



TECHNICAL INTERVIEW GUIDE

PREPARATION FOR FINANCE INTERVIEWS

FOURTH EDITION

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Technical Questions: Introduction

Technical questions are part of nearly every finance interview. While the level of difficulty of these questions varies from firm to firm, from interviewer to interviewer, and from candidate to candidate, every applicant will be grilled on technical questions in at least one round of interviews. This *Guide* is offered a compilation of the most common technical questions from finance interviews in a variety of fields. Obviously, you will not encounter every question from this *Guide*. Likewise, your interview may include variations on the questions included here or even questions that are altogether new. If you have studied this *Guide*, however, you will be prepared to field any of your interviewer's questions with confidence.

The material in this *Guide* is organized into the following topics: Current Events, Accounting / Finance / Valuation, Stocks, Bonds / Loans/Interest Rates, Currencies, Options & Derivatives, and Mergers & Acquisitions. These concepts are further arranged according to basic, intermediate, and advanced levels of difficulty. The more common questions appear in **boldface print**. Obviously, you should focus your attention on those, as well as on the sections relevant to your specific job interview. If you are preparing for a Sales and Trading interview, for example, you should focus on Stocks, Bonds/Loans/Interest Rates, Currencies, and Options & Derivatives. For Investment Banking positions, you should have a general background in all those categories, but you are most likely to encounter questions from the Accounting/Finance/Valuation and Mergers & Acquisitions sections. (You should always be prepared for the behavioral aspects of your interview, covered in the *WSO Behavioral Interview Guide*.)

The final section of this *Guide* is Brainteasers. The purpose of a brainteaser during an interview is to see how you react under pressure. The purpose of this section of the guide is to give you some insight into what your thought process should look like. More important than actually solving the brainteaser is being able to organize your thoughts and deliver a reasonable response. The interviewer wants to observe your analytical aptitude, your capability to handle some stress, and your ability to think on your feet.

You will soon realize that interviews are similar to a game. Your interviewer will likely push you to see how far you can go until you don't know an answer. That's a good thing. Even with a 4.0 in a finance and economics double major from Wharton, you still know little compared to the interviewer across the table. When studying these questions, keep in mind that you cannot prepare for everything your interviewers may ask. They will always be coming up with new questions and new twists on standard questions, so it is important that you understand the theory behind the answers, rather than just memorizing them. The explanations in the *Guide* are intentionally brief; when there is a question that you do not understand, do some research and develop a deeper understanding. The message boards at Wall Street Oasis are a great place to get expert advice and insight from Wall Street insiders. Use the search function! With over a million posts to date, your question has probably been asked before, and an answer is in our archives. Look for advice from "starred" users who have been certified as experienced finance professionals who consistently give sound advice.

Most answers to these questions should not take more than 30 to 60 seconds. Answer the question and move on. Do not try and guess your way through technical questions. If you do not know the answer, don't waste your



interviewer's time. Just say you don't know. Do not apologize. Say something like "this is what I am thinking..." and ask for an explanation. There is no shame in not knowing what a dividend recap is if you're a history major with no finance experience. Just be confident in what you know and don't know. Your most important task is to prove that you can and want to learn on the job. If you get into questions from the advanced section of this *Guide*, remember that your interviewer is trying to see how you respond to pressure. Remain calm, cool, and collected.

Finally, although failure to answer a technical question usually won't disqualify you, missing the answer to a behavioral question can definitely hurt your chances. If you don't stumble much, your missteps on technical questions will usually be outweighed by truly connecting with your interviewer on a personal level and showing that you have the drive, passion, and ability to learn this crazy business! Even if you answer all of your technical questions perfectly, on the other hand, you will not get the job if your interviewers don't think you are someone they can enjoy "hanging out" with during those 80- to 120-hour weeks. The *Wall Street Oasis Behavioral Interview Guide* has extensive advice on how to succeed in this crucial portion of the interview.

Note: The first few bullets following each question present pertinent definitions and information about the concept. Bullets in italics are sample responses. Subsequent bullets may present common follow-up questions.



General Topics of Study

Keeping Current is Key!

In most interview processes, you will likely encounter questions about current events and market conditions, in addition to the more standard questions that follow. Senior level interviewers (VPs, MDs, etc.) will often be more interested in your opinions about the markets as a whole than in your ability to walk them through a discounted cash flow model. Answering their high level questions effectively will demonstrate your interest in current events and in the industry. This is crucial to showing your true drive and passion for the job. Perfecting the answers to standard technical questions may show your interviewer that you have done your homework, but your responses to current-event questions can prove to your interviewer you are able to think on your feet and express a coherent, intelligent opinion.

Answering these types of questions without some sort of background on the topic is nearly impossible. Your interviewers will have a thorough understanding of the topics they are asking you about, and they will be able to tell immediately if you try to answer off the cuff. The only way to succeed is to know what is going on. Your interviewer probably won't grill you on some obscure article from the 18th page of the *Financial Times* from three weeks ago, but, you may be asked about yesterday's lead story in the *Wall Street Journal*, especially if the story is related to the firm that is interviewing you. Be sure you pay close attention to any recent news of the company to which you are applying.

Unfortunately, you cannot cram for this portion of the interview in the way you can for the technical topics. Constant monitoring of the markets, the news, and the economy is essential. To assure that you are prepared, read the at least the headlines of publications like the *Wall Street Journal*, *Financial Times* and *The Economist* every day. Although these are paid publications, the insights you can gain from reading them are invaluable to your interview preparation. You should give yourself about 30-60 minutes every day reading them if you really want to absorb the latest financial news.

In addition to reading the headlines, you should pick out an interesting article from a non-headline story each day. Referring to a lesser-known fact or story within a discussion of broader market issues can be a strong point of differentiation between you and other candidates. Holding an intelligent conversation about the latest current events is a relatively easy way to impress your interviewer with your passion for the industry.



Financial Reporting Basics

Throughout this guide, we refer to 10-Ks and 10-Qs...but what are they? Financial reports filed with the Securities and Exchange Commission (SEC) are required of any company with publicly traded securities (stocks, bonds, etc.) in the United States. These documents must follow very specific regulatory standards and are available for anyone to see at any time. Such documentation is required essentially any time a public company experiences a significant financial event, and the most relevant documents are 10-Ks (annual reports) and 10-Qs (quarterly reports).

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.¹ The 10-K also includes a Notes section that explains to the public any adjustments made to financial statements in previous reports. There is also a Financial Highlights section, a simplified and unregulated summary of the firm's financial performance.

10-Q: The 10-Q is a boiled-down 10-K. It must be filed by a public company for each fiscal quarter. The 10-Q focuses mainly on financial statements and includes less narrative information.

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

These reports can be found at several locations online, including www.sec.gov, a firm's own website, [Yahoo! Finance](http://Yahoo!Finance), or a database like *CapitalIQ*.

¹For more information on the three main financial statements, see the Accounting Section and the "Statement Basics" section at the end of this guide.



Current Event Questions

- 🦊 One of the keys to a successful interview is being able to carry on intelligent conversation about macro issues that affect the world and shape the finance industry. In order to do that, you must stay up to date on current events.
- 🦊 Try to read at least the *Wall Street Journal* or a business website for at least 30 minutes a day in order to stay up to speed.
- 🦊 While topics of conversation are constantly changing, the bullet points below present some of the events that are current as of this *Guide*'s publication date. Read up on them and be able to talk about them in your interviews.
 - European Economic Crisis
 - Knight Trading Loss
 - Effect of the presidential election on the U.S. financial system
 - JP Morgan Trading Loss
 - Facebook IPO errors, and drop in stock price
 - Downgrade of U.S. sovereign debt
 - U.S. housing/mortgage crisis
 - The Fiscal Cliff

What is a Mortgage-Backed Security (MBS)?

- 🦊 A mortgage-backed security is a security that pays its holder a periodic payment based on cash flows from the underlying mortgages that fund the security.
- 🦊 It will pay periodic payments that are very similar to coupon payments from bonds. These cash flows come from packaged mortgages that have been bought up by a bank.
- 🦊 The MBS market allowed the investment community to lend money to homeowners with banks acting as the middlemen. An investor paid for an MBS and was paid back over time with homeowners' mortgage payments.
- 🦊 Many MBS were rated AAA because they were considered highly diversified; investors did not expect the housing market to collapse all at once across the entire country. Unfortunately, we learned the hard way that housing values are highly correlated and the AAA rating of these securities was unfounded.

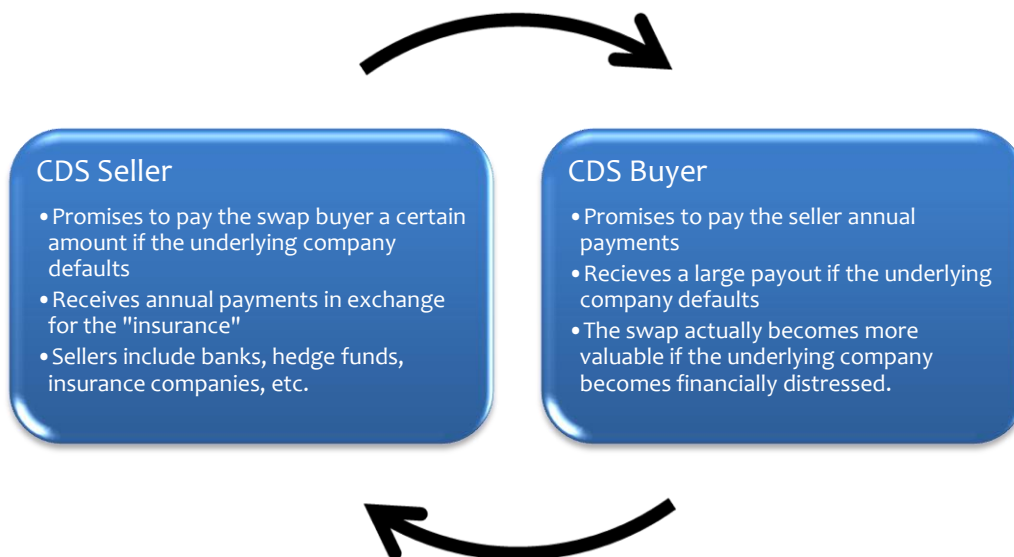


What is a Collateralized Debt Obligation (CDO)?

- 🦊 CDO refers to the broad asset class in which a variety of interest-paying assets are securitized and sold in the form of bonds. The assets packaged together in a CDO may include mortgages, student loans, etc.
- 🦊 The investor pays market value for the CDO, and then has the rights to the interest payments on the packaged assets 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.*

What is a Credit Default Swap (CDS)?

- 🦊 A credit default swap is essentially insurance on a company's debt. It is a way to insure that an investor will not be hurt if the company defaults.
- 🦊 Credit Default Swaps are sold over the counter in an unregulated market.
- 🦊 Here's how it works: if you own a Company X bond and you purchase a CDS of that bond, and then if Company X defaults, whoever sold you the CDS has to pay you an agreed portion of what you lost in the default.
- 🦊 A CDS can be used for hedging, as an insurance policy against your bond defaulting. It can also be used for speculating: you can purchase a swap expecting the bond to become distressed; when more investors want insurance, then your swap is worth more, and you sell it at a profit.
- 🦊 CDS prices for European sovereign debt have skyrocketed as foreign markets become more and more risky.



- 🦁 *A Credit Default Swap can be used for one of two things. First, it can be used as insurance for the buyer of a credit such as a bond or loan in order to minimize risk, ensuring that the buyer will be repaid in a bankruptcy scenario. Second, a swap can be purchased as a speculation tool, with the buyer believing that the credit will become distressed, increasing demand for the CDS contract and therefore increasing its value.*

Why are companies like Facebook, Twitter, and Instagram receiving multi-billion dollar valuations?

- 🦁 The key here is that investors are anticipating extremely high future earnings for these businesses due to their reach and growth trajectory, so investors are less focused on present revenues and margins.
- 🦁 Investors believe that Facebook and Twitter will, in the future, be able to tap into the earning power of their millions of users in some way that isn't currently happening.
- 🦁 *With the social media giant Facebook, investors are expecting the company to find a better way to monetize their massive user base. With over 800 million members, if Facebook can figure out how to charge more for advertising, their earnings could be astronomical! Another reason a company like Facebook may be valued in the billions is because companies like Microsoft are willing to pay astronomical premiums for a small equity stake in order to catch the wave of the future. For example, when Microsoft invested in 2007, Facebook was valued at \$15 billion; at its IPO in 2012, Facebook's value was around \$100 billion.*



Accounting, Finance, and Valuation

Basic

What are the three main financial statements?²

🐼 Income Statement

- $\text{Revenues} - \text{Cost of Goods Sold} - \text{Expenses} = \text{Net Income}$

🐼 Balance Sheet

- $\text{Assets} = \text{Liabilities} + \text{Shareholders' Equity}$

🐼 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. The Income Statement shows a company's revenues, costs, and expenses, which together yield net income. The Balance Sheet shows a company's assets, liabilities, and equity. The Cash Flow Statement starts with net income from the Income Statement; then it shows adjustments for non-cash expenses, non-expense purchases such as capital expenditures, changes in working capital, or debt repayment and issuance to calculate the company's ending cash balance.*

How are the three main financial statements connected?³

🐼 This question is very common, but it is usually just a check-the-box question. If you can nail a few solid connections, you should be OK. Some of the main connections are:

- Net Income flows from the IS into cash flow from operations on the CF Statement.
- Net income minus dividends is added to retained earnings from the prior period's Balance Sheet to come up with retained earnings on the current period's Balance Sheet.
- Beginning Cash on the CF Statement is cash from the prior period's Balance Sheet, and Ending Cash on the CF statement is Cash on the current period's Balance Sheet.

²See Appendices A, B and C for more detailed information on the three major financial statements

³View the Wall Street Oasis Sample Excel Model for examples of the three financial statements and how they are connected.



Simplified Overview of the Three Statements

○ **Income Statement**


- Net income is the beginning point for the Cash Flow statement.
- Interest expense on the Income Statement is calculated from the debt on the Balance Sheet.
- Depreciation and Amortization is calculated based on property, plant, and equipment (PP&E) from the Balance Sheet. A \$10 increase in depreciation expense will result in a \$10 reduction in net PP&E and a $\$10 \times (1-T)$ in net income.
- Net income minus dividends paid = addition to retained earnings on the Balance Sheet.


○ **Cash Flow Statement**

- Organized into Cash Flow from Operations, Investing, and Financing.
- Net income is the one of the first lines and comes from the Income Statement.
- Adjust for non-cash items (like Depreciation and Amortization) from the Income Statement.
- Adjust for change in working capital, which is calculated from changes in current assets and current liabilities on the Balance Sheet. (More information on changes in working capital is presented later in this *Guide*.)
- One of the final lines will be change in cash.
- Beginning cash (which comes from prior period's Balance Sheet) plus change in cash yields ending cash balance on the current period's Balance Sheet.

○ **Balance Sheet**

- Debt is affected by Cash Flow from financing, which would include any mandatory amortization of debt, optional amortization, repayments, new debt issuance, etc.
- Cash balance is determined from the Cash Flow statement as described above.
- Assets like PP&E and goodwill are reduced in value by depreciation and amortization.
- Retained earnings is increased/decreased by net income minus dividends paid as described above

 A good summary answer could be like the one shown below. Or start with a few connections from the list above, and be ready to expand your answer as necessary.

