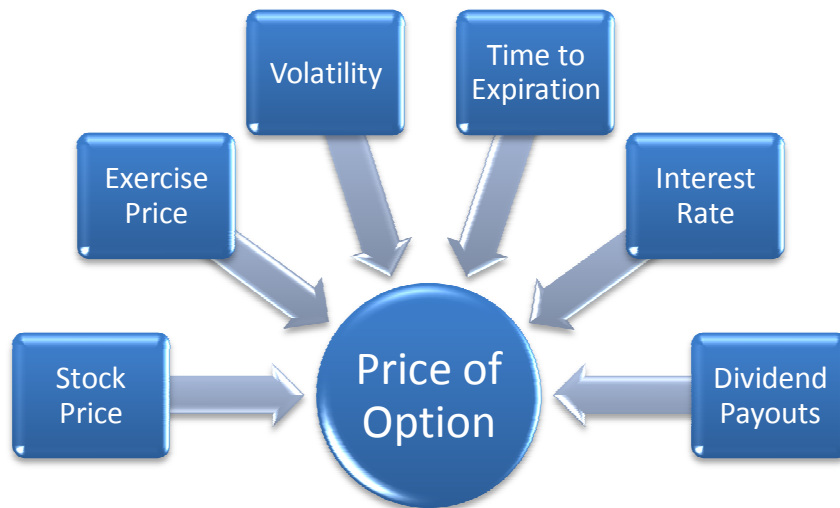
- 🦊 There are a few slight differences between futures and forwards.
- 🦊 Futures are traded on exchanges and forwards are traded over-the-counter.
- 🦊 Futures are highly standardized, which allows them to be traded on exchanges.
- 🦊 Forwards are privately negotiated and can be customized and can also be changed after the contract has been agreed upon, as long as both parties agree.
- 🦊 *Futures are very strict in their terms and are traded publicly on exchanges, while forwards are privately negotiated contracts and can be arranged to basically any specifications that the buyer and seller agree upon.*



INTERMEDIATE

What factors influence the price of an option?

- Factors include current stock price, exercise price, the volatility of the stock, time to expiration, interest rate and the dividend rate of the stock.
- Below is a chart of how these factors influence the price of an option.
- To play around with the variables and see what happens to price, visit the following website:
http://www.numa.com/cgi-bin/numa/calc_op.pl



Increasing Variable	Effect on Call Option Price	Effect on Put Option Price
Current Stock Price	Price Increases	Price Decreases
Exercise/Strike Price	Price Decreases	Price Increases
Volatility	Price Increases	Price Increases
Time to Expiration	Price Increases	Price Increases
Interest Rate	Price Increases	Price Decreases
Dividend Payout	Price Decreases	Price Increases



If an option is “in the money” what does that mean?

- 🐼 An option is “in the money” when exercising the option will result in a profit.
- 🐼 A call option is in the money when its exercise price is below the market price since an investor can purchase the asset at the exercise price and instantly sell it at the market price.
- 🐼 A put option is in the money when its exercise price is above the market price since an investor can buy the asset at the market price and instantly sell it at the exercise price.
- 🐼 *If an option is “in the money” it means that at this point in time, if an investor decides to exercise their option, there will be value based on the difference between the exercise price and the market price.*

What are swaps?

- 🐼 Swaps are an exchange of future cash flows. This can be a swap of interest rates, currency exchange rates, etc.
- 🐼 Swaps can benefit both companies if one has access to a lower floating rate, and one has access to a lower fixed rate, and each desires the rate the other company has access to.
- 🐼 *Basically a swap is an agreement to exchange future cash flows. The most prominent “swap” lately have been credit default swaps issued by banks as a type of insurance against companies not being able to pay back their debt.*

Say I hold a put option on Microsoft stock with an exercise price of \$60, the expiration date is today, and Microsoft is trading at \$50. About how much is my put worth and why?

- 🐼 *This put is worth \$10. This is due to the fact that the put gives you the option to sell the shares at \$60, and you can currently buy them in the open market at \$50. You can buy them at \$50, instantaneously them for \$60, therefore making a profit of \$10 per share.*



ADVANCED

All else being equal, which would be less valuable: a December put option on a small cap tech stock or a December put option on a large cap healthcare stock?

- 🦁 *The put option on the healthcare stock would usually be less valuable due to the fact that the healthcare industry and large cap stocks are usually less volatile than small tech stocks. The more volatile the underlying asset, the more valuable the option on the stock.*

All else being equal, which would be more valuable: a December call option for Apple or a January call option for Apple?

- 🦁 *The January option would be more valuable since the later an option's expiration date, the more valuable the option.*

Why do interest rates matter when figuring the price of options?

- 🦁 *Interest rates matter due to net present value. Higher interest rates lower the value of options since the PV of that option will be lower.*



What is the Black-Scholes Model?

- 🐼 The Black-Scholes model is one way to value asset options (puts and calls)
- 🐼 The model contains a few equations and is quite complicated. (Don't freak out when you see the formulas, if you needed to use them at work, they would have a program where you simply plug in the variables and it does the work for you!)
- 🐼 The equations are listed below for reference, but more important is to remember the model has 6 inputs:
 - S = Current price of the asset
 - K = Exercise or Strike price of the option
 - t = Time until expiration of the option
 - r = Risk Free Rate
 - σ^2 = Variance
 - D = Dividend Yield
- 🐼 After giving the answer below, be ready to answer follow up questions on what effect an increase or decrease in any of the variables would have on a put or call option. These effects are listed in the chart below.
- 🐼 *The Black-Scholes model is really the industry standard for pricing options. The formula is pretty complicated, but there are 6 inputs that effect the price including the current price of the asset, the exercise price of the option, the time until expiration, the current risk free rate, the asset's variance and the dividend yield.*
- 🐼 *Price of A Call Option* = $Se^{-yt}N(d_1) - Ke^{-rt}N(d_2)$
- 🐼 *Price of a Put Option* = $Ke^{-rt}[1 - N(d_2)] - Se^{-yt}[1 - N(d_1)]$
- 🐼 $d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$
- 🐼 $d_2 = d_1 - \sigma\sqrt{t}$
- 🐼 *Note y = dividend yield AKA $\frac{\text{Dividend}}{\text{Current Price}}$



MERGERS AND ACQUISITIONS

BASIC

What are some reasons that two companies would want to merge?