 *The three main financial statements show separate views, and together they create a whole picture of a company's financial health. For example, the Income Statement closes with a net income figure that appears on the Cash Flow Statement as an addition to cash flow from operations. The Cash Flow Statement's beginning cash balance comes from the Balance Sheet for the prior period. The Cash Flow Statement's ending cash balance becomes the cash asset on the current period's Balance Sheet.*



Walk me through the major line items of an Income Statement.⁴ (negative numbers are shown in parentheses).

Revenues
(Cost of Goods Sold)
<hr/>
Gross Margin
(Operating Expenses)
<hr/>
Operating Income (aka EBIT)
Interest (Expense)/Income
Other (Expenses)/Income
(Taxes)
<hr/>
Net Income
<hr/>

- 🦉 *The first line of the Income Statement represents revenues or sales. From that you subtract the cost of goods sold, which leaves gross margin. Subtracting operating expenses from gross margin gives you operating income. From operating income you subtract interest expense and any other expenses (or add other income), such as tax payments or interest earnings, and what's left is net income.*

What are the three components of the Statement of Cash Flows⁵?

- 🦉 The Statement of Cash Flows is one of the three financial reports that all public companies are required by the SEC to produce on a quarterly basis. (Most non-public companies also produce Cash Flow (CF) Statements.) The CF Statement comprises the three main components described below, showing all the company's sources and uses of cash. Since companies tend to use accrual accounting, a company's net income may not (and most of the time does not) portray how much cash is actually flowing in or out due to non-cash expenses, investing activities, financing activities, changes in working capital, etc. Because of this, even profitable companies may have trouble managing their cash flows, and non-profitable companies may be able to survive without raising outside capital.
- 🦉 **Cash from Operations** – Cash generated or lost through normal operations, sales, and changes in working capital (more detail on working capital below).
- 🦉 **Cash from Investing** – Cash generated or spent on investing activities; may include, for example, capital expenditures (use of cash) or asset sales (source of cash). This section will also show any investments in the financial markets and operating subsidiaries. Note: This section can explain a large negative cash flow during the reporting period, which isn't necessarily a bad thing if it is due a large capital expenditure in preparation for future growth.

⁴ See Appendix A for a more detailed Income Statement and explanation.

⁵ See Appendix C for a more detailed Cash Flow Statement and explanation.



- 🦉 **Cash from Financing** – Cash generated or spent on financing the business; may include proceeds from debt or equity issuance (source of cash) or cost of debt or equity repurchase (use of cash).
- 🦉 *The three components of the Cash Flows Statement are Cash from Operations, Cash from Investing, and Cash from Financing.*

If you could use only one financial statement to evaluate the financial state of a company, which would you choose?

- 🦉 *I would want to see the Cash Flow Statement so I could see the actual liquidity position of the business and how much cash it is using and generating. The Income Statement can be misleading due to any number of non-cash expenses that may not truly be affecting the overall business. And the Balance Sheet alone just shows a snapshot of the Company at one point in time, without showing how operations are actually performing. But whether a company has a healthy cash balance and generates significant cash flow indicates whether it is probably financially stable, and this is what the CF Statement would show.*

What is the difference between the Income Statement and Statement of Cash Flows?⁶

- 🦉 *A company's sales and expenses are recorded on its Income Statement. The Statement of Cash Flows records what cash is actually being used during the reporting period and where it is being spent. Other items included on the Cash Flow Statement could be issuance or repurchase of debt or equity and capital expenditures or other investments. Amortization and depreciation will be reflected as expenses on the Income Statement, but they will be added back to net income on the Cash Flow Statement since they are expenses but not actually a use of cash.*

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 other links, but the above are some of the main connections.
- 🦉 *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.*

⁶See the Excel spreadsheet for a model showing how the financial statements interact.



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

- 🐼 Beginning cash on CF comes from the prior reporting period's Balance Sheet.
- 🐼 Cash from operations is calculated using changes in Balance Sheet accounts—net working capital (current assets minus current liabilities) and other changes in assets and liabilities that cannot be classified as investing or financing activities.
- 🐼 Cash Flow's depreciation adjustment is calculated on the Balance Sheet's net property, plant, and equipment (PP&E).
- 🐼 Investments in PP&E come from the Balance Sheet and are accounted for under investment activities on the Cash Flow Statement.
- 🐼 Ending cash on the CF Statement goes back onto the Balance Sheet.
- 🐼 *Beginning cash on the Statement of Cash Flows comes from the previous period's Balance Sheet. Cash from operations on the Cash Flow Statement is affected by the Balance Sheet's numbers for change in net working capital, current assets minus current liabilities. Property, plant, and equipment is another Balance Sheet item that affects the Cash Flow Statement because depreciation is based on the amount of PP&E a company has. Any change due to purchase or sale of property, plant, and equipment will affect cash from investing. Finally the Cash Flow Statement's ending cash balance becomes the beginning cash balance on the new Balance Sheet.*

What is EBITDA?

- 🐼 EBITDA stands for **E**arnings **B**efore **I**nterest, **T**axes, **D**epreciation, and **A**mortization. It is a good metric for evaluating a company's profitability. It is sometimes used as a proxy for free cash flow because it will allow you to determine how much cash is available from operations to pay interest, capital expenditures, etc.
- 🐼 EBITDA is one of the most important single items someone will look at in evaluating a Company.
- 🐼 $\text{EBITDA} = \text{Revenues} - \text{Expenses (excluding interest, taxes, depreciation, and amortization)}$
- 🐼 A very common valuation methodology is the EV/EBITDA multiple, which estimates the Enterprise Value of a company using a multiple of its EBITDA.⁷ An EV/EBITDA multiple is probably the most commonly used “quick and dirty” valuation multiple used by investment banks, private equity firms, hedge funds, etc.
- 🐼 Another use of EBITDA is the calculation of a company's leverage ratio (Total Debt/EBITDA) and interest coverage ratios (Total Interest/EBITDA). These ratios are used for comparing companies based on their amount of debt compared with the amount of cash they are generating that can service the interest on their debt.

⁷See the valuation section for further explanation of multiples analysis.



- 🦉 *EBITDA is an acronym for Earnings Before Interest, Taxes, Depreciation, and Amortization. It's a good high-level indicator of a company's financial performance. Since it removes the effects of financing and accounting decisions such as interest and depreciation, it's a good way to compare the performance of different companies. It serves as a rough estimate of free cash flow, and is used in the EV/EBITDA multiple to quickly establish a company's high-level valuation.*

How could a company have positive EBITDA and still go bankrupt?

- 🦉 *Bankruptcy occurs when a company can't make its interest or debt payments. Since EBITDA is Earnings BEFORE Interest, if a required interest payment exceeds a company's EBITDA, then if they have insufficient cash on hand, they would soon default on their debt and could eventually need bankruptcy protection.*

What is Enterprise Value?

- 🦉 *Enterprise Value is the value of an entire firm, both debt and equity, according to the equation below. This is the price that would be paid for a company in the event of an acquisition.*
- 🦉 *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. To calculate Enterprise Value in its simplest form, you take the market value of equity (aka the company's market cap), add the debt and the value of outstanding preferred stock, add the value of any minority interests the company owns, and then subtract the cash the company currently holds.*
- 🦉 *Note: This is a highly simplified Enterprise Value formula. When bankers working on a deal are calculating the true Enterprise Value in an acquisition, they must take into account numerous other factors such as leases, pension obligations, and NOLs.*

What is net debt?

- 🦉 *Net debt is a company's total debt minus the cash it has on the balance sheet. Net debt assumes that a company pays off any debt it can with excess cash on the balance sheet.*

If Enterprise Value is \$150mm, and Equity Value is \$100mm, what is net debt?

- 🦉 *Since Enterprise Value = Equity Value + Net Debt + Preferred Stock + Minority Interest, if we assume there is no minority interest or preferred stock, then Net Debt will be \$150mm – \$100mm, or \$50mm.*

Why do you subtract cash from Enterprise Value?

- 🦉 *One good reason is that cash has already been accounted for within the market value of equity. You also subtract cash because it can be used either to pay a dividend or to reduce debt, effectively reducing the purchase price of the company.*



What is the difference between Enterprise Value and Equity Value?

EQUITY VALUE	ENTERPRISE VALUE
Net Debt	
Preferred Stock	
Minority Interest	

When looking at the acquisition of a company, do you look at Equity Value or Enterprise Value?

- ☛ *Because the acquiring company must purchase both liabilities and equity in order to take over the business, the buyer will need to assess the company's Enterprise Value, which includes both the debt and the equity.*

When calculating Enterprise Value, do you use the book value or the market value of equity?

- ☛ *Technically, you should use the market value of both debt and equity, so as to estimate the true value based on supply and demand.*
- ☛ *In practice however, you normally use the market value of only the equity because, if a company is publicly traded, this is a very easy value to come up with simply by looking up a company's market cap.*
- ☛ *When calculating a company's Enterprise Value, you use the market value of the equity because that represents the true supply-demand value of the company's equity in the open market.*

Could a company have a negative book Equity Value?

- ☛ *Yes, a company could have a negative book Equity Value if the owners are taking out large cash dividends or if the company has been operating for a long time at a net loss, both of which reduce shareholders' equity.*

What is the difference between public Equity Value and book value of equity?

- ☛ *Public Equity Value is the market value of a company's equity; while the book value is just an accounting number. A company can have a negative book value of equity if it has been taking large cash dividends, or running at a net loss; but it can never have a negative public Equity Value, because it cannot have negative shares or a negative stock price.*



What is valuation and what is it used for?

- 🦊 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. Investment bankers are hired to value a company, often in the context of purchasing another company, selling itself or divesting a division.
- 🦊 Investment bankers use valuation in pitch books and other presentations to guide clients toward what they should expect.
- 🦊 Private equity firms, hedge funds, asset managers, and others engage in valuation techniques to determine which assets are undervalued, how much to pay for an asset, etc.
- 🦊 *Valuation is the procedure of calculating the worth of an asset, security, company, etc.*

What are some ways you can value a company?

- 🦊 Comparable Companies/Multiples Analysis (to calculate either Enterprise Value or Equity Value)
 - Most often an analyst will take the average multiple from comparable companies (based on size, industry, etc) and use that multiple with the operating metric of the company being valued
 - The most commonly used multiple is Enterprise Value/EBITDA
 - Other multiples analysts will use include Price/Earnings, PEG, EV/EBIT, Price/Book, EV/Sales
 - Some industry-specific multiples include:
 - EV/EBITDAR (companies with significant rent/lease expense)
 - EV/Proven Reserves, EV/Production (energy)
 - EV/Visitors (Internet)
 - Different multiples may be more or less appropriate for specific industries, and some multiples calculate Equity Value, while others calculate Enterprise Value. For example, if you use an EV/EBITDA multiple, you would be calculating the total value of the firm, including debt, since you are using a metric that excludes interest expense. If you were to use a multiple such as P/E (price/earnings) ratio, you would be valuing only the equity because the metric is earnings, which hypothetically could be distributed through dividends to those who own the firm's equity.
 - Example: Comparable Company A is trading at an EV/EBITDA multiple of 6.0x, and the company you are valuing has EBITDA of \$100 million; your company's EV would be valued at \$600 million based on this valuation technique.⁸

⁸See the Excel spreadsheet model for an example of a multiples/comps analysis.



Market Valuation / Market Capitalization

- The market value of equity is used only for publicly traded companies. It is calculated by multiplying the number of shares outstanding by the current stock price.
- Apple and Exxon Mobil are the two corporations with the highest market caps. They have values of \$496 billion and \$394 billion respectively as of November 17, 2012.
- Facebook has lost about \$55 billion in value from its peak market cap of over \$96 billion on its first day of trading (\$45 per share) to \$51 billion (\$23.56 per share) as of November 17, 2012.

Precedent Transactions

- A precedent transaction analysis is based on the idea that a company's worth can be determined by looking at the prices paid for similar companies in similar situations in the past. This methodology is as much an art as it is a science.
- With this valuation technique an analyst will research historical transactions similar to the transaction in question. This includes looking at the size of the companies involved, their industry, the economic context of the transaction, premiums paid, purpose of the transaction (strategic or financial), etc.
- Sometimes it may make more sense to focus on a small group of highly relevant, similar transactions, rather than a broader selection of less similar deals. Studying each prior deal in detail is vital to determining the likenesses among transactions and coming up with an accurate valuation.
- Once an analyst has found transactions that are comparable, they look at how those companies were valued. What were the EV/EBITDA and EV/Sales multiples paid? They calculate a valuation multiple based on the sale prices in those transactions, and apply the multiple to the comparable metric of the company being valued.
- Most of the time this valuation technique will result in the highest valuation due to the inclusion of a "control premium" the buyer is willing to pay for the assumed "synergies" they hope will occur after the purchase.
- Some advantages of this valuation technique include its reliance on public information (for many transactions) and its basis in reality, based on actual comparable deals that have closed in the past. However, market conditions at the time of the prior deal may be significantly different from those prevailing at the time of the current transaction. For example, multiples paid for a dot-com company during the bubble in the early 2000's would be significantly higher than the multiples paid for a similar company today. A good analyst will take this into account and discount the valuation accordingly.
- Below is a sample of what a simple precedent transaction summary chart may look like.



(\$-millions)		Target Name	Acquirer Name	Equity Value	Net Debt	Enterprise Value	Multiples			Equity/Net Income
Date							EV/Sales	EV/EBITDA	EV/EBIT	
May-00		Fox	Hostel	84.3	0.0	84.3	2.3x	7.0x	7.5x	11.0x
Mar-05		Charlie	Wolf	34.2	50.0	84.2	2.1x	7.6x	8.0x	11.5x
Jun-07		Delta	Cross	53.5	40.2	93.7	1.9x	6.3x	7.0x	10.4x
Aug-08		Igloo	Swiss	23.2	0.0	23.2	3.5x	8.1x	9.0x	12.1x
Dec-09		Apple	North	100.3	80.4	180.7	2.5x	7.7x	8.5x	11.4x
						High	3.5x	8.1x	9.0x	12.1x
						Mean	2.5x	7.3x	8.0x	11.3x
						Median	2.3x	7.6x	8.0x	11.4x
						Low	1.9x	6.3x	7.0x	10.4x

🐼 Discounted Cash Flow Analysis

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

🐼 LBO Valuation

- An LBO (leveraged buyout) is when a firm (usually a private equity—PE—firm) uses a higher than normal amount of debt (known as leverage) to finance the purchase of a company.
- The PE investors will purchase the equity of another company, using a percentage (anywhere from 10% to 40%) of its own capital and financing the remainder with debt through bank loans, bonds, or a combination of the two. The PE firm then uses the cash flows from the acquired company to pay off the debt over time with the goal of increasing the value of their equity.
- The PE firm frequently uses the assets of the company being acquired as collateral for a bank loan that will be underwritten by an investment bank’s leveraged finance unit and then syndicated out to investors.
- When the PE firm is ready to sell the company, ideally the debt has been partially or fully paid, and the PE firm—as the majority equity owners of the company—can collect most of the profits from an IPO or sale of the business. 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 entirely with their own equity (i.e. without any debt). For more detailed information on LBOs, see the LBO analysis in the later in this guide.