- 🐼 Synergies
- 🐼 New market presence
- 🐼 Consolidate operations
- 🐼 Gain brand recognition
- 🐼 Grow in size
- 🐼 Gain patents, plants, equipment, intellectual property
- 🐼 Management Ego and the desire to run a larger company and increase their own compensation
- 🐼 *The main reason two companies would want to merge would ideally be the synergies that the companies will gain by combining their operations. However, some other reasons would be gaining a new market presence, an effort to consolidate their operations, gain brand recognition, grow in size, or to potentially gain the rights to some property (physical or intellectual) that they couldn't gain as quickly by creating or building it on their own.*

What are some reasons two companies would not want to merge?

- 🐼 The “synergies” they are looking to gain through the merger simply will not occur.
- 🐼 Many times, mergers are more about boosting a management team's ego and growing the business in order to gain the marketability and media attention of a merger.
- 🐼 High investment banking fees associated with going through a merger.
- 🐼 *A lot of times the synergies that a company hopes to gain by going through with a merger will not actually occur. Also, many times a company may be looking to go through with a merger due to management ego and wanting to gain media attention. Finally, the investment banking fees associated with completing a merger can be prohibitively high.*



What are synergies?

- ☛ Synergies are the improvements that result from the combination of two companies. The idea is that the one combined company can generate a higher EPS than the standalone businesses.
- ☛ The value of the combined company will be greater than simply adding the two together.
- ☛ Synergies can result for many reasons including cost cuts due to reduction in redundant management, employees, offices, etc. There are also sometimes revenue synergies due to the ability to raise prices because of reduced competition, cross-marketing, economies of scale, etc.
- ☛ *The concept of synergies is that the combination of two companies results in a company that is more valuable than the sum of the values of the two individual companies coming together. The reasons for synergies can be either cost-saving synergies like cutting employees, reduction in office size, etc or it can include revenue generating synergies such as higher prices and economies of scale.*

What is the difference between a strategic buyer and a financial buyer?

- ☛ Strategic buyer: A corporation that wants to acquire another company for strategic business reasons such as synergies, growth potential, etc.
- ☛ Financial buyer: A group looking to acquire another company purely as a financial investment. An example is a private equity fund doing a leveraged buyout of the company.
- ☛ *Strategic buyers and financial buyers are very different. A strategic buyer is usually one company who is looking to buy another company in order to enhance their business strategically, whether it be through cost cutting, synergies, gaining property, etc. A financial buyer is traditionally a group of investors such as a private equity firm who is buying a company purely as an investment, looking to gain the income the company produces.*

Which will normally pay a higher price for a company, a strategic buyer or a financial buyer?

A strategic buyer will normally pay a higher price. This is due to their willingness to pay a premium to potentially gain the synergies of lowering costs, improving their existing business and/or revenue synergies. The financial buyer typically looks at the company purely in terms of returns on a standalone basis unless they have other companies in their portfolio that could significantly improve operations of the target.



INTERMEDIATE

Can you name two companies that you think should merge?

- 🐼 This is another question testing your awareness of what is going on in the markets. There is no right or wrong answer to this question, just have two companies you believe would benefit from merging, and have a well formulated reason behind the merger (think synergies, gain foothold in a new market, consolidation of operations, or brand recognition).
- 🐼 The important part of your answer to this question is that the two companies you choose make sense as a combined entity, and you have several logical reasons why.

What is a stock swap?

- 🐼 A stock swap is when the acquired company agrees to be paid in stock of the new company because they believe in the potential for success in the merger.
- 🐼 Stock swaps are more likely to occur when the stock market is performing well and the stock price of the acquiring firm is relatively high, giving them something of high value to purchase the company with.
- 🐼 *A stock swap is when a company purchases another company by issuing new stock of the combined company to the old owners of the company being acquired, rather than paying in cash.*

What is the difference between shares outstanding and fully diluted shares?

- 🐼 *Shares outstanding represent the actual number of shares of common stock that have been issued as of the current date. Fully diluted shares are the number of shares that would be outstanding if all “in the money” options were exercised.*

How do you calculate the number of fully diluted shares?

- 🐼 The most common way of calculating the number of fully diluted shares is the treasury stock method.
- 🐼 This method involves finding the number of current shares outstanding, adding the number of options and warrants that are currently “in the money” and then subtracting the number of shares that could be repurchased using the proceeds from the exercising of the options and warrants.
- 🐼 *The most common way of determining the number of fully diluted shares is the treasury stock method (See explanation in the advanced section).*



What is a cash offer?

🦉 *A cash offer is payment for the ownership of a corporation in cash.*

Would I be able to purchase a company at its current stock price?

🦉 *Due to the fact that purchasing a majority stake in a company will require paying a control premium, most of the time a buyer would not be able to simply purchase a company at its current stock price.*

Why pay in stock versus cash?