🐼 Other Techniques

- Liquidation Valuation: This valuation technique uses the value of the company if they simply sold all its assets. This might happen in a Chapter 7 bankruptcy. The company would sell off its PP&E, inventory, etc. It may be sold at a discount to the value it is being held on the Balance Sheet because it is a forced sale (not necessarily true if an asset like a piece of property or a building has been sitting on the Balance Sheet depreciating for years meaning that its book value could be well below its market value).



- Sum of the Parts: This valuation technique should be used if the company has multiple divisions with different margins, growth rates, etc. For example, one methodology you could use for a company like Apple would be to value each of their different businesses (iPhone, iPod, iPad, desktop, laptop, software, accessories, etc) on its own and then combine the values of all those divisions.

🦁 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 I can think of to value a company, and I'm sure you know even more. The simplest is probably market valuation, which is just the public Equity Value of a company based on the public markets. To get the Enterprise Value, you add the net debt on its books, preferred stock, and any minority interest. A few other ways to value a company include comparable company analysis, precedent transactions, discounted cash flow, leveraged buyout valuation, and liquidation 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 companies and is the easiest valuation technique.
- Market value is calculated simply by multiplying the number of shares outstanding by the current stock price.
- This is also known as Market Cap, and gives the Equity Value of the firm.

Precedent Transaction

- First, find historical transactions similar to the transaction in question, including size of the company, industry, economic contexts, etc.
- Once you have found one or more transactions, look at the valuation process. What metrics (EBIT, EBITDA, etc) were used? Calculate a valuation multiple based on the sale price(s) in the precedent(s), and apply the multiple to the appropriate metric for the current company.
- Most of the time this valuation technique will result in the highest valuation, due to the inclusion of a "control premium" a company will pay for the assumed "synergies" they expect to occur after purchase.

Discounted Cash Flow

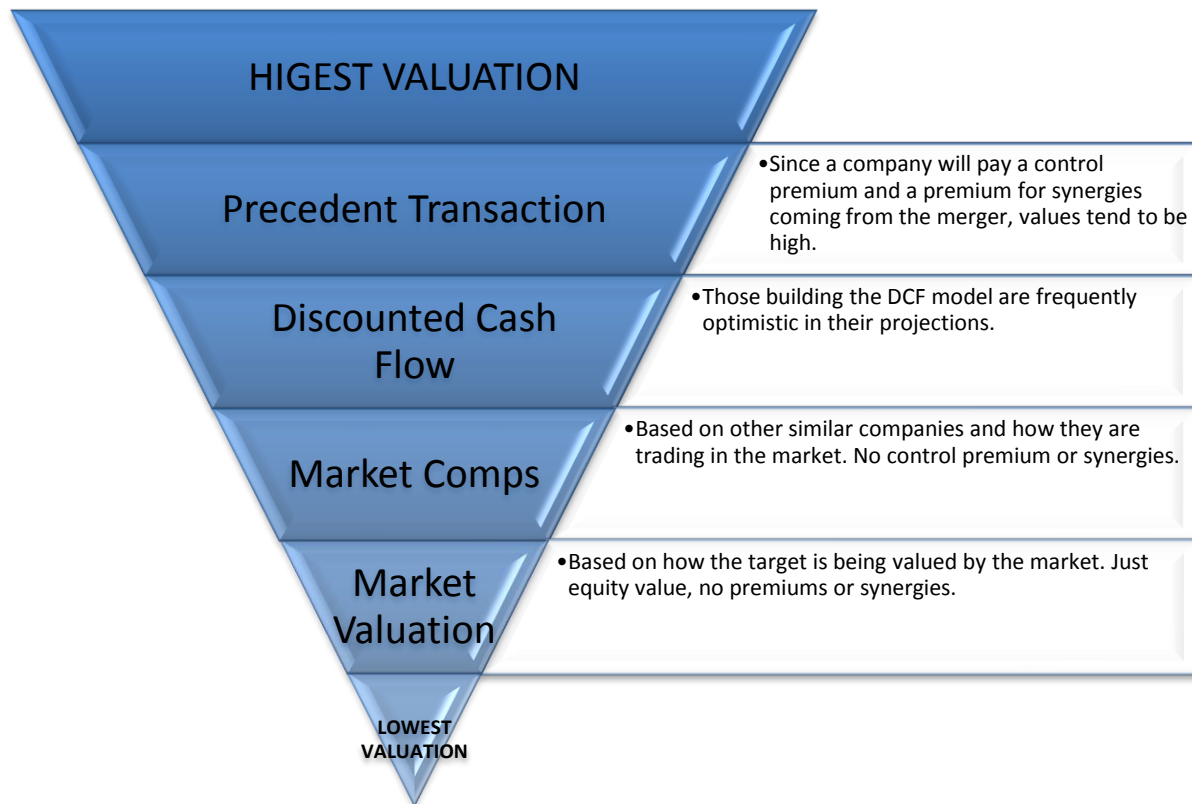
- See the "Walk me through a DCF" for more information on this valuation technique.

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 company's cash flows to pay off the debt over time.
- The acquired company's assets may be used as collateral for the loan.
- Ideally, the debt has been partially or fully retired when LBO buyers are ready to sell the company, and—as sole equity owners of the company—they can collect most of the profits from the sale.
- 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 entirely with their own equity (i.e., without any debt). For more detailed information on LBOs, 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 projected synergies coming from the merger. A DCF analysis will typically give you the next highest valuation simply because those building the DCF model tend to be somewhat optimistic in their assumptions and projections. Market Comps and Market Value will usually produce the lowest valuations.*

How do you value a private company?

- ☛ You can value a private company using the same techniques you use for a public company, with a couple of exceptions:
- You cannot use a straight market valuation since the company is not publicly traded.
 - A DCF can be complicated by the absence of an equity beta, which would make calculating WACC difficult. In this case, you have to use the equity beta of a close comp in your WACC calculation.
- ☛ Financial information for private companies is more difficult to find because they are not required to make public online filings.



- ☛ An analyst may apply a discount in a comparable companies valuation if the comps are publicly held, because a public company will demand a 10-15% premium for the liquidity an investor enjoys when investing in a public company because it is easier to buy and sell in the public markets.
- ☛ *You can value a private company with the same techniques you would use for a public company but with a few differences that make it more difficult. Financial information will likely be harder to find and potentially less complete and less reliable. Second, you can't use a straight market valuation for a company that isn't publicly traded. In addition, a DCF can be problematic because a private company won't have an equity beta to use in the WACC calculation. Finally, if you're doing a comps analysis using publicly traded companies, a 10-15% discount may be required as a 10-15% premium is paid for the public company's relative liquidity.*

What does spreading comps mean?

- ☛ "Spreading comps" is the task of collecting and calculating relevant multiples for comparable companies.
- ☛ Sometimes an analyst can pull the relevant multiples from a resource like *CapitalIQ*. However, sometimes you have to research a 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 that can skew multiples across comparable companies. These charges can include one-time legal expenses, restructuring fees, asset write-downs, etc.
- ☛ These adjustments will be detailed in the footnotes section of the financial statements.
- ☛ A simple comps table is shown below. A sample comps table is also included in the Excel model provided with this guide.
- ☛ *Spreading comps means calculating relevant multiples from comparable companies and summarizing them for easy analysis and comparison. It can be challenging when a company's data and financial information must be scoured to conduct the necessary research.*

Food Manufacturer Equity Comps Analysis

Ticker	Company Name	Current Price	LTM Rev	LTM Gross Profit	LTM Gross Margin	LTM EBITDA	EBITDA Margin	Market Cap	Long Term Debt	Cash	TEV	Debt/ EBITDA	TEV/ Revenue	TEV/ EBITDA
HNZ	H. J. Heinz Company	43.22	10,495.0	3,818.3	36.4%	1,899.7	18.1%	13,746.6	4,567.6	483.3	17,888.1	2.40x	1.70x	9.42x
SLE	Sara Lee Corp.	14.10	9,140.0	3,322.0	36.3%	1,451.0	15.9%	9,323.9	2,718.0	935.0	11,139.9	1.87x	1.22x	7.68x
HRL	Hormel Foods Corp.	20.24	6,676.8	1,173.1	17.6%	722.2	10.8%	5,393.6	350.0	355.2	5,391.8	0.48x	0.81x	7.47x
SJM	The J. M. Smucker Company	60.22	4,605.3	1,790.6	38.9%	1,020.6	22.2%	7,194.6	900.0	283.6	7,811.0	0.88x	1.70x	7.65x
BGS	B&G Foods Inc.	10.78	507.6	152.0	29.9%	105.7	20.8%	513.3	489.4	69.4	933.4	4.63x	1.84x	8.83x
FLO	Flowers Foods, Inc.	16.29	2,588.9	1,213.3	46.9%	287.3	11.1%	2,241.3	326.8	8.4	2,559.7	1.14x	0.99x	8.91x
JJSF	J&J Snack Foods Corp.	42.10	679.0	222.6	32.8%	104.8	15.4%	775.3	0.0	54.3	721.0	0.00x	1.06x	6.88x
LNCE	Snyder's-Lance, Inc.	16.49	923.0	370.3	40.1%	94.9	10.3%	531.0	118.9	7.0	642.9	1.25x	0.70x	6.77x
THS	Treehouse Foods, Inc.	45.66	1,627.0	368.8	22.7%	197.3	12.1%	1,587.6	887.6	3.4	2,471.7	4.50x	1.52x	12.53x
Low:					17.6%		10.3%					0.00x	0.70x	6.77x
Mean:					33.1%		15.4%					2.20x	1.29x	8.41x
Median:					34.6%		15.7%					1.56x	1.31x	7.81x
High:					46.9%		22.2%					4.83x	1.84x	12.53x

Note: LTM Period Ending 6/30/10

TEV for Heinz, Sara Lee and Hormel include 57.2mm, 33.0mm and 3.4mm of minority interest



Would you be calculating Enterprise Value or Equity Value when using a multiple based on free cash flow or EBITDA?

- ☛ *EBITDA and free cash flow represent cash flows that are available to repay holders of a company's debt and equity, so a multiple based on one of those two metrics would describe the value of the firm to all investors. A multiple such as P/E ratio, based on earnings alone, represents the amount available to common shareholders after all expenses are paid, so if you used this multiple, you would be calculating the value of the firm's equity.*



Walk me through a Discounted Cash Flow model.⁹

- 🦉 This is one of the most common questions in investment banking interviews. Don't mess it up!
- 🦉 To begin, project free cash flows for a specified period, usually five to ten years. Free cash flow is equal to EBIT (earnings before interest and taxes) multiplied by (1–the tax rate) plus (depreciation and amortization) minus capital expenditures minus the change in net working capital.
- 🦉 Next, predict free cash flows for the years beyond the five or ten years projected. This requires establishment of a terminal value, as is detailed in the next question below.
- 🦉 Once future cash flows have been projected, calculate the present value of those cash flows. First, establish an appropriate discount rate—the Weighted Average Cost of Capital, or WACC. This calculation is discussed in the following two questions.
- 🦉 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 (CF_n) 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 a DCF tutorial online (*Investopedia* is a great resource) and study the Excel model you received when you purchased this guide.
- 🦉 *First, project the company's free cash flows for about 5 years using the standard formula. (Free cash flow is EBIT times 1 minus the tax rate, plus Depreciation and Amortization, minus Capital Expenditures, minus the Change in Net Working Capital.) Next, predict free cash flows beyond 5 years using either a terminal value multiple or the perpetuity method. To calculate the perpetuity, establish a terminal growth rate, usually about the rate of inflation or GDP growth, a low single-digit percentage. Now multiply the Year 5 cash flow by 1 plus the growth rate and divide that by your discount rate minus the growth rate. Your discount rate is the Weighted Average Cost of Capital, or WACC. Use that rate to discount all your cash flows back to year zero. The sum of the present values of all those cash flows is the estimated present Enterprise Value of the firm according to a discounted cash flow model.*

⁹ See the attached Excel spreadsheet for a sample of a DCF analysis.



Discounted Cash Flow Summary Chart

Project out Free Cash Flows

- About 5 Years
- $[\text{EBIT} \times (1 - \text{Tax Rate})] + \text{D\&A} - \text{CapEx} - \text{Change in NWC}$

Estimate FCF beyond Year 5

- Terminal Growth Multiple
- Perpetuity Method
- Growth rate around GDP growth or inflation (low single digit %)
- $[\text{Year 5 FCF} \times (1 + \text{Growth Rate})] / (\text{Cost of Capital} - \text{Growth Rate})$

Use WACC as your discount rate
Explained Below

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

Discount Cash Flows Back to Year 0

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

How do you calculate a firm's terminal value?

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

- 🦊 To establish a terminal value, either you can 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 the "terminal value" of the firm.
- 🦊 In either case, you must remember to 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 commonly 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 where you choose a modest growth rate, usually just a bit higher than the inflation rate or GDP growth rate, and assume that the company can grow at this rate infinitely. You 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 is the acronym for Weighted Average Cost of Capital. It is used as the discount rate in a discounted cash flow analysis to calculate the present value of a company's cash flows and terminal value. It reflects the overall cost of a company raising new capital, which is also a representation of the riskiness of investment in the company.
- WACC represents the blended cost to both debt holders and equity holders, based on the cost of debt and the 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 = Market Value of Equity

D = Book Value of Debt

P = Value of Preferred Stock

K_E = Cost of Equity (Calculate using CAPM)

K_D = Cost of Debt (Current Yield of Debt)

K_P = Cost of Preferred Stock (Interest Rate on Preferred Stock)

T = Corporate Tax Rate

- WACC is the acronym for Weighted Average Cost of Capital. It is used as the discount rate in a discounted cash flow analysis to calculate the present value of a company's cash flows and terminal value. It reflects the overall cost of a company's raising new capital, which is also a representation of the riskiness of investing in the company. Mathematically, WACC is the percentage of equity in the capital structure times the cost of equity (calculated by the Capital Assets Pricing Model) plus percentage of debt in the capital structure times one minus the corporate tax rate times the cost of debt—current yield on outstanding debt—plus percentage of preferred stock in the capital structure times the cost of preferred stock if there is any preferred stock outstanding.



All else equal, should the WACC be higher for a company with \$100 million of market cap or a company with \$100 billion of market cap?

- ☛ Normally the larger company will be considered “safer” and therefore will have a lower WACC. However, depending upon their respective capital structures, the larger company could have a higher WACC.
- ☛ *Without knowing more information about the companies, it is impossible to say. If the capital structures are the same, then the larger company should be less risky and therefore have a lower WACC. However, if the larger company has a lot of high-interest debt, it could have a higher WACC.*

All else equal, should the cost of equity be higher for a company with \$100 million of market cap or a company with \$100 billion of market cap?

- ☛ *Typically, a smaller company is expected to produce greater returns than a large company, meaning the smaller company is more risky and therefore would have a higher cost of equity.*

How do you calculate Free Cash Flow?

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

- ☛ *Free cash flow is EBIT 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 debt holders and equity holders from the earnings of a company.*

When would you not want to use a DCF?

- ☛ *If you have a company that has very unpredictable cash flows, then attempting to project those cash flows and create a DCF model would not be effective or accurate. In this situation you will most likely want to use a multiples or precedent transactions analysis.*

What is Net Working Capital?

- ☛ *Net Working Capital = Current Assets – Current Liabilities*
- ☛ Current assets include items on the Balance Sheet like inventory, accounts receivable and other short term assets. Current liabilities include items such as accounts payable and other short term liabilities.
- ☛ An increase in net working capital is a use of cash. This could be from increasing current assets like inventory or accounts receivable. If you increase inventory for example, it is not a cost on the Income Statement, but is still a use of cash due which needs to be accounted for on the CF statement.



- 🦉 A decrease in net working capital is a source of cash. This could include changes such as increasing accounts payable or reducing inventory. If you reduce inventory, it means you are selling more goods than you are producing, which means you are realizing a cost on your Income Statement. This is why in calculating free cash flow you subtract an increase in net working capital.
- 🦉 If net working capital went up, a company must have “used” cash to produce the increase (for example, by purchasing more inventory than they sold).
- 🦉 *Net Working Capital is current assets minus current liabilities. It is a measure of a company’s ability 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. A negative number indicates that the company may have trouble paying off its creditors, which could result in bankruptcy if cash reserves are insufficient.*

What happens to Free Cash Flow if Net 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 accounts receivable, inventory, etc.), free cash flow will be reduced.
- 🦉 Remember, if an asset goes up, this is a use of cash; if a liability goes up; it is a source of cash.
- 🦉 *You subtract the change in Net Working Capital when you calculate Free Cash Flow, so if Net Working Capital increases, your Free Cash Flow decreases and vice versa.*

When would a company collect cash from a customer and not show it as revenue? If it isn’t revenue, what is it?

- 🦉 Normally this will occur when a customer pays for a good or service to be delivered in the future.
- 🦉 Some examples would be annual magazine subscriptions, annual contracts on cell phone service, online dating site memberships, etc.
- 🦉 The revenue is not recognized until the good or service is delivered to the customer.
- 🦉 Until it is delivered, it is recorded as deferred revenue (liability) on the Balance Sheet.
- 🦉 It will be recognized as revenue as it is delivered, and the deferred revenue line item on the Balance Sheet will be reduced accordingly.
- 🦉 *This typically occurs when a company is paid in advance for future delivery of a good or service, such as a magazine subscription. If a customer pays for delivery of 12 months of magazines in advance, cash from that purchase goes onto the Balance Sheet as cash, but also increases deferred revenue, a liability. As each issue is delivered to the customer over the course of the year, the deferred revenue line item will go down, reducing the company’s liability, while a portion of the subscription payment will be recorded as revenue.*

What is the difference between accounts receivable and deferred revenue?

- 🦉 *Accounts receivable is money a company has earned from delivery of goods or services but has not collected yet. Deferred revenue is the opposite, money that has not yet been recorded as revenue because it was collected for goods or services not yet delivered.*



Why might there be multiple valuations of a single company?

- ☛ *Each method of valuation will generate a different value because it is based on different assumptions, different multiples, or different comparable companies and/or transactions. Generally, the precedent transaction methodology and discounted cash flow method lead to higher valuations than comparable companies analysis or market valuation does. The precedent transaction result may be higher because the approach usually will include a “control premium” above the company’s market value to entice shareholders to sell and will account for the “synergies” that are expected from the merger. The DCF approach normally produces higher valuations because analysts’ projections and assumptions are usually somewhat optimistic.*

Why might two companies with similar growth and profitability have different valuations?

- ☛ *The difference in valuation could reflect some sort of a competitive advantage that isn’t represented on the financial statements. Perhaps the more valuable company is a market leader in a key region or owns uniquely valuable intellectual property or enjoys a significantly stronger management track record.*

How do you determine which valuation methodology to use?

- ☛ *Because each method has unique ability to provide useful information, you don’t choose just one. The best way to determine the value of a company is to use a combination of valuation techniques. For example, if you have a precedent transaction valuation that you feel is extremely accurate, you may give that result more weight. Or if you are extremely confident in your DCF analysis, you will place more emphasis on its outcome. 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 public sale of stock in a previously private company.
- ☛ This is known as “going public.”
- ☛ The IPO process is incredibly complex, and investment banks charge high fees to lead companies through it.
- ☛ Companies go public for a number of reasons—raising capital, cashing out for the original owners, and investor and employee compensation.
- ☛ Some negatives against “going public” include sharing future profits with public investors, loss of confidentiality, loss of control, IPO fees to investment banks, and legal liabilities.
- ☛ Some recent IPOs include Groupon and Zynga, and the most anticipated IPO of 2012 was Facebook, which issued its IPO at around a \$100 billion valuation and was led by Morgan Stanley.
- ☛ *IPO is the acronym for Initial Public Offering. It is the first time a privately-held company sells shares of stock to the public market. Usually a company goes public to raise capital for growing 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 where an investment bank sells 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 New York Stock Exchange, American Stock Exchange, or Nasdaq, in the United States.
- 🐼 *The primary market is the market where a new stock or bond is sold the first time it comes to market. The secondary market is where the security will trade after its initial public offering (NYSE, Nasdaq).*



Intermediate

What is the Capital Assets Pricing Model?

- Used to calculate the required/expected return on equity (ROE), or the cost of equity of a company
- $Re = Rf + B(Rm - Rf)$
- The Capital Assets Pricing Model, referred to as CAPM, 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 (usually the yield on a 10-year U.S. government bond) plus the company's beta (a measure of the stock's volatility in relation to the stock market) times the market risk premium.*

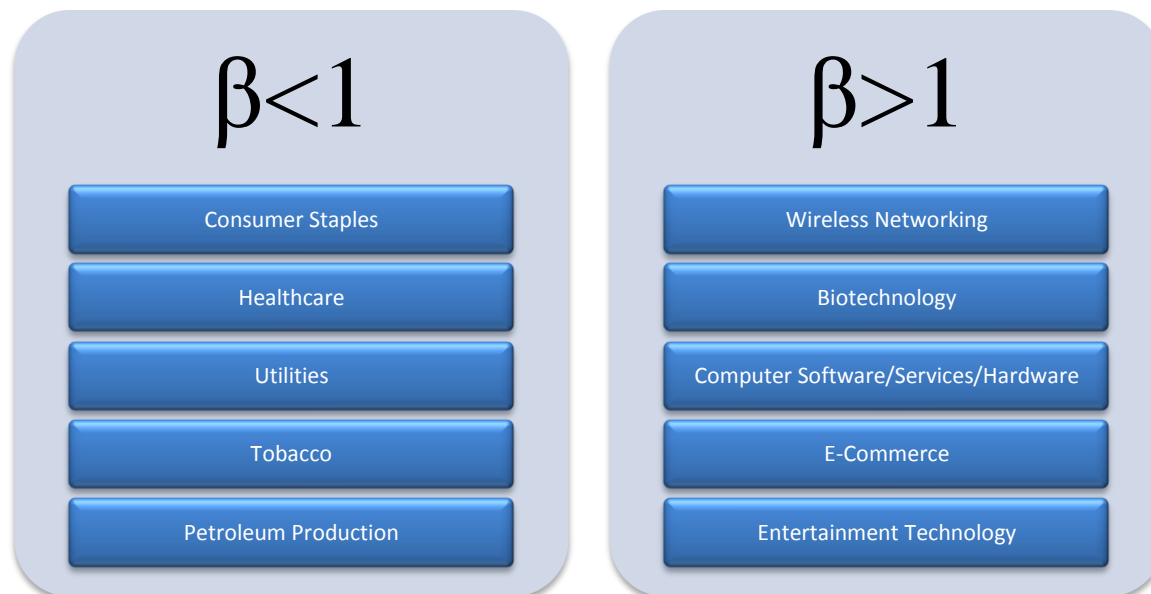
Where do you find the risk-free rate?

- 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 U.S. government is considered to be a risk-free borrower, meaning the government is expected never to default on its debt.
- Recently, S&P downgraded the United States from its AAA “risk-free” rating to AA+. The other two major ratings agencies have maintained their ratings on U.S. government debt, however. See the section in the current events section of this guide for more information.

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 theoretically will 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 less than 1.*





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

- 🦉 The key to this question is understanding that if you have the beginning and ending Balance Sheets for the period, along with the ending Income Statement, you can generate a Cash Flow Statement for yourself. So the answer to this question is easy: you want the beginning and ending Balance Sheets and the Income Statement for the same period.
- 🦉 *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 does depreciation affect the cash balance if it is a non-cash expense?

- 🦉 *Since depreciation is an expense, it will reduce the amount of taxes a company will pay. Since taxes are a cash expense, anything that affects them—including depreciation—will affect the cash balance.*

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

- 🦉 Note: There are many forms of this question. An interviewer could ask how the statements are affected by a \$20 decrease in inventory, or a \$50 million capital expenditure project. Since you will not be able to memorize each and every possible question, you must know how the changes in line items flow through the financial statements. Use the WSO model provided with this guide to help you master that.
- 🦉 Break this question down into pieces.
- 🦉 Start with the Income Statement.
 - The \$10 increase in depreciation is an expense, which therefore lowers operating profit by \$10 and reduces taxes.



- Taxes decrease by $\$10 \times \text{Tax Rate}$ and net income decreases by $\$10 \times (1 - \text{Tax Rate})$.
- Assuming a 40% tax rate, the drop in net income will be $\$6$ [$\$10 \times (1 - 0.40)$].

🐼 Next move to the Statement of Cash Flows.

- The $\$6$ reduction in net income reduces cash from operations by $\$6$.
- However, depreciation is a non-cash item, so it will *increase* cash from operations by $\$10$ because you add back depreciation.
- Ending cash is therefore increased by $\$4$.

🐼 Now to the Balance Sheet.

- Cash increases by $\$4$.
- PP&E decreases by $\$10$ because of depreciation.
- Overall assets fall by $\$6$.
- This needs to balance with the other side of the Balance Sheet; therefore, 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 reduce net income by $\$10$ times $(1 - \text{the tax rate})$. Assuming a 40% tax rate, this will mean a reduction in net income of 60% or $\$6$. So $\$6$ flows to cash from operations, where net income will be reduced by $\$6$ but depreciation will increase by $\$10$, resulting in an increase of ending cash by $\$4$. Cash then flows onto the Balance Sheet where it increases by $\$4$, PP&E decreases by $\$10$, and retained earnings decreases by $\$6$, keeping everything in balance.*

Note: See the chart on the next page to help you follow the flow. You can also use the accompanying Excel spreadsheet to change depreciation and see what happens to the three statements.



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 loses \$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

In what scenario could a company have negative shareholders equity?

- 🦊 *If a company has had negative net income for a long time, it would have a negative retained earnings balance, which would lead to negative shareholders equity. A leveraged buy-out could have the same effect, and so would a large dividend payment to the owners of the business.*

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 excess return that investors require for choosing to purchase stocks over “risk-free” securities. It is calculated as the average return on the market (normally the S&P 500, typically around 10-12%) minus the risk free rate (current yield on a 10-year Treasury).*



What kind of an investment would have a negative beta?

- 🦉 An investment with a negative beta is one that moves opposite to the stock market as a whole. In other words, if the stock market moves up, the value of the negative beta investment would decline and vice versa.
- 🦉 *Gold is an investment that has a negative beta. When the stock market goes up, the price of gold typically declines as people flee from the “safe haven” of gold. The opposite happens when the market goes down, indicating a negative correlation.*

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

- 🦉 If this was the only information you were given, you could 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.
- 🦉 *Since you have no information about historical or projected performance, and no details about the firm’s capital structure, it would be impossible to do a DCF analysis. Assuming you know the firm’s industry, you could identify a group of comparable companies and do a multiples analysis using the ratios from those most relevant to the company being valued.*

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 construct 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 Adjusted Present Value and WACC?

- 🦉 WACC incorporates the 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 Net Present Value assuming all Equity Value
 - Useful where costs of financing are complex and if capital structure is changing
 - Used for Leveraged Buyouts
 - See investopedia.com for more information on APV

How would you calculate the WACC of a private company?

- 🦉 *Since a private company has no market capitalization and no beta, you would most likely use the WACC for a comparable public company.*



Describe a company's typical capital structure.

- ☛ A company may finance itself using multiple layers of debt and equity, each of which will have a different cost and repayment preference in the event of bankruptcy. The paragraph below would be a relatively good answer, and the chart that follows illustrates the different layers of the capital structure.
- ☛ *A company's capital structure is made up of debt and equity, and there may be multiple levels of each. Debt can be senior, mezzanine, or subordinated, with senior being paid off first in the event of bankruptcy, then mezzanine, then subordinated. Since senior debt is most secure and will be paid off first in bankruptcy, it offers the lowest interest rate. The most senior debt is bank loans; the rest is bonds, which can be issued to the general public. Equity is either preferred or common stock. Preferred stock combines some features of both debt and equity: it can appreciate in value, and also pays out a consistent dividend but it has very little or no rights in a bankruptcy. Common stock is traded on the exchanges, if the company is public. In the event of bankruptcy, common stockholders have the least claim to assets in the event of liquidation, and therefore they bear the highest level of risk and earn the highest return on investment. Common shareholders are the company's owners and are entitled to profits, which may be reinvested in the business or paid as dividends.*



Senior Bank Loans

- Underwritten by an investment bank and syndicated to institutional buyers.
- First priority in the event of a bankruptcy.
- Often "secured" in case of liquidation by company assets pledged as collateral.
- Many times will have a "floating" interest rate based on LIBOR + a certain rate.

Mezzanine Debt/Bonds

- Arranged by an investment bank and sold on the bond market.
- May be secured or unsecured.
- Bonds normally will have a fixed interest rate.
- Bonds may have call or put options, may be convertible into equity, etc.

Subordinated/ High Yield Bonds

- Similar to Mezzanine Debt/Bonds but lower in the capital structure (subordinated).
- Since they are subordinated, they will have fewer rights in the event of a bankruptcy.
- Investors will require a higher interest rate on this layer of debt.

Preferred Stock

- Preferred stock is like a hybrid of a bond and common equity.
- The preferred will pay a constant dividend to its shareholders, and the principal value of the preferred can gain value as well.
- Preferred stock may also carry a conversion feature, where shareholders can convert their preferred into common.
- Preferred will be paid prior to common shareholders having any recovery in a bankruptcy, but it is typically subordinated to all other company debt.

Common Stock

- Common stock is the form of equity traded on public exchanges such as NYSE & Nasdaq.
- Common shareholders purchase shares and are the company's "owners," with voting rights that can be exercised in corporate decisions.
- Stock is underwritten by a bank hired to run the highly complex IPO process. The new shares issued are then sold mainly to institutional buyers.
- Common stock is lowest in the capital structure and has the fewest rights in the event of bankruptcy.