🦉 *If a company pays in cash, the owners receiving the cash will need to pay taxes on the cash received. Additionally, if the owners of the company being acquired want to be a part of the new company, they may prefer to gain stock. Current market performance may also affect the stock/cash decision. If the market is performing poorly, or is highly volatile, the company being acquired may prefer cash.*

What is a tender offer?

🦉 *A tender offer occurs during a hostile takeover, when the acquiring company offers a higher price than the stock's market price in an attempt to gain controlling interest of a company.*

🦉 *In a hostile tender offer Company A wants to acquire Company B, but B refuses. Company A therefore issues a tender offering. When this occurs, Company A will run advertisements in newspapers to buy stock of B at a price usually well above the market price. For example, Company A will offer to pay \$30 for shares currently trading at \$15 in an attempt to gain ownership of more than 50% of the stock and ownership of the business as a whole.*

🦉 *A tender offer is usually a hostile takeover technique. It occurs when the acquiring company offers to purchase the stock of the target company for a price over the current market price in an attempt to take control of the company without management approval.*

Describe a recent M&A transaction you have read about?

🦉 *This is similar to the recent IPO question. It is simply to see your general interest in the markets. Look in the Wall Street Journal, Financial Times or dealbook.blogs.nytimes.com to get information about recent M&A transactions. Know the companies involved, the price and multiples paid, whether it was a merger or an acquisition, and the banks working on the deal. Also know the primary reasons behind the M&A transaction.*

If Company A purchases Company B, what will the combined company's balance sheet look like?

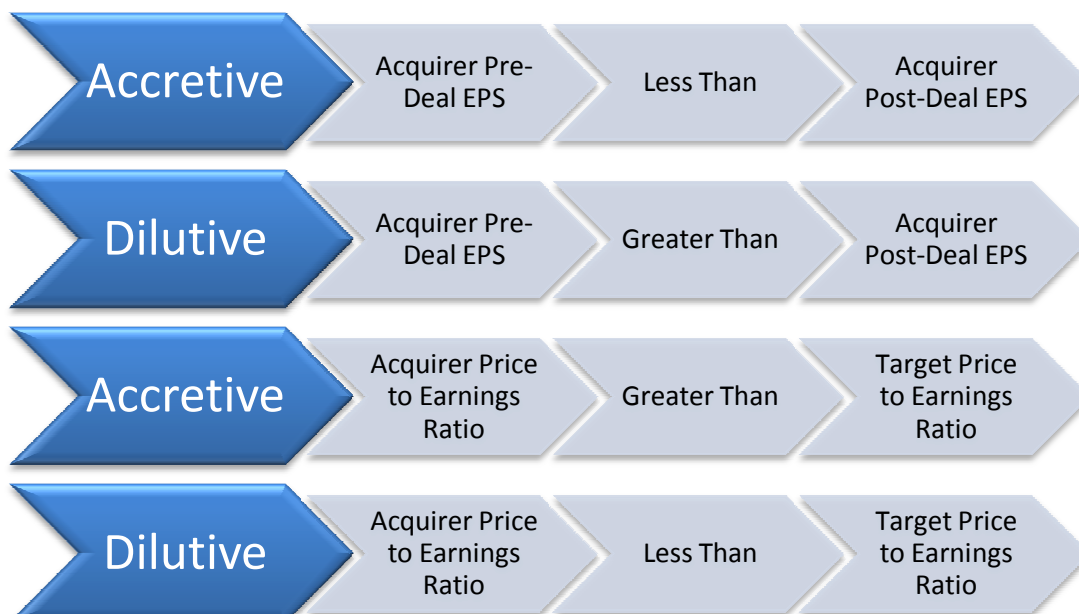
🦉 *The new balance sheet will simply be the sum of the two company's balance sheets plus the addition of "goodwill" which would be an intangible asset to account for any premium paid on top of Company B's actual assets.*



ADVANCED

What is the difference between an accretive merger and a dilutive merger, and how would you go about figuring out if a merger is in fact accretive or dilutive?

- 🐼 Company A acquires Company B. Company A has \$5 million in earnings, 1 million shares outstanding, and earnings of \$5 per share. Company B has earnings of \$1 million.
- 🐼 If Company A's EPS Pre-Deal > Company A's EPS Post-Deal, the deal is dilutive.
- 🐼 If Company A's EPS Pre-Deal < Company A's EPS Post-Deal, the deal is accretive.
- 🐼 Whether or not the deal is accretive or dilutive depends on how much Company A pays for Company B, and how they decide to pay.
- 🐼 For example, if Company A has a ton of cash on hand, and decides to not issue any new stock, the deal is accretive since earnings will increase to \$6 million, with the same 1 million shares of stock, resulting in EPS of \$6. However, if Company A decides to issue another million shares in a stock swap transaction, EPS will decrease since earnings will be \$6 million with 2 million shares outstanding, meaning EPS is now only \$3.
- 🐼 A quick and easy way to figure out whether or not a deal will be accretive or dilutive is to use P/E ratios of the firms in the transaction. If Company A has a higher P/E ratio than Company B, the merger will be accretive, and vice versa. This is because the acquirer will pay less per dollar of earnings for the target.
- 🐼 *An accretive merger is one in which the acquiring company's earnings per share will increase following the acquisition. A dilutive merger is one in which the opposite occurs. The quickest way to figure out if a merger is accretive or dilutive is to look at the P/E ratios of the firms involved in the transaction. If the acquiring firm has a higher P/E ratio than the firm they are purchasing, the merger will be accretive because the acquirer will pay less per dollar of earnings for the target company than where they are currently trading.*



Company A is considering acquiring Company B. Company A's P/E ratio is 50 times earnings, whereas Company B's P/E ratio is 20 times earnings. After Company A acquires Company B, will Company A's earnings per share rise, fall, or stay the same?

☛ *Since the P/E of the firm doing the purchasing is higher than the firm it is purchasing, the new company's EPS will be higher, therefore creating an accretive merger.*

What is the treasury stock method?

- ☛ The Treasury Stock Method is a hypothetical exercise that estimates the potential impact of certain securities on equity holders' ownership
- ☛ This method estimates the effects of employee stock options as well as convertible debt and preferred stock
- ☛ It is mainly used to estimate diluted EPS numbers
- ☛ First you must assume those holding options that are in the money will exercise them
- ☛ Also assume that all the proceeds generated from the exercising of the options will be used to repurchase the company's stock at the current price.
- ☛ Here is the methodology
 - Begin with the company's common shares outstanding. This can be found in their most recent 10-K or 10-Q. For this example, assume they have 1,000,000 shares.
 - Then go to the 10-K or 10-Q and find the options chart. The options that will be exercised are all those that have a weighted average exercise price below the current market price. Assume there are 100,000 shares with a W.A.E.P. of \$5 and the stock is selling for \$10 currently.
 - This means that 100,000 new shares of stock will be issued, and the company will profit \$500,000 from the sale of those shares. Meaning there will be 1,100,000 shares.
 - That \$500,000 will then be used to repurchase shares in the open market at \$10 per share.
 - The company will repurchase 50,000 shares, meaning there will be 1,050,000 shares after the exercise of the options.
- ☛ *The treasury stock method is a way of calculating a hypothetical number of shares outstanding based on current options and warrants that are currently "in the money." The methodology involves adding the number of "in the money" options and warrants to the number of common shares currently outstanding, and then assuming all the proceeds from exercising the options will go towards repurchasing stock at the current price.*



Are most mergers stock swaps or cash transactions and why?

- ☛ *In strong markets, most mergers are stock swaps mainly because the prices of companies are so high, as well as the fact that the current owners will most likely desire stock in the new company, anticipating growth in the strong market.*

You are advising a client in the potential sale of the company. Who would you expect to pay more for the company: a competitor, or an LBO fund?

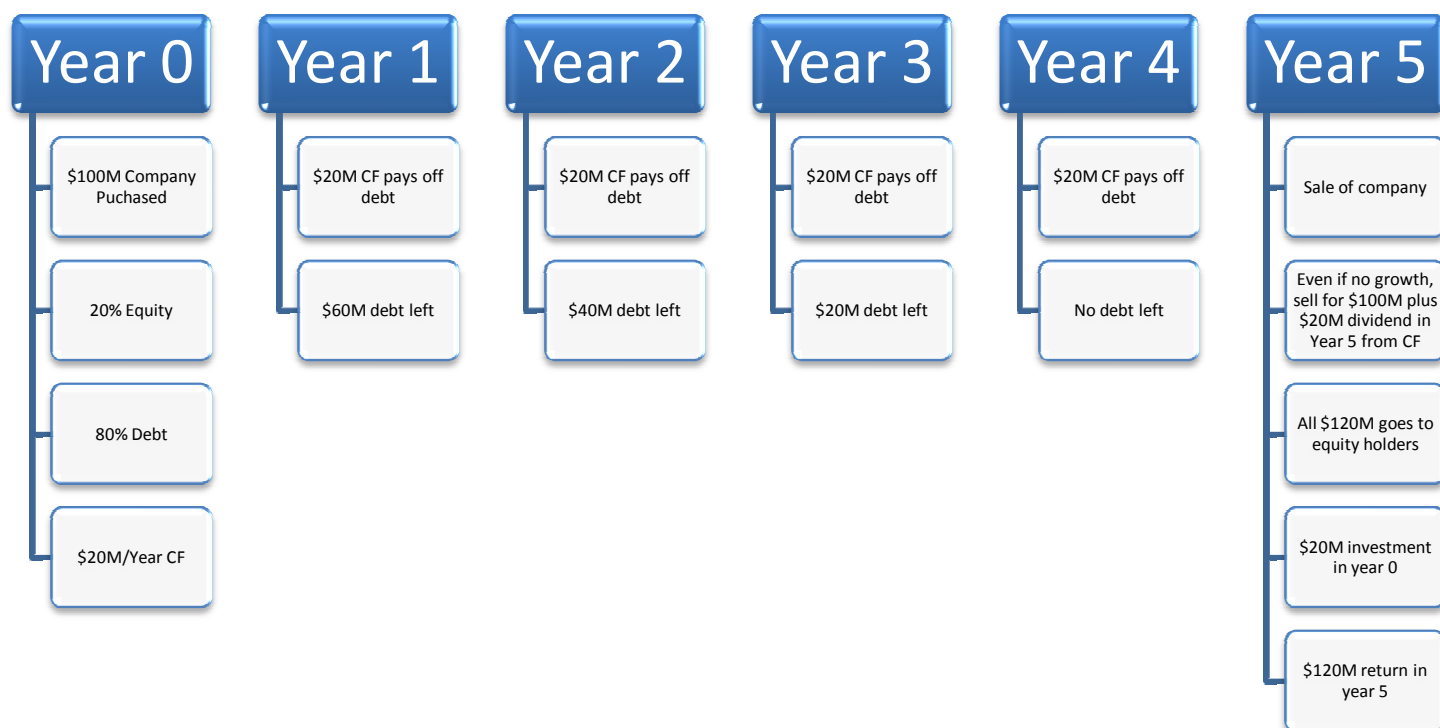
- ☛ *You would expect a competitor who is a strategic buyer to pay more for the given company. This is due to the fact that strategic buyers would derive additional benefits (synergies) and therefore higher cash flows from the purchase than would an LBO fund which is traditionally a financial buyer.*



What is a leveraged buyout? How is it different from a merger?