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

- 🦉 If the company feels its stock price is inflated, it would raise a large amount of capital relative to the percentage of ownership sold.
- 🦉 If new projects the company plans on investing in may not produce immediate or consistent cash flows to make interest payments...
- 🦉 If the company wants to adjust its capital structure, or pay down debt...
- 🦉 If the company's owners want the ability to sell off a portion of their ownership and monetize their investment...
- 🦉 *There are several reasons for issuing stock rather than debt. First, if a company believes its stock price is inflated, issuing stock can raise a lot of capital relative to the ownership sold. Second, if the projects to be funded may not generate predictable cash flows in the immediate future, the company would want to avoid the obligation of consistent coupon payments required by the issuance of debt. Issuing stock is also an effective way to adjust the debt/equity ratio of a company's capital structure or to monetize the owners' investment.*

When should an investor buy preferred stock?

- 🦉 Preferred stock could be looked at as a cross between debt and equity. Preferred stock will normally provide investors with a fixed dividend rate (like a bond), but also allow for some capital appreciation (like a stock). Preferred stock may also have a conversion feature which allows shareholders to convert their preferred stock into common stock.
- 🦉 Preferred typically does not have voting rights like those of common stock.
- 🦉 Preferred is senior to common stock within the company's capital structure.
- 🦉 *An investor should buy preferred for the upside potential of equity while limiting risk and assuring stability of current income in the form of a dividend. Preferred stock's dividends are more secure than those from common stock, and owners of preferred stock enjoy a superior right to the company's assets, though inferior to those of debt holders, should the company go bankrupt.*

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

- 🦉 *The distribution of a dividend signals that a company is healthy and profitable, thus attracting 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.
- 🦉 If a company has a high level of operating leverage, it means that much of any increase in revenue will fall straight to the bottom line in the form of profit, because the incremental cost of producing another unit is so low.
- 🦉 For example, a swim club is a business that operates with a high level of operating leverage. Once the club is built and opened, its costs are relatively fixed. With the same number of staff, same size pool, same locker rooms, same maintenance expense, the club could go from 500 members to 510 members with little additional cost. Nearly 100% of the membership fees collected from the 10 new members would turn into profit.
- 🦉 *Operating leverage is the relationship between a company's fixed and variable costs. A company with more fixed costs has a higher 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 revenue, growth, risk, etc. but one is private and one is public, which company's shares would be higher priced?

- 🦉 The public company most likely will be priced higher due to the liquidity premium one would pay to be able to buy and sell the shares quickly and easily in the public capital markets.
- 🦉 Another reason the public shares should be priced higher would be the transparency required for the firm to be listed on a public exchange. Publicly traded companies are required to file audited financial statements, allowing investors to view them.
- 🦉 *The public company is likely to be priced higher for a couple of reasons. The main reason is the liquidity premium investors will pay for the ability to trade their stock quickly and easily on the public exchanges. A second reason is the sort of "transparency premium" that derives from the public company's requirement to make their audited financial documents public.*



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 (especially in a time of economic turmoil), holding too much cash means you are giving up potential earnings from investing that cash elsewhere.
- ☛ A firm must be aware of its cash needs, and keep enough cash to cover itself in the event of a downturn, but excess cash should be used or invested.
- ☛ A growing company will normally reinvest its cash in the operations of the business itself. This allows the company to expand and grow. This could be an investment in equipment, more employees, new offices, increased/upgraded marketing, etc.
- ☛ A company could also pay out the excess earnings as additional salary or bonuses to its employees or a dividend to its shareholders.
- ☛ An option to preserve some sense of liquidity would be investing in short-term CDs, allowing the firm to earn interest while locking up the investment for only a short time.
- ☛ Other options include investing in other companies, buying out a competitor, supplier or distributor, paying off debt, repurchasing stock, expanding to new markets, etc.
- ☛ *Although it seems like having a lot of cash on hand might be a good thing, especially in a recession, it really isn't, because there is an opportunity cost to holding cash. A company should have enough cash to protect itself from bankruptcy in a downturn, but any excess cash should be put to work. The company could pay a dividend to its equity holders or bonuses to employees, although a growing company will tend to reinvest rather than pay out cash. It can reinvest its cash in plants, equipment, personnel, or marketing; it can pay off debt, repurchase equity, or buy out a competitor, supplier, or distributor. If nothing else, that cash can earn a little something invested in CDs until it can be put to better use.*



What is goodwill and how does it affect net income?

- 🦉 Goodwill is a line item in the assets section of a company's Balance Sheet.
- 🦉 Goodwill can arise from an acquisition where the price paid for the firm being acquired is higher than the tangible assets being purchased. The difference between 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, customer relationships, intellectual property, etc.
- 🦉 If something happens that impairs the goodwill of the firm (such as a patent running out, an event hurting the brand, etc.), goodwill must be "written down" as an expense on the Income Statement.
- 🦉 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 included on a company's Balance Sheet. Goodwill may include things like intellectual property rights, brand name, or customer relations. Goodwill is acquired when purchasing a firm if the acquirer pays more than the book value of its assets. When something occurs to diminish the value of the intangible assets, goodwill must be "written down" in a process much like that for depreciation. Goodwill is subtracted as a non-cash expense and therefore reduces net income.

What are some examples of items that may need to get added back to EBITDA to get a better sense for the financial health of a company?

- 🦉 Some examples are one-time, non-recurring items like legal expenses, one-time disaster payments or events, restructuring charges, debt/equity financing expenses, etc. Any items that are not likely to continue from one year to the next may be added back to EBITDA



Advanced

When building a model, what is the most common way to project items like accounts receivable, accounts payable, inventory, depreciation, and capital expenditures?

- 🐼 Accounts receivable is normally projected as a percentage of revenues or using a ratio like Days Sales Outstanding.
- 🐼 Accounts payable is normally projected as a percentage of cost of goods sold or using a ratio like Days Payable Outstanding.
- 🐼 Inventory is normally projected as a percentage of cost of goods sold or using a ratio like Inventory Days.
- 🐼 Depreciation can be calculated very simply using a percentage of the prior years' PP&E or can be calculated at the individual asset level using different schedules, useful lives, etc.
- 🐼 Capex is normally projected as a percentage of revenues, or from company guidance you will have a relatively good idea of what capex requirements are going forward.

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 remove the financial effects of debt in the capital structure. This unlevered beta shows you the risk of a firm's equity compared to the market. Comparing unlevered betas allows investors to see how much risk they will be taking by investing in a company's equity (i.e. buying stock in the public market). When you have a company that doesn't have a beta, Company A, you can find comparable Company B, take its levered beta, unlever it, and then relever it using 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.*



What would be the effect of using levered free cash flow rather than unlevered free cash flow in your DCF model?

- 🐼 *If you were to use the levered free cash flow in your DCF, you would end up with the Equity Value of the company rather than the Enterprise Value since the cash flows you are finding the present value for are after the debt investors had been repaid, therefore indicating how much cash would be available to equity investors, not to all investors.*

What is a dividend discount model?

- 🐼 A dividend discount model is much like a DCF, but it will use dividends rather than free cash flow.
- 🐼 Rather than projecting out free cash flow, you project out the earnings per share for the business.
- 🐼 Assume that a certain percentage of EPS is being paid out as a dividend based on the historical dividend policy and how much cash the company wants to retain on its Balance Sheet.
- 🐼 Project out the dividends for the next 5-10 years just as you would with free cash flow, and then discount them back and sum them like in a DCF, but rather than using WACC, you are going to use the cost of equity for the firm.
- 🐼 For the terminal value, you will want to use an equity valuation multiple like P/E, and then discount that back to year 0, just as you would do in a DCF.
- 🐼 The sum of the PV's of all the dividends is the per share value of the company.

What's the difference between cash-based accounting and accrual accounting?

- 🐼 **Cash based accounting:** This form of accounting recognizes revenues and expenses as of the time cash is actually collected or disbursed. For example, if a company receives a payment on a credit card, it wouldn't be recorded as revenue until the credit card company actually deposits the money into the company's bank account.
- 🐼 **Accrual accounting:** With accrual accounting, as soon as the company makes a payment or sale and believes it will pay for or be paid for a good or service, it will recognize the expense or revenue. Using the prior example, if the company is using accrual accounting, they will book the revenue as soon as they are paid, and it will show up as an accounts receivable on the Balance Sheet until the money is actually deposited into their account, at which time the accounts receivable balance will go down and the cash balance will go up.
- 🐼 *With cash-based accounting, a company won't recognize expenses or revenues until the cash is actually disbursed or collected. With accrual accounting, a company will recognize expenses and revenues when it has entered into a transaction or agreement that will require it to pay or be paid, even if cash won't change hands until sometime in the future. Most companies use accrual accounting since credit cards are so prevalent.*



What are some differences between tax accounting and GAAP accounting?

- ☛ Since tax accounting is used to calculate just what income tax a company owes in a year, it is focused on just the revenues and expenses for a given year and is cash based. GAAP accounting is more concerned with tracking a company long term, so it tracks assets and liabilities as well and is accrual based.
- ☛ Another difference includes different the depreciation schedules: accelerated for tax accounting and straight line for GAAP accounting.

What is the difference between LIFO and FIFO?

- ☛ LIFO and FIFO are different ways of keeping track of inventory value and cost of goods sold.
- ☛ **LIFO (Last In First Out):** With the LIFO accounting policy, a company assigns the value of the most recently purchased/produced goods to the first sale. For example, if a company built 5 widgets for \$5 and then built 5 widgets for \$10, the value of their inventory would be \$75. The first 5 widgets they sell will have a \$10 COGS and will reduce inventory by \$10 each, and the last 5 widgets will have a \$5 COGS and will reduce inventory by \$5 each.
- ☛ **FIFO (First in First Out):** With the FIFO accounting policy, a company assigns to the first sale the value of goods built or purchased first. For example, if a company built 5 widgets for \$5 and then built 5 widgets for \$10, the value of their inventory would be \$75. The first 5 widgets they sell will have a \$5 COGS and will reduce inventory by \$5 each, and the last 5 widgets will have a \$10 COGS and will reduce inventory by \$10 each.
- ☛ *LIFO and FIFO are different methods of dealing with inventory and COGS in a company's accounting policy. With LIFO, the last inventory produced or purchased will be the first to be recognized when goods are sold. With FIFO, the first inventory produced or purchased will be the first recognized when goods are sold.*



What is the mid-year convention in a DCF?

- 🦊 To account for the fact that cash is collected equally over the course of the year, you discount back using “half-years” as if the cash were all collected in the middle of the year.
- 🦊 The mid-year convention is used because the cash flows in a business are not all received at the end of a year.
- 🦊 To account for the fact that cash is collected throughout the year, you discount back using “half-years” in order to assume the cash is all collected in the middle of the year.

	Year 1	Year 2	Year 3	Year 4	Year 5
Normal	1.0	2.0	3.0	4.0	5.0
Mid-Year	0.5	1.5	2.5	3.5	4.5

- 🦊 *Since cash is not collected all at once at the end of the year, you account for that in the way you discount the cash flows. In order to do this, you will discount using “half-years,” which assumes that all the cash is collected in the middle of the year, which is a more reasonable assumption. For example. The 4th year’s cash flow number would be discounted using 3.5 years to assume the cash is collected midway between the end of year 3 and the end of year 4.*

How do you go from the Enterprise Value you would calculate using a DCF to a per share price for a public company?

- 🦊 *Once you come up with your Enterprise Value, you add cash and then subtract debt, preferred stock, and minority interest to come up with an Equity Value. Once you have the Equity Value, you must use Excel to calculate a per share price based on the number of fully diluted shares outstanding. However, the number of fully diluted shares will depend on the share price, so you will have to use the iterations function in Excel in order calculate this.*

Walk me through the IPO process for a Company that is being taken public.

- 🦊 When valuing a company for an IPO, the investment bank leading the deal will price the company primarily on publicly traded comparable companies.
- 🦊 Once the banking team has identified a strong comps set, they will perform a comparable companies analysis.



Stocks

Basic

Name three stocks/companies that you think are undervalued and explain why you chose them.

- 🦊 This question is unique to you and is particularly common in Sales and Trading interviews.
- 🦊 Do some research and find a few stocks you believe are good buys at the current market price. You must have a good reason behind each of your picks.
- 🦊 The best way to find these stocks is to use equity research reports if you can. Many schools will have access to them through their library website. You also can use sites like Jim Cramer's TheStreet.com or Motleyfool.com to look at articles about others' stock picks and the reasons behind them. WallStreetOasis.com is a good place to find stock ideas.
- 🦊 If you are feeling ambitious, you could go through the process of valuing the stocks yourself, using any of the valuation techniques.
- 🦊 Generally speaking, we have found you are better off picking a less well known company, so your interviewers have less ability to cross-examine you on your reasoning. If they know a stock well, they will be able to test you and push you on specifics about it.
- 🦊 Variations of this question include "Pitch me a stock" or "What stocks would you short right now?" (The "Short" answer would be opposite to the "Pitch" answer, in that you would short a stock you believe will perform poorly.)

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

- 🦊 This question is 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/indices, as well as whether they were up or down and why, will show your interviewer that you keep track of what is going on in the world of finance.
- 🦊 You should know how the market moved (up or down) the previous day and why it moved. You can find this information by watching CNBC, reading the *WSJ*, etc.
- 🦊 *Yesterday the XXXX closed at XXXX, up/down XXX from the open. I also noticed that it was up XXX from the day before 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 or the industry to which XYZ belongs could have been down on the day, which had more of an impact than the company's positive earnings. More likely, however, is that the increased earnings figures they reported were not as high as the Wall Street analysts' estimates.*



What does it mean to short a stock?

- 🦊 Short selling is selling a stock that you don't actually own.
- 🦊 Investors that short-sell a stock believe they will be able to purchase that stock at a lower price in the future.
- 🦊 Typically, a short-seller will borrow the stock from another investor, and then sell it, promising to return the stock to the lender at a later date. Brokerage firms are able to facilitate this borrowing; however, not all stocks can be shorted.
- 🦊 “Naked” short selling occurs when an investor sells the stock without actually having borrowed any.
- 🦊 *Short selling a stock is the opposite of going long in a stock. Usually an investor buys a stock believing it will sell for a higher price in the future. When short-selling, investors stock they don't actually own, in the belief that they will be able to purchase it for a lower price in the future.*

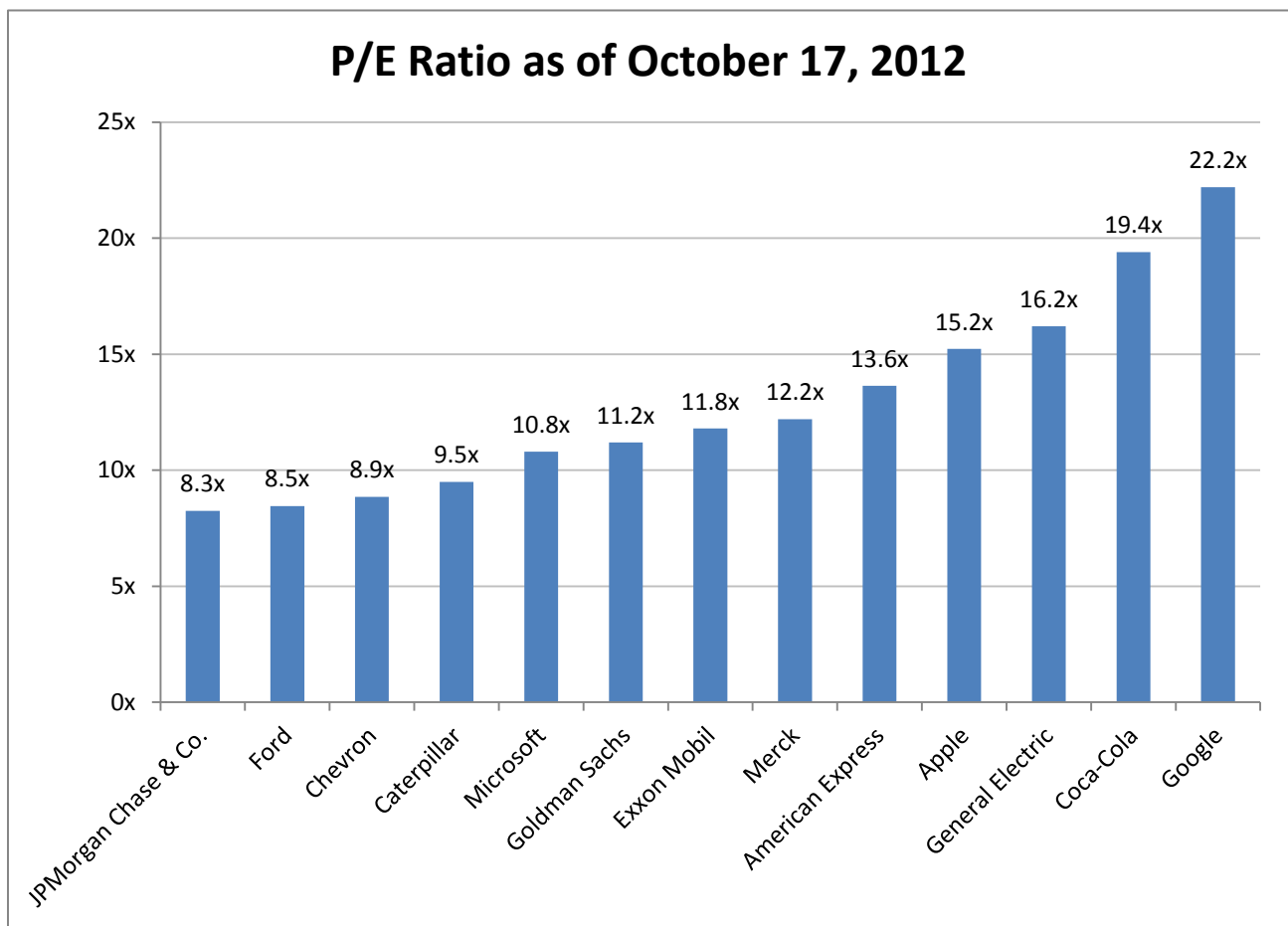
What is liquidity?

- 🦊 Liquidity is how freely an asset or security can be bought and sold on the open markets.
 - Money market accounts, publicly traded large cap stocks and bonds, ETF's, and open-ended mutual funds are very liquid.
 - Micro-cap stocks, bonds, loans, or investments in privately-owned companies could be considered relatively illiquid due to the limited market for them.
- 🦊 Liquidity also describes how quickly an asset can be converted into cash.
 - Cash itself is the most liquid asset.
 - A large pharmaceutical production plant is *not* a very liquid asset because it would take the owner of the plant a long time to sell the plant and convert it into usable cash.
- 🦊 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 and large-cap stocks. Some non-liquid assets include many micro-cap stocks, or a large, specialized factory or production plant that could take years to convert into cash.*



Is 15 a high P/E (price to earnings) ratio?

- 🐘 This is not a yes or no question. A firm's P/E ratio is important in comparison with other companies in its industry. P/E can be thought of as 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 its earnings at a high rate, and therefore deserves a higher valuation relative to current earnings. For a large pharmaceutical company, however, a P/E of 15 may be considered high, since earnings growth may be expected to be slow but steady in future years.
- 🐘 *It depends on the industry. A P/E ratio of 15 in an industry like basic materials may be considered a bit high, but if the 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 can show your interest in the markets. There is no right or wrong answer since everyone has different opinions on where the market is going.
- 🐼 You need to have an opinion and 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* to explain 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 to display logical reasoning than to be right.
- 🐼 Do some research before your interview; see what writers for major newspapers are saying and predicting, and then use some of their reasons in your explanation.
- 🐼 Also, stick to your reasoning. Your interviewer may challenge you and question your reasoning. If you have come up with solid theory behind your response, be confident in your answer and try to explain your rationale. If your logic makes sense, don't 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 research around the time of your interview. You can find an IPO discussed 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 what company went public, a little information about the company, what the offer price was, which banks completed the IPO, etc.
- 🐼 A few recent big name IPOs are listed below, but always search before your interview to see if there is anything recent.

Company	Month	Lead Underwriter	Amount Raised
 facebook	May 2012	Morgan Stanley	\$16 billion
 zynga	December 2011	Morgan Stanley	\$1 billion
 GROUPON Collective Buying Power	November 2011	Morgan Stanley	\$600 million
 P PANDORA	June 2011	Morgan Stanley	\$240 million
 Bankrate.com	June 2011	Goldman Sachs	\$300 million
 AIR LEASE CORPORATION	April 2011	J.P. Morgan	\$795 million



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

- 🦉 Past performance is not an indication of future results. This is the disclaimer you hear at the end of nearly every commercial that presents a fund's past performance as a selling point. The reason for this is because a specific investment type could perform remarkably well one year and then significantly underperform in the following year.
- 🦉 *To make an investment decision you need to research more in depth into the fund's holdings, management, fee structure, etc., because past performance—especially a single year—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% the year after the market for MBSs collapsed.*

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

- 🦉 *The answer to that question depends on a number of factors including the company's beta and the market's performance. 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 buying or selling public securities based on information that is not available to the general public.
- 🦉 Examples include an investment banker buying or selling the stock of a company before an M&A deal is announced or a CEO buying or selling his or her company's stock prior to making a major company announcement.
- 🦉 The biggest insider trading scandal in the recent past involved Raj Rajaratnam, who was convicted and sentenced to 11 years in prison. He was the founder and former manager of the hedge fund, the Galleon Group. Even Martha Stewart was convicted of insider trading!
- 🦉 *Insider trading is buying or selling stock based on information that is not publicly available. For example, if a CEO of a pharmaceutical company knows that one of his or her company's drugs is going to be pulled from the shelves by the FDA, that CEO cannot sell his or her stock until the information has been released to the public.*

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

- 🦉 *A bondholder is always senior to a stockholder. In the event of bankruptcy/liquidation, the bondholder will be repaid 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 can repurchase stock, which lowers the number of shares outstanding and therefore increases the value per share.
- 🦊 It can improve operations to produce higher earnings, causing its EPS to be higher than anticipated by industry analysts, which will send a positive signal to the market.
- 🦊 It can announce a change to its organizational structure such as cost-cutting or consolidation, which would lead to increased earnings.
- 🦊 It could announce the institution of a dividend policy or an increase in an existing dividend.
- 🦊 It can announce an accretive merger or an acquisition that will increase earnings per share.
- 🦊 *Any positive news about the company can potentially raise the stock price. If the company repurchases stock, it lowers the shares outstanding and raises the EPS, which would raise the stock price. A repurchase is also seen as a positive signal in the market. A company could announce operational efficiencies or other cost-cuts, or a change to its organizational structure such as consolidations. It could announce an accretive merger or acquisition that would increase earnings per share. Any of these occurrences would most likely raise the company's stock price.*

A stock is trading at \$5 and another 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 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...
$$\text{Return on Stock X} = \frac{\$15 + \$5 - \$10}{\$10} = 100\%$$

- 🦊 *Return on a stock is its sale price plus dividends paid minus its purchase price, as a percentage of the purchase price. For stock X, that would be 15 plus 5 minus 10, which is 10, or 100% return on my investment.*



What is correlation?

- Correlation is how two stocks move in relation to each other.
- If two stocks have a strong positive correlation, they move up or down together.
- 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 or down, the other will do the same. 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 and a small
software company

Correlation of 1

Strong Positive
Correlation

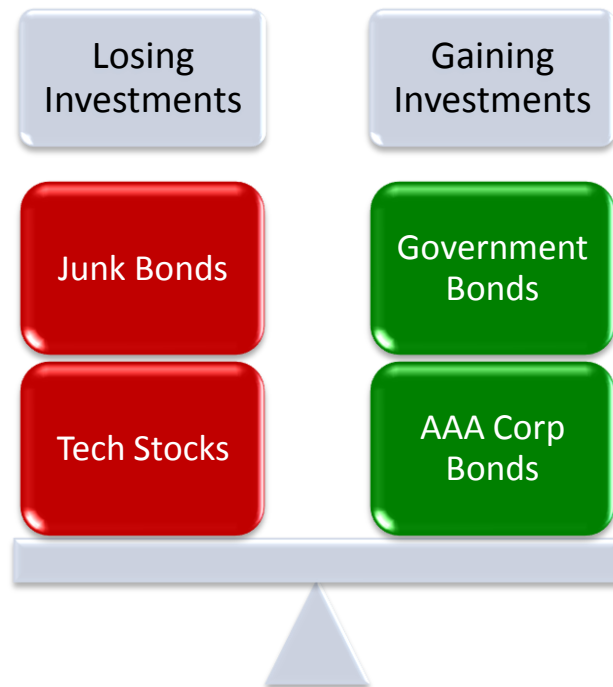
When one investment
goes up in value, the
other goes up

Example: Two high
end hotel chains



What is diversification?

- ☛ Diversification is mixing a wide variety of investments in your portfolio in search of a better risk/return ratio than putting all your capital into only one or a few investments.
- ☛ To diversify your portfolio you may want to pick investments that have a low correlation. When economic conditions push one investment to have a good period, the other may 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, investors can essentially eliminate all unsystematic risk from their portfolios.
- ☛ *Diversification is 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 investors are properly diversified, they can essentially eliminate all unsystematic risk from their portfolios, meaning that they can limit the risk associated with individual stocks so that their portfolios will be affected only 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 between the new investment and the rest of the portfolio. It could lower the overall risk of the portfolio if the new stock has a negative correlation compared to the rest 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. Fundamental analysis is examining a company's fundamentals, financial statements, industry, etc., and then 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*, and/or *The Economist*, and/or watching CNBC.
- 🐼 Chances are your interviewer will ask you about a company or industry that has been in the news recently or about something that you have shown interest in on your resume, rather than picking a completely arbitrary company or industry.

When should a company buy back stock?

- 🐼 *A company should buy back its own stock if it believes the stock is undervalued, when it has extra cash, if it believes it can make money by investing in itself, or if it wants to increase its stock price by increasing its EPS by reducing shares outstanding or sending 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"?

- 🐼 Groupon is great example of a stock that gained over 50% during its first day of trading in 2011. The stock had an IPO price of \$20 per share and rose to over \$31 per share. As of October 2012, the stock has traded down below \$5 per share.
- 🐼 *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 to 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 did. This happened a lot during the dot-com boom. Companies' stock would skyrocket on the first day of trading due to the huge hype over the stock.*

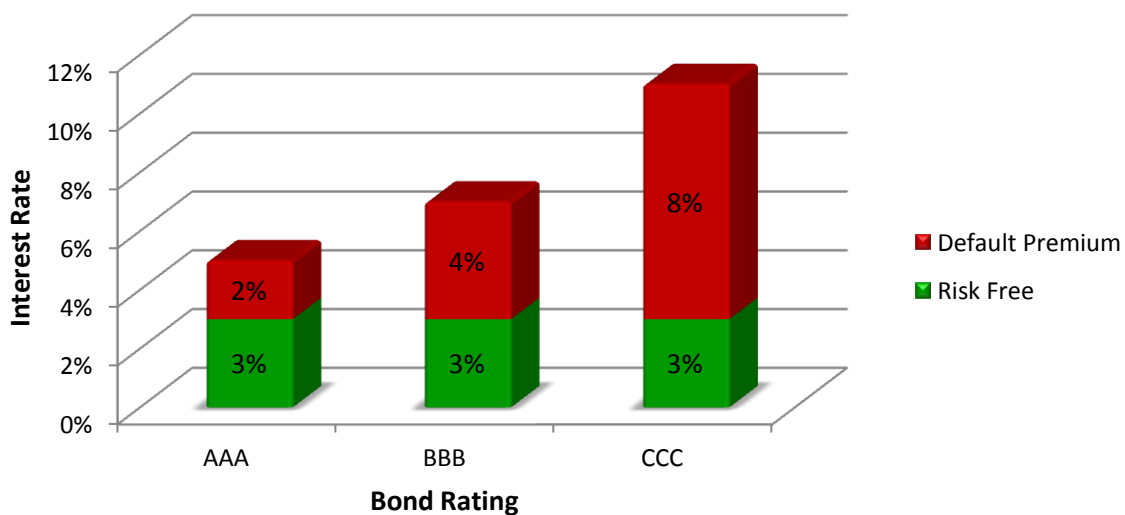


Bonds, Loans, and Interest Rates

Basic

What is the default premium?

- 🐼 The chart below is for illustrative purposes only. Current risk-free rates and default premiums may be different from those shown.
- 🐼 *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 not being able to make its interest payments or pay back the principal amount of their debt. All else equal, the higher a company’s default risk, the higher the interest rate a lender will require it to pay.*

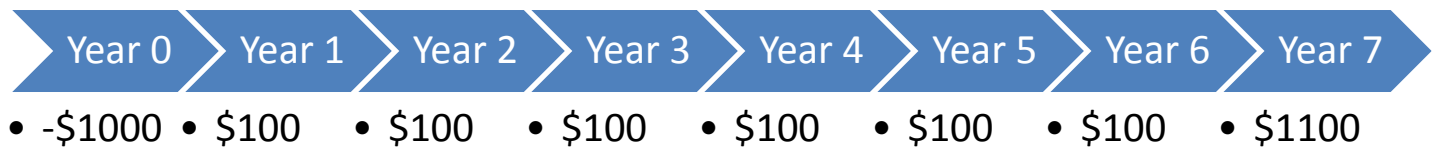
What is “face value”?

- 🐼 *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 on a bond or loan is the interest payment a company will pay to holders of the bond/loan.
- 🦊 This coupon payment is the stated interest rate times the face amount of the bond or loan. Bonds typically make coupon payments annually or semi-annually while loans typically make interest payments once per quarter.
 - If a company issues 10% 7-year annual bonds with a face value of \$1,000 each, annual coupon payments will be \$100 each: $\frac{10\% \text{ interest} \times \$1000 \text{ face value}}{1 \text{ payment per year}}$. The chart below shows the hypothetical cash flows with a \$1,000 purchase in year zero, then a \$100 coupon payment each year from years one through seven and the repayment of principal in year seven in addition the final coupon payment.
- 🦊 *The coupon payment is the amount a company pays its loan and bondholders, usually on an annual, semi-annual or quarterly basis. It is the coupon rate, or interest rate times the face value of the bond. For example, the coupon payment on an annual 10% bond with a \$1,000 face value would be \$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 (AAA to BBB, Aaa to Baa) and a low risk of default and therefore pays a low interest rate. These are usually low-risk, fundamentally sound companies, which produce steady, reliable cash flows significantly greater than their interest requirements.
- 🦊 A “junk bond” is a bond that has a poor credit rating (BB to D, Ba to C) and a relatively high risk of bankruptcy and is therefore required to pay investors a higher interest rate. These companies usually are characterized as having less consistent cash flows, or they may be in relatively more volatile industries.
- 🦊 *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.*



CREDIT RATINGS

<u>Moody's</u>	<u>S&P</u>	<u>Grade</u>	<u>Risk</u>
Aaa, Aa, A	AAA, AA, A	Investment	Low Risk
Baa	BBB	Investment	Med Risk
Ba, B	BB, B	Junk	High Risk
Caa, Ca	CCC, CC, C	Junk	Highest Risk
C	D	Junk	In Default

What is the difference between a corporate bond and a consumer loan?