- 🐼 An LBO is when a group, usually a private equity firm, purchases a company using a relatively high amount of financial leverage, meaning the purchase is financed using mostly debt, with a relatively low equity investment. Ideally, the company then pays off the debt over the investment horizon using the cash flow from the business. Over the course of the investment, the capital structure changes from a high percentage of debt to a high percentage of equity.
- 🐼 For example, a PE firm purchases a company for \$100mm, using \$20mm in equity and borrowing \$80mm in debt. Over the course of 5 years, they pay off the debt using the company's cash flow. Even if the company's enterprise value does not increase over the 5 years, if the firm now sells the company for \$100mm, the fund would have returned \$120mm on a \$20mm investment, a healthy return.
- 🐼 *Essentially, an LBO takes place when a fund wants to buy a company now with the intention of exiting the investment usually within three to seven years and potentially changing management to increase the company's profitability. What makes it a **leveraged** buyout is the fact that the acquiring firm will fund the purchase of the company with a relatively high level of debt and then pay off the debt with the cash flows produced by the firm. This means that by the time the fund is ready to sell the company, the business will ideally have little to no debt and the PE firm will collect a higher percentage of the selling price and/or use the excess cash flow to pay themselves a dividend since the debt has been reduced or paid off.*

🐼 See visualization below



How could a firm increase the returns on an LBO acquisition?

- 🦊 In order to increase a Private Equity fund's return on an LBO investment, there are a number of drivers that can be changed.
 - The most obvious way to increase a potential return is to increase the sale price when the firm monetizes its investment.
 - In modeling the returns, you could also increase your projections for the acquired companies earnings and cash flows.
 - The firm could also negotiate a lower purchase price, which would have the similar effect as raising the selling price.
 - Finally, the private equity firm could increase the amount of leverage or debt on the deal. The higher the leverage, the higher the return all else equal. However, increasing the leverage puts more financial stress on the company being acquired and increases the bankruptcy risk.
- 🦊 *There are a many ways a Private Equity fund can increase the return on an investment. First, they could increase the sale price at the time of monetization through either an increase in operating profits or multiple expansion. Up front, they could negotiate a lower purchase price, or increase the amount of leverage they use in purchasing the company which would imply a smaller equity check with a higher internal rate of return on the capital deployed.*

What makes a company an attractive target for a Leveraged Buy-Out?

- 🦊 Most importantly, an LBO needs to have a steady stream of cash flows so they are able to pay down the debt used to purchase the business.
- 🦊 This means the company should be at the lower end of the risk spectrum, have limited need for additional capital expenditures, and preferably be in a relatively stable industry.
- 🦊 A good candidate should also have a strong management team (unless the Private Equity firm intends to replace them), the ability to reduce its cost structure and a solid asset base that can be used as collateral.
- 🦊 *The most important characteristic of a good LBO candidate is steady cash flows. The firm ideally could pay off a significant portion or all of the debt raised in the acquisition over the life of the investment horizon, with minimal bankruptcy risk. Some other good characteristics include strong management, cost-cutting opportunities, and a non-cyclical industry.*



In a leveraged buyout, what would be the ideal amount of leverage to put on a company?

- 🦉 In order to maximize returns, you would like to finance the deal with the least amount of equity possible.
- 🦉 However, there is a fine line to walk between maximizing returns and putting the company into financial distress due to the level of debt the company has in its capital structure.
- 🦉 *In order to maximize returns in a leveraged buyout, the acquiring firm wants to finance the deal with the least amount of equity possible. However, they need to be careful as to not put the company into financial distress by overburdening the acquired company with debt.*

What are the three types of mergers and what are the benefits of each?

- 🦉 The three types of mergers are horizontal, vertical and conglomerate. A horizontal merger is a merger with a competitor and will ideally result in synergies. A vertical merger is a merger with a supplier or distributor and will ideally result in cost cutting. A conglomerate merger is a merger with a company in a completely unrelated business and is most likely done for market or product expansions, or to diversify its product platform and reduce risk exposure.

What are some defensive tactics that a target firm may employ to block a hostile takeover?

- 🦉 A poison pill shareholder rights plan gives existing shareholders the right to purchase more shares at a discount in the event of a takeover, making the takeover less attractive by diluting the acquirer.
- 🦉 A Pac-Man defense is when the company which is the target of the hostile takeover turns around and tries to acquire the firm that originally attempted the hostile takeover.
- 🦉 A white knight is a company which comes in with a friendly takeover offer to the target company which is being targeted in a hostile takeover.



OTHER

If you worked in the finance division of a company, how would you decide whether or not to invest in a project?

- ☛ *In order to decide, you will determine the IRR of the project. The IRR is the discount rate which will return an NPV of 0 of all cash flows. If the IRR of the project is higher than the current cost of capital for the project, then you would want to invest in the project.*

What are some recent trends in investment banking?

- ☛ Consolidation: Banks being acquired by other banks. JPMorgan buying Bear Stearns, Barclays buying part of Lehman Brothers.
- ☛ Capital Infusions: Buffett investing in Goldman Sachs, Mitsubishi investing in Morgan Stanley, TARP
- ☛ Global Expansion: Firms looking to expand into other, fast growing nations
- ☛ Technology: High technology is being used to execute trades, and distribute information more quickly

What is an institutional investor?