- 🐼 In theory, a bond and a loan are similar in that they are both forms of debt. 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 while 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 corporate bond and a consumer 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.*



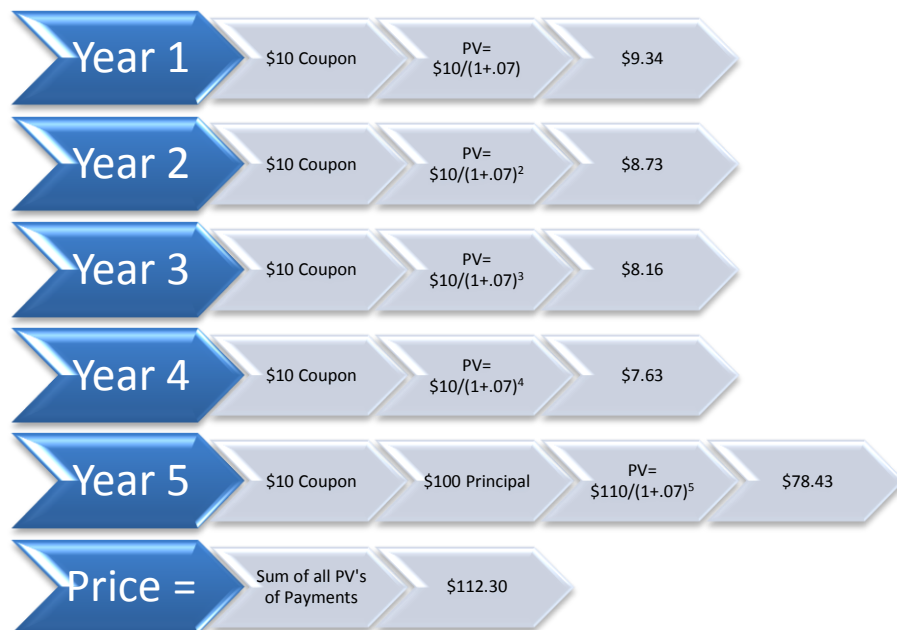
How do you determine the discount rate on a bond?

- 🐼 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, the amount of current debt outstanding, leverage and interest coverage.

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.
- 🐼 For the example below, assume the current interest rate is 7% on comparable bonds. The bond you are looking to invest in has a \$100 face value and pays 10% annual interest. Since the bond you are investing in pays a higher coupon than bonds of comparable companies, you will be required to pay a premium for that higher interest rate, hence the \$112.30 price, which brings the yield on the bond down to levels in line with comparables.



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?

- ☛ If you believe interest rates are going to fall bond prices should rise. If you are looking to make money on the capital appreciation of the bonds, you should be looking to buy the bonds.
- ☛ *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.
- ☛ As of February 10, 2012 the yield on the 10-year was 1.99%

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

- ☛ The chart above showing the relation between bond prices and yields also applies to the relationship between Treasury notes and their 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.*

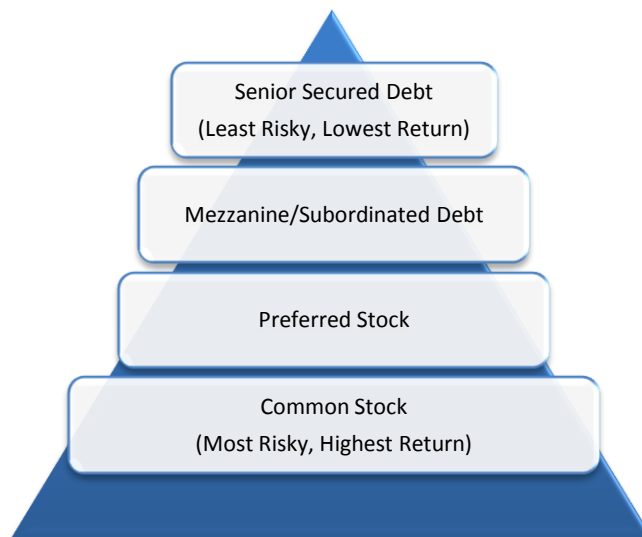
How many basis points equal 0.5 percent?

🦊 One basis point = 0.01 percent. Therefore 0.5 percent = 50 basis points

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

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

🦊 The order of preference is shown in the chart below. Those at the top of the pyramid have first claim on the firm's assets in the event of liquidation or sale, followed in order by those below them.



🦊 *The first creditors to get paid in the event of liquidation are the senior debt holders—usually banks and senior bondholders. They likely have some of the firm's assets as collateral. Next come those holding subordinated debt, followed by preferred stockholders. Common stockholders have the last claim on assets in the event of liquidation or bankruptcy.*



What is the difference between senior secured debt or “bank debt” and bonds?

Bank Debt

Low Interest Rate
Floating Interest Rate
Cash Interest Payments
4-8 Year Tenor
Small Amortization
Prepayment is Allowed
Banks, Loan Funds, CLOs
Secured by Company Assets
Normally has Maint. and Incur. Cov.

Bonds

Higher Interest Rate
Fixed Interest Rate
May have PIK interest
7-12+ Year Tenor
No Amortization
No Prepayment
Diversified Investors
May be Unsecured
Incurrence Covenants

🦄 *The first difference is that bank debt is secured by the assets of the company and bonds many times are not, so the interest rate on bank debt is typically lower. Second, bank debt tends to have floating interest rates based on LIBOR plus a spread, whereas bonds normally pay at a fixed rate. Third, bank debt may carry financial maintenance covenants that require the company to maintain certain leverage levels, interest coverage levels, etc., while bonds do not. Fourth, bank debt is normally amortized at a certain percentage per year. The fifth and final difference is that bank debt tends to be pre-payable at any time, whereas bonds tend to have call protection for some years after issuance, ensuring that bonds remain outstanding. In smaller transactions, the deal may be uni-tranche (all bank debt), but in large transactions the capital structure could include first-lien bank debt, second-lien bank debt, AND bonds.*

Why would a company use bank debt rather than high-yield bonds?

🦄 *Bank debt is secured by the assets of the company and therefore normally commands lower interest rates. The trade off is that it will typically amortize and may have maintenance covenants.*



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

- 🐼 One of the bonds could be callable.
- 🐼 One of the bonds could be puttable.
- 🐼 One of the bonds could be convertible.
- 🐼 *There are a couple of explanations for the observed price difference. A bond that is puttable or convertible would demand a premium, and a callable bond would trade at a discount.*

What are bond ratings?

- 🐼 A bond rating is a grade given to a bond according to its risk of defaulting.
- 🐼 The three best known and most trusted ratings agencies are Standard & Poor's, Moody's, and Fitch.
- 🐼 Recently, ratings agencies have faced some skepticism about their ratings techniques because so many of the mortgage backed securities that were given very high ratings ended up defaulting.
- 🐼 The lower the grade, the more speculative the stock, and all else equal, the higher the yield.
- 🐼 See the chart a few pages earlier for a visualization of the different ratings and agencies.
- 🐼 *A bond rating is a grade given to a bond based on its risk of defaulting. This rating is issued by an independent firm and updated over the life of the bond. The most trusted rating agencies are S&P, Moody, and Fitch, and their ratings range from AAA to C or even D. The top rating of AAA goes to highly rated "investment grade" bonds with a low default risk; the C rated bond is "non-investment grade" or "junk," and a rating of D means the bond is already in default and not making payments.*



Intermediate

What is the yield to maturity on a bond?

- 🐼 The yield to maturity (YTM) is the rate of return on a bond if it is purchased today for its current price, held through its maturity date and is paid off in full at maturity.
- 🐼 Normally, the yield to maturity is expressed as an annual rate.
- 🐼 The calculation of YTM includes the current market price, the face value, the coupon payments, and the time to maturity.
- 🐼 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 its rate of return if held through its maturity date, based on its current price, coupon payments, face value, and maturity date.*

What is the difference between yield to maturity and yield to worst?

- 🐼 *Yield to maturity assumes the debt holder will maintain the investment through its maturity date, collecting all interest payments and being repaid in full when it matures. Yield to worst is the lowest potential yield an investor can earn on a debt investment short of default by the issuer. This means that if a bond is callable, or has other provisions, an investor could earn less than yield to maturity should the company exercise a prepayment option to get out of the bond early.*

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. This makes existing bonds with lower coupon payments less attractive, and their price must fall to raise the yield enough to compete with the new bonds.*

What is a Eurodollar bond?

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



What is a callable bond?

- 🐼 A callable bond has a price (or prices) built into the bond indenture that allow the issuer to buy back the bond on a certain date (or dates) usually for a premium over the face value of the bond.
- 🐼 *A callable bond allows the issuer of the bond to redeem the bond prior to its maturity date, thus ending 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 (usually at face value) prior to maturity.*

What is a convertible bond?

- 🐼 Within the bond indenture of a convertible bond are a specified number of shares of common stock that each bond can be “converted” into at a time of the bondholders’ choosing. If the value of those shares exceeds the face value of the bond, the investor typically will convert the bond.
- 🐼 *A convertible bond can be “converted” into equity during the bond’s lifetime. Therefore, the bond can be converted before maturity should the bondholder decide that equity in the company is worth more than the bond.*

What is a perpetual bond?

- 🐼 *A perpetual bond is a bond that simply pays a coupon payment indefinitely (or until the company goes into default) and never returns a principal amount.*

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

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

- 🐼 *A perpetual bond is one that pays coupon payments regularly for eternity, with no repayment of principal (par value). The value of the bond will be coupon payment divided by the current interest rate. If the interest rate on comparable bonds were 10%, a bond paying a \$1,000 coupon would be \$1,000/10% or \$10,000.*

When should a company issue debt instead of equity?

- 🐼 *A company will normally prefer to issue debt because it is cheaper than issuing equity. In addition, interest payments are tax deductible and therefore provide tax shields. However, a company has to have a steady cash flow to make coupon payments, whereas that is not necessary when issuing equity. A company may also try to raise debt if it feels its stock is particularly undervalued such that an equity offering would not raise the capital needed.*



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

- 🐼 *The price of a zero-coupon bond is more sensitive to fluctuations in interest rates, and the price moves in the opposite direction of interest rates. So, when interest rates fall, the price of the zero-coupon bond will rise more than the price of the coupon bond. Therefore, if you believe interest rates will fall, you should purchase the zero-coupon bond.*

Which is riskier, a 30-year coupon bond or a 30-year zero-coupon bond?

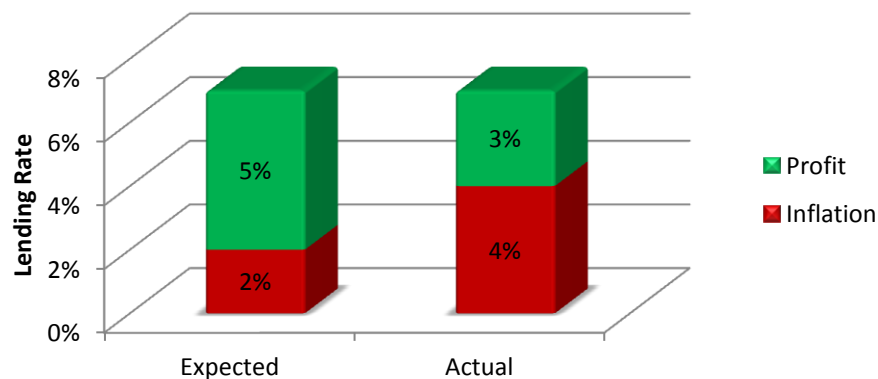
- 🐼 A zero-coupon bond is riskier since you will receive no payments until the final redemption date, whereas on a coupon bond you will receive payments over the life of the bond.
- 🐼 According to the chart below, if the company were to default in Year 4, an investor in the coupon bond would have collected \$30, while the holder of the zero-coupon bond would have received nothing.
- 🐼 The price of a zero-coupon bond is also more sensitive to interest rate fluctuations, increasing its level of risk.
- 🐼 To make up for the fact that a zero-coupon pays no coupon, the bond will be sold at a steep discount to its face value.
- 🐼 *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 prior to the bond's 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



How could inflation hurt creditors?

- 🦊 Inflation cuts into the real percentage return that creditors make when they lend out money at a fixed rate.
- 🦊 When a bank sets its lending rate, it projects a certain rate of inflation and then assigns a level of return it wants to capture, over and above the inflation rate, based on the riskiness of the borrower.
- 🦊 For example, if a bank lends at 7%, expecting 2% inflation, they expect to make a 5% real gain based on the riskiness of the loan. However, if inflation increases to 4%, they are only making a 3% real return on their loan.
- 🦊 *Inflation can severely injure creditors. Creditors assign interest rates based on the risk of default as well as the expected inflation rate. Creditors lending at 7% with inflation expected at 2%, 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. A zero-coupon bond makes no interest payments; it just pays back its face value at maturity. If a zero-coupon bond is also a perpetual bond, it will never pay out anything, and is therefore worth nothing.
- 🦊 *Since a zero-coupon bond doesn't have any interest payments, and a perpetual bond has no par value, the value of a zero-coupon perpetual bond is zero because it will pay out nothing.*