- ☛ *An institutional investor is an organization that pools together large sums of money and puts that money to use in other investments. Some examples of institutional investors are investment banks, insurance companies, retirement funds, pension funds, hedge funds, and mutual funds. They act as specialized investors who invest on behalf of their clients.*

What is a hedge fund?

- ☛ *A hedge fund is a loosely regulated investment pool. Generally speaking, they are only open to high net worth individuals or institutional investors since they are limited to 100 or 500 investors. They use many strategies to hedge against risk with the goal of making a profit in any market environment. Oftentimes these funds take on high risk and are highly leveraged to give their clients the potential for higher returns. They have much more latitude in the types of securities they can invest in because they are typically not restricted by most of regulations that other mutual funds must follow.*



What is securitization?

- 🐼 Mortgage backed securities are probably the most widely known type of securitized asset. A bank will take a pool of mortgages they issued, and sell off the future cash flows (mortgage payments) from those mortgages to another investor.
- 🐼 *Securitization is when an issuer bundles together a group of assets and creates a new financial instrument by combining those assets and reselling them in different tiers called traunches. One of the reasons for the recession has been the mortgage-backed securities market which is made up of securitized pools of mortgages.*

What is arbitrage?

- 🐼 Arbitrage is the instantaneous buying and selling of two related assets in order to capture a guaranteed profit from the trade.
- 🐼 This occurs when two assets are inaccurately priced by the markets and since markets today are so fast, usually only traders with sophisticated computer software can really scan the investment community, identify, and take advantage of arbitrage opportunities since they often only exist for a matter of seconds.
- 🐼 *Arbitrage occurs when an investor buys and sells an asset or related assets at the same time in order to take advantage of temporary price differences. Because of the technology now employed in the markets today, the only people who can truly take advantage of arbitrage opportunities are traders with sophisticate software since the price inefficiencies often close in a matter of seconds.*



BRAINTEASERS

There is no way to prepare for every brainteaser. There are many that are commonly used in interviews and you can prepare for those, but remember answering the brainteaser the way the interviewer wants to hear it answered is more important than actually getting the answer correct. Remember not to lose your cool.

What's 17 squared? What's 18x22?

- 🦉 Don't worry; they want to know how you will handle this question and it is not difficult if you think about it the correct way.
- 🦉 Think 17x10 plus 17x7. Break 17x7 down into 10x7 and 7x7. This gives you 170+70+49, which gives you 289. Whatever you do don't panic and practice these types of questions.
- 🦉 Same idea applies to 18x22, break it down. Do 18x20 + 18x2. Easy, 360 + 36=396.
- 🦉 As far as brainteasers go, this is a rather common one.

Two boats are going towards each other at 10 miles per hour. They are 5 miles apart. How long until they hit?

- 🦉 Be careful here. The initial instinct is to say half an hour. However, *both* boats are moving at 10 miles per hour, so they are converging at 20 miles per hour, meaning they will crash in ¼ of an hour, or 15 minutes.

How many NYSE-listed companies have 1 letter ticker symbols?

- 🦉 26, actually 24 because I & M is used for Intel and Microsoft in case they change their minds.

A driver is going to drive 100 miles. If they drive the first 50 miles at 50 miles per hour, how fast do they have to drive the second to average 100 miles per hour for the entire run?

- 🦉 Most people think "oh, well if they drive the second leg at 150 miles per hour they will average 100 miles per hour."
- 🦉 This is **WRONG!** Think about it for a second. They went the first 50 miles at 50 MPH, which means they drove for an hour. They want to drive the entire 100 miles at an average of 100 MPH, which means they would have to drive the *entire* 100 miles in only 1 hour. Since they have already been driving for an hour, it is impossible to average 100 MPH!
- 🦉 There are TONS of variations on this question. If you get it, make sure you put on a good show and act like you don't know the answer right away; otherwise you will get no credit.



How many gas stations are in the United States?

- ☛ With a question like this, the interviewer is looking at your thought process, not that you can actually figure out how many gas stations are in the U.S.
- ☛ The easiest way to go about answering a question like this is to start small and work your way out. Think about your town. Say your town has 30,000 people, and you have 5 gas stations serving that area. The United States has approximately 300 million people, so that means there are 10,000 “towns” in the United States, and 50,000 gas stations.
- ☛ You then want to make adjustments. For example. Say assume that a quarter of the population lives in larger cities where there is only 1 gas station per 30,000 people. So you have 7,500 towns with 5 gas stations and 2,500 “towns” with only 1. Do a little mental math, and you get a number of 40,000 gas stations in the U.S.

If you were going to build a building in a city, and had no physical restraints, no capital restraints, nothing, how tall would you build it?

- ☛ This question is similar to the question above in that there is no right or wrong answer.
- ☛ They are not looking for an actual height in feet, but more what kind of things you would think about in determining the height.
- ☛ Some things to think about:
 - ☛ Measuring the demand for space in a new building
 - ☛ How high people would be willing to purchase space due to safety concerns
 - ☛ How much you can sell the space for in comparison with how much it costs to maintain
 - ☛ How much the demand for the space will grow over the life of the building, so how much extra space should you build into the design

You are late for a pitch with the CEO of a company in the Town of Truth. You are speeding down a road that suddenly forks, and there are no signs. You know that one way leads to the Town of Truth where everyone tells the truth and the other way leads to the Town of Lies where everyone tells lies. There is a guy standing there at the crossroads and you don't know which town he's from. You only have time to ask him one question.... So what do you ask him?

- ☛ The key to this question is to ask a question to which both guys would point the same direction. You could ask them to point to which town they are from (in which case they would both point to the town of truth).



You have a five gallon container and a three gallon container with no markings. You are standing next to a hose. Measure exactly two gallons of water.

- 🦊 This is one of the more common brainteasers. If you are smart and want to look good, you should sit there and “ponder” the answer for a few seconds, like you are working it out in your head, not that you simply memorized the answer. There are also other versions of this question, so don’t just hear “you have a five gallon container...” and assume it’s this answer.
- 🦊 You first fill the 5 gallon container then dump it into the 3 gallon container, leaving you with 2 gallons in the 5 gallon container.

How many degrees are there between a clock’s two hands when the clock reads 3:15?

- 🦊 The quick thought would be 90 degrees, but it isn’t. If the clock is 360 degrees, the minute hand will be exactly at the 90 degree mark. The hour hand will be $\frac{1}{4}$ of the way between the 3 and the 4. Since there are 12 numbers the 3 and the 4 are 30 degrees apart, making the hour hand 7.5 degrees beyond the 3, and 7.5 degrees from the minute hand.

A stock is trading at 10 and $\frac{1}{16}$. There are 1 million shares outstanding. What is the stock’s Market Cap?

- 🦊 This is just a test of your mental math. If a fourth is .25, an eighth is .125, and a sixteenth is .0625.
- 🦊 The stock price is 10.0625 and the Market Cap is 10.0625 million.



INCOME STATEMENT BASICS

(Apple's 2008 Income Statement)

Revenue or Net Sales: This is the amount of money, total, that a firm receives for the production of its goods or services. For a company like Apple, it would be all the money it brings in for sale of computers, iPods, iPhones, etc. For a service company, it would include all those fees brought in from those services.

Cost of Sales or Cost of Goods Sold: These are the direct costs that go into the production of the goods and services the firm produces. For example, with Apple, Cost of Sales includes raw material costs of the computers themselves, as well as any labor costs that are required for the manufacturing process.

Gross Margin: Gross margin is Revenue minus the Cost of Sales. This number is how much money a company retains from the sale of a good or service after paying for the production of that good or service, but not including any additional expenses the company occurs after the production of the good or service. This money can be put towards paying operating expenses.

Operating Expenses: These are any costs that a firm will incur through its normal course of business, but not including the manufacturing of the goods themselves. Operating expenses for a company like Apple would include employees' salaries (not those involved in manufacturing), marketing expenses (SG&A), research and development, etc.

Three fiscal years ended September 27, 2008		2008
Net sales		\$ 32,479
Cost of sales (1)		21,334
Gross margin		11,145
Operating expenses:		
Research and development (1)		1,109
Selling, general, and administrative (1)		3,761
Total operating expenses		4,870
Operating income		6,275
Other income and expense		620
Income before provision for income taxes		6,895
Provision for income taxes		2,061
Net income		\$ 4,834
Earnings per common share:		
Basic		\$ 5.48
Diluted		\$ 5.36
Shares used in computing earnings per share:		
Basic		881,592
Diluted		902,139

Operating Income: This is the income that a firm produces from its normal operations. For Apple, this would include the profit from the production and sales of its computers and other products, after paying all operating expenses. This would not include any profit from investments, minority interests in other companies, debt and interest payments, etc.

Other Income and Expenses: This includes any income or expenses from non-operating activities, such as other investments or interest payments.

Provision for Income Taxes: This is the amount of money a company allocates to pay its income taxes.

Earnings Per Share: Earnings per Share is (Net Income - Dividends on Preferred Stock)/Average Shares Outstanding. This number is viewed by many as the single most important determinant of a firm's share price. Most analyst predictions are centered around this number. A company announcing an EPS below the analyst's expectations will likely result in a drop in share price, while an announcement above the expectations will likely result in an increase.

Note: There are normally footnotes to the Income Statement explaining how the company calculates most of its numbers and explains any adjustments made.



BALANCE SHEET BASICS

(Apple's 2008 Balance Sheet)

A balance sheet is separated into three main sections: Assets, Liabilities and Equities.

Always remember that the balance sheet MUST balance, meaning

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

Assets:

Assets are broken down into two main categories, current and long term. Assets are essentially the items that a firm has ownership of.

Current Assets are any assets that are cash or can be converted into cash within one year. This includes accounts receivable, short-term investments and inventory.

Long-Term Assets are assets such as buildings or land that would take more than a year to change into cash. Long-term assets are tangible assets (buildings, computers, land, etc) but also include intangible assets. Intangible assets include the value of things such as goodwill, patents, copyrights, licenses, etc. The company approximates the values of these assets.

Current Liabilities are any liabilities the company must pay within the next 12 months. These are important because the company needs to have liquid assets available to pay off these debts. These include notes payable (aka short-term debt), accounts payable, accrued expenses and the current portion of long-term debt. Current portion of long-term debt includes principal and interest on outstanding long-term debt that will need to be paid in the next 12 months.

Long Term Liabilities include things like bonds issued, mortgages, or loans that are not to be repaid within the next 12 months.

Preferred stock holders have more priority to assets than common stock holders, but still less than debt holders. Preferred stock is almost a combination of a bond and common stock, since it pays a fixed dividend, and has the potential for capital appreciation. Not all companies have preferred stock

Common stock is the stock of a company that is traded on the public markets. Some common stock pays a dividend to its investors, while other common stock may simply appreciate in value over time. Common stock also gives owners the right to vote at shareholder's meetings since the owners of common stock are technically the owners of the company. When an investor buys a share of common stock they are purchasing a small piece of ownership in the company, and therefore the rights to that small piece of the company's profits, which are sometimes distributed as dividends.

Retained Earnings are the profits that a company generates and does not redistribute to their shareholders in the form of a dividend. This money usually will flow back into the assets section of the balance sheet in the form of cash or investments in new projects used to expand the business. A growing business will be more likely to reinvest its profits into the company than pay out a dividend. This will lead to capital appreciation of the stock, since the investment is assumed to produce higher profits in the future.

September 27, 2008

ASSETS:

Current assets:	
Cash and cash equivalents	\$ 11,875
Short-term investments	12,615
Accounts receivable, less allowances of \$47 in each period	2,422
Inventories	509
Deferred tax assets	1,447
Other current assets	5,822
Total current assets	34,690
Property, plant, and equipment, net	2,455
Goodwill	207
Acquired intangible assets, net	285
Other assets	1,935
Total assets	\$ 39,572

LIABILITIES AND SHAREHOLDERS' EQUITY:

Current liabilities:	
Accounts payable	\$ 5,520
Accrued expenses	8,572
Total current liabilities	14,092
Non-current liabilities	4,450
Total liabilities	18,542
Commitments and contingencies	

Shareholders' equity:

Common stock, no par value; 1,800,000,000 shares authorized; 888,325,973 and 872,328,972 shares issued and outstanding, respectively	7,177
Retained earnings	13,845
Accumulated other comprehensive income	8
Total shareholders' equity	21,030
Total liabilities and shareholders' equity	\$ 39,572

Liabilities:

Anything that a company owes another party in exchange for borrowing in the past.

Equity:

Equity is sometimes referred to as "Owner's Equity" or "Shareholder's Equity" and represents the value of the company to the actual owners of the firm. This is the value of the Assets of the firm minus all outstanding debts since debt holders will get repaid before any equity holders get paid in the event of liquidation. The main components of equity are stock and retained earnings. Stock primarily comes in two forms, Preferred and Common.



CASH FLOW BASICS

(Apple's 2008 Cash Flow Statement)

Cash and Cash Equivalents, Beginning of Year: This number is pulled directly from the "Cash and Cash Equivalents" line item on the previous year's balance sheet. The balance sheet is a snapshot of what the company looks like at that time. So the cash number from the previous year will be how much cash the company holds at the end of that fiscal year, which is also the beginning of the NEXT fiscal year. Cash and equivalents are any items on a company's balance sheet that are either cash, or can be liquidated into cash immediately.

Cash from Operating Activities: This represents the amount of cash used by, or generated by a company from its normal operations, AKA production of its goods and services. It should be the primary source of cash. This is important because it shows a company's ability to generate cash from its core businesses, which is a good measure of the firm's health. For Apple, its core business is sales of its hardware and software products. Cash from operations takes into account any changes in operating assets and liabilities (since the company would have spent or gained cash to change the values of these items).

Cash from Investing Activities: This shows the cash generated by the company through purchasing of or sale of income producing assets. These assets can include investments like other companies or investments in capital expenditures and Property, Plant and Equipment.

Cash from Financing: This section includes any cash generated by the sale of equity or debt, or cash used to repurchase equity or debt. This section will also include any dividends that are paid out to the company's shareholders.

Three fiscal years ended September 27, 2008		2008
Cash and cash equivalents, beginning of the year		\$ 9,352
Operating Activities:		
Net income		4,834
Adjustments to reconcile net income to cash generated by operating activities:		
Depreciation, amortization and accretion		473
Stock-based compensation expense		516
Provision for deferred income taxes		(368)
Loss on disposition of property, plant, and equipment		22
Changes in operating assets and liabilities:		
Accounts receivable, net		(785)
Inventories		(163)
Other current assets		(1,958)
Other assets		(492)
Accounts payable		596
Deferred revenue		5,642
Other liabilities		1,279
Cash generated by operating activities		9,596
Investing Activities:		
Purchases of short-term investments		(22,965)
Proceeds from maturities of short-term investments		11,804
Proceeds from sales of short-term investments		4,439
Purchases of long-term investments		(38)
Payments made in connection with business acquisitions, net of cash acquired		(220)
Payment for acquisition of property, plant, and equipment		(1,091)
Payment for acquisition of intangible assets		(108)
Other		(10)
Cash (used in)/generated by investing activities		(8,189)
Financing Activities:		
Proceeds from issuance of common stock		483
Excess tax benefits from stock-based compensation		757
Cash used to net share settle equity awards		(124)
Cash generated by financing activities		1,116
Increase in cash and cash equivalents		2,523
Cash and cash equivalents, end of the year		\$ 11,875
Supplemental cash flow disclosures:		
Cash paid for income taxes, net		\$ 1,267

One of the most important things that you will use the cash flow statement for is the calculation of free cash flow for a discounted cash flow valuation. As stated earlier in the guide, FCF is the amount of cash a firm generates after paying the required amount necessary to maintain its assets, and is used in the numerator of a discounted cash flow analysis.

$$\begin{aligned}
 &\text{NET INCOME} \\
 &+ \text{DEPRECIATION AND AMORTIZATION} \\
 &- \text{CHANGE IN NET WORKING CAPITAL} \\
 &- \text{CAPITAL EXPENDITURES} \\
 &= \text{FREE CASH FLOW}
 \end{aligned}$$

CASH IS KING!!! Cash flow is important for a number of reasons. Many believe that investors are too focused on a company's net income or earnings. These items can relatively easily be manipulated by accounting adjustments. However, it is more difficult for a company to disguise its actual cash flows. Free cash flow may give a better impression of a firm's ability to earn money and pay out its profits in the form of a dividend.



LINK BETWEEN FINANCIAL STATEMENTS