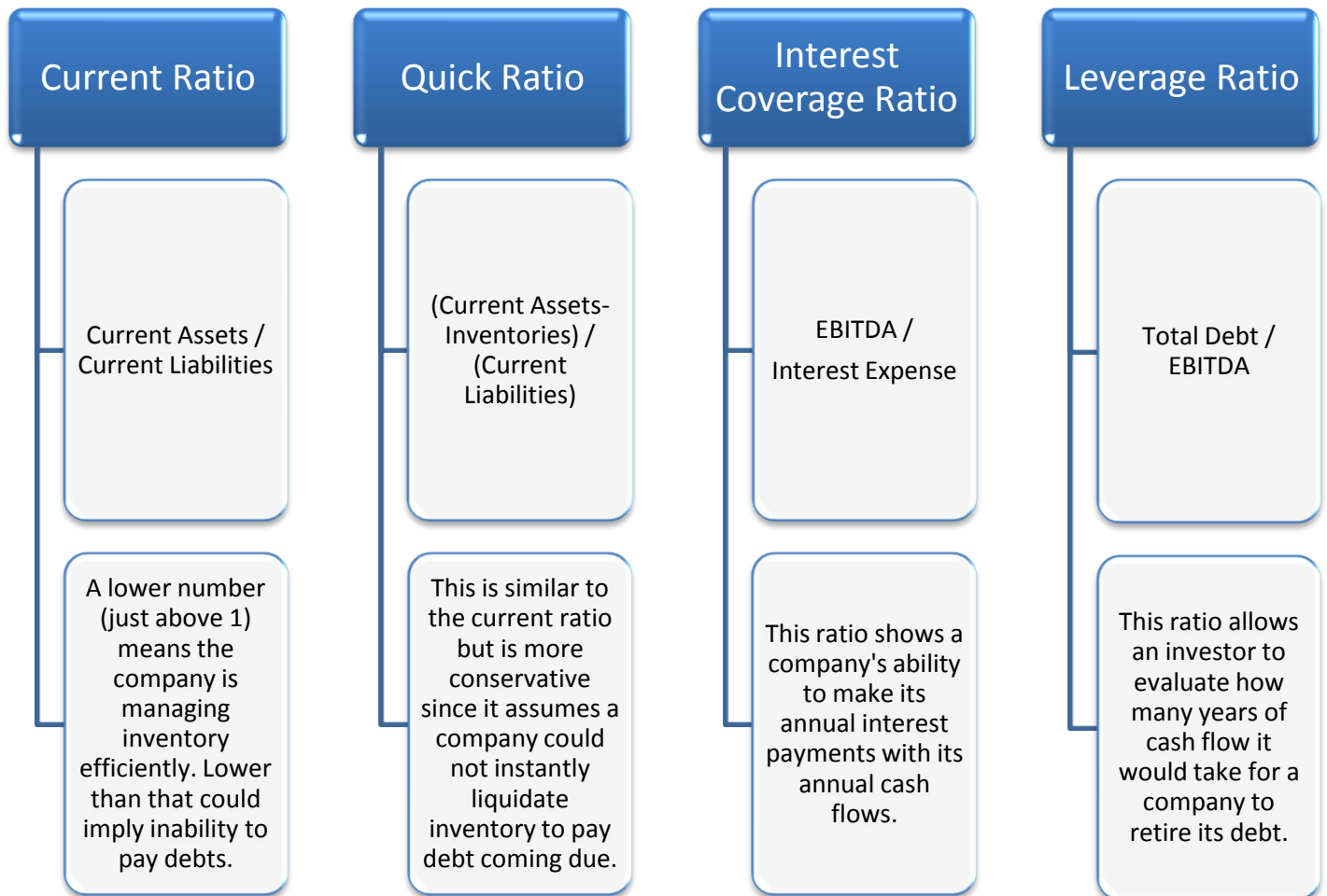
If the stock market falls, what would you expect to happen to bond prices and yields?

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



What are some ways to determine the extent to which a company poses a credit risk?

- 🦊 The easiest way to determine a company's credit risk is to look at its credit rating, available from Standard & Poor's, Moody's and Fitch.
- 🦊 If you wanted to perform your own analysis, some metrics to look at would be the Current Ratio, Quick Ratio, Interest Coverage Ratio, and Leverage Ratio.



- 🦊 Compare these ratios to those of similar companies in the same industry.
- 🦊 Look at a company's cash flows and evaluate how steady/consistent they are. A company with more predictable cash flows poses less default risk.
- 🦊 Also consider how much the company must pay each year in maintenance capital expenditures.
- 🦊 *Determining the credit risk of a company takes an incredible amount of work and research. However, some quick checks can include credit ratings from Moody's and Standard and Poor's, the current ratio, quick ratio, interest coverage ratio, leverage ratio, and debt to equity ratio, compared to those of similar companies in the same industry.*



Why is a firm's credit rating important?

- 🐼 *The lower a firm's credit rating, the higher its risk of bankruptcy, according to ratings agencies, and therefore the higher its cost of borrowing capital.*

What is the difference between a corporate bond and a corporate loan?

- 🐼 Bonds and loans are both forms of debt a company will use to finance operations.
- 🐼 A company will hire a bank to issue a loan or complete a bond underwriting.
- 🐼 When issuing a loan, a bank or other financial institution will lend a company a certain amount of money and then may syndicate the loan to institutional investors that are required to meet certain requirements in order to invest. Additionally, those investing in the loan can "go private" on the name which will restrict them from investing in public securities such as stocks and bonds, but will give them access to additional, more detailed financial information about the company they are investing in.
- 🐼 In a bond offering, an investment bank will go to market with the size and interest rate required by the company. The bank will then offer the bond to institutional investors such as mutual funds. The requirements for investing in bonds are less stringent than those for investing in loans; hypothetically, the average investor could invest in individual corporate bonds.
- 🐼 A corporate loan will usually be secured by the assets of the firm; a bond may or may not be secured. Bonds are also normally subordinated to bank loans. Therefore, if a company issues both bank loans and bonds, their bonds will typically pay a higher interest rate (all else equal).
- 🐼 *While both loans and bonds are forms of debt, there are several differences between them. One difference is that a loan will be syndicated by a bank who leads the deal and then sells pieces of the loan to other investors such as loan funds and CLOs. A bond will be underwritten by a bank that will go on a road show to sell the issue to other financial institutions like mutual funds. Another difference is that a bank loan is a private security in which investors may have access to private, more detailed information about the company's operations, which then prohibits them from investing in public bonds or stocks. Bondholders have access only to public information and are therefore not restricted. Yet another difference is that bank loans are usually secured by all assets of the company, while bonds may or may not be secured. Bonds are also lower in the capital structure and will be repaid in bankruptcy after loans are, so all else equal, bonds will have a higher interest rate.*



What is a floating interest rate?

- 🦉 Floating rate interest is used to protect against fluctuations in interest rates.
- 🦉 A floating interest rate is typically seen on bank loans and is set at LIBOR (the London Interbank Offer Rate) plus a certain number of basis points (the spread). For example, a company may get a term loan at L+600bps (6.00%). If LIBOR is at 1%, interest payments will be 7% (1% + 6%) per year. However, if LIBOR increases to 4%, the company will be required to pay 10% annually. The higher the borrower's default risk, the higher the spread.
- 🦉 Many floating rate loans will have a "LIBOR floor" because LIBOR is so low right now. This LIBOR floor is typically between 1% and 1.5% and means the company will pay the higher of LIBOR plus the spread, or the LIBOR floor plus the spread. In 2012, since LIBOR is below 0.4%, most loans will pay interest based on their LIBOR floors.
- 🦉 *Floating rate interest is typically seen on bank loans when a bank makes a loan to a company at a rate that will move with interest rates. The loan's rate typically is LIBOR plus a certain spread based on the default risk of the borrower.*

What is PIK interest?

- 🦉 PIK stands for Paid In Kind.
- 🦉 When a company issues PIK interest, rather than making cash payments to bond/loan holders, the face value of its investment will increase.
- 🦉 A company may look to issue debt with PIK interest if it wants to limit cash interest payments in the near term and is willing to make slightly higher future payments.
- 🦉 A company may also issue debt that has both a PIK and a cash component. For example, if a company's cost of debt is 10%, it may negotiate a bank loan that pays interest at 5% cash and 5% PIK.
- 🦉 For simplicity's sake, let's take a \$1,000 bond that pays an annual coupon of 10% and has a 5-year maturity.
- 🦉 As shown in the following chart, the bond will accrete in value over its lifetime and due to compounding, it will actually return a higher money multiple than if the investor were to receive annual cash interest payments. A \$1,000 investment will be repaid \$1,611 at the end of five years, whereas an equivalent bond paying cash would return \$1,500 spread over the course of the five years.
- 🦉 *PIK interest is interest that is Paid In Kind. This means that rather than making a cash interest payment, the bond or loan will increase in face value each period by the PIK interest rate. Because of compounding, the company will be required to pay more overall, but the cash outflow will be at maturity rather than annually, semi annually, or quarterly.*



Investment Date	End of Year 1	End of Year 2	End of Year 3	End of Year 4	End of Year 5
Invest \$1,000	10% PIK Interest	10% PIK Interest	10% PIK Interest	10% PIK Interest	10% PIK Interest
Face Value = \$1,000	Face Value = \$1,100 ($\$1,000 \times 1.10$)	Face Value = \$1,210 ($\$1,100 \times 1.10$)	Face Value = \$1,331 ($\$1,210 \times 1.10$)	Face Value = \$1,464 ($\$1,331 \times 1.10$)	Face Value = 1.611 ($\$1,464 \times 1.10$)

What are covenants?

- 🦊 Covenants are requirements a company must comply with according to the legal documents governing a loan or bond in order to avoid defaulting on it.
- 🦊 Covenants can be either financial or technical in nature. Financial covenants may include maintaining a certain leverage ratio, limiting spending on capital expenditures, paying dividends, etc. Technical covenants may include financial reporting requirements, such as producing monthly financial statements within 30 days of month end.
- 🦊 If a company breaches a covenant it is technically in default; however, a lender may elect to waive the covenant (normally for a fee) and not force the company into bankruptcy.
- 🦊 Not all loans and bonds have covenants; many recent loans have been issued “covenant-lite,” which means the company is required to comply with no covenants at all.
- 🦊 *A covenant is a requirement included in the legal documents governing a bond or loan. The company must comply with these requirements during the life of the bond or loan in order to avoid a default.*



What is amortization?

- Amortization is a feature that may be built into a loan requiring the borrowing company to pay off the loan over its term rather than paying the entire face value at maturity.
- Each payment period, the company pays its lenders the interest payment and a portion of the loan's face value.
- Since the pay down of face value reduces the amount outstanding, interest payments will grow successively smaller.
- In the below example, the company borrows \$1,000 at a 10% interest rate with a \$100/year amortization schedule and a 5 year maturity.

Borrowing Date	End of Year 1	End of Year 2	End of Year 3	End of Year 4	End of Year 5
Borrow \$1,000	10% Interest \$100 amortization	10% Interest \$100 amortization	10% Interest \$100 amortization	10% Interest \$100 amortization	10% interest Principal Repayment
Face Value = \$1,000	Ending Face Value = \$900 (\$1,000 - \$100)	Ending Face Value = \$800 (\$900 - \$100)	Ending Face Value = \$700 (\$800 - \$100)	Ending Face Value = \$600 (\$700 - \$100)	Ending Face Value = \$0 Entire Principal Repaid
	Interest Payment = \$100 (\$1,000 x 10%)	Interest Payment = \$90 (\$900 x 10%)	Interest Payment = \$80 (\$800 x 10%)	Interest Payment = \$70 (\$700 x 10%)	Interest Payment = \$60 (\$600 x 10%)

How are convertible bonds accounted for in calculating Enterprise Value?

- If the convertible bonds are "in the money" meaning the conversion price is below the current market price, then you account for the bonds as additional dilution to the Equity Value. However, if the bonds are out of the money, then you would account for them as debt at their face value.



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 can be loaned and pumped into the economy, so lowering the reserve requirement is expansionary policy.

How does X economic event affect inflation, interest rates, and bond prices?

Economic Events and Their Impacts

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



Economic Indicators: Positive & Negative Directions

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 interest rates? The president is impeached and convicted.

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

What is duration?

- Duration is how sensitive a bond's price is to changes in interest rates and is expressed as a number of years. The calculation is relatively complicated and requires present value, yield, coupon, final maturity, and any call features. However, duration is normally presented to investors and is not something they typically calculate on their own.
- The duration of a bond or bond fund allows an investor to evaluate the investment's interest rate risk. If investors believe there is a great risk that interest rates will rise (and therefore prices will fall), they may shy away from bonds or funds with high durations due to their sensitivity to interest rate fluctuations.
- The cash flows (coupon payments) at the beginning of a bond's life are "worth more" in present value terms because they do not have to be discounted for as many years.
- When interest rates rise, the PV of future cash flows go down more than those earlier in the bond's life cycle.
- 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, duration is the "weighted average maturity of cash flows". In simple terms, it is the price sensitivity to changes in interest rates. If cash flows occur faster or sooner, 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 is convexity?

🦉 *Convexity measures the relationship between bond prices and bond yields. It is used as a tool to manage risk and measure the amount of exposure on a portfolio of bonds. If bond A has a higher convexity than bond B, bond A will have a higher price than bond B. As the convexity of a bond portfolio increases, the systematic risk to that portfolio increases. This means that the higher the convexity of the portfolio, the more sensitive it is to overall fluctuations in interest rates. As a general rule, the higher the coupon rate, the lower the convexity of a bond.*

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

- 🦉 To slow the economy and defuse hyperinflation, the government 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.

Suppose a report released today showed that inflation last month was very low, yet bond prices closed lower. Why might this happen?

🦉 *This could occur because bond prices are based on expectations of future inflation. Bond traders may expect future inflation to be higher, and therefore today's demand for bonds might 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 a buyer will pay “on the spot” for a foreign currency.*

Spot Exchange Rates

Currency	Value of US \$1 in December 2008	Value of US \$1 in October 2012
British Pound	0.68	0.63
Euro	0.71	0.77
Japanese Yen	90.20	78.23
Chinese Yuan	6.84	6.39
Brazilian Real	2.35	2.03
Mexican Peso	12.86	12.86
Canadian Dollar	1.00	0.98

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 and lock in a future exchange rate.
- 🦊 For example, a company which will be receiving payment in the future (in a foreign currency) may want to budget the receivable. If it cannot lock in an exchange rate for future incoming cash flows, the company will have difficulty setting an accurate budget. However, with a forward exchange rate contract, a company can enter into an agreement to convert those future cash flows of foreign currency into their local currency at a set rate, thus eliminating its foreign exchange risk.
- 🦊 *The forward exchange rate is what a foreign currency is agreed to be worth at some time in the future. A company can enter into a forward contract on exchange rates to help hedge against exchange rate fluctuations.*



What factors affect foreign exchange rates?

- 🐼 Differences in interest rates
- 🐼 Differences in inflation
- 🐼 Budget deficits
- 🐼 Public debt
- 🐼 Trade policies
- 🐼 Capital market equilibrium

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

- 🐼 *A strong currency is one with a rising value relative to other currencies. A weak currency is one with a falling value relative to other currencies*



Intermediate

What are some ways the market exchange rate between two country's currencies is determined?

- 🦉 The exchange rate may be determined by the interest rates in the two countries:
 - If the interest rate in a foreign country goes up relative to the home country rate, 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.
 - The exchange rate may be determined by the rates of inflation in the two countries. If inflation in Country A is expected to be higher than that in Country B, Country A's currency will become less valuable (theoretically, all else equal).
- 🦉 *The exchange rate between two countries' currencies is determined by a few factors. One is the interest rates in the two countries. If the interest rate in the home country increases relative to that in the foreign country, demand for the home country's currency tends to increase because investors can get higher rates of return, and increased demand strengthens the home currency. Another factor affecting exchange rates is expectations about inflation in the two countries. If one country is expected to experience relatively high inflation, the inflating currency will become less valuable in the long run, all else equal.*

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

- 🦉 Generally speaking, when the U.S. dollar weakens, interest rates in the U.S. will rise.
- 🦉 A weak dollar means that the price of imported goods will rise. This means higher inflation and puts pressure on The Fed to raise interest rates.
- 🦉 *Most times, when the U.S. dollar weakens, the price of imported goods will rise, causing higher inflation. This in turn puts pressure on The Fed to raise interest rates. So if the dollar weakens, U.S. interest rates should generally rise.*



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

- 🐼 If inflation rates in the U.S. become lower than those in Great Britain, then more pounds than dollars will be in circulation.
- 🐼 When this occurs, a dollar becomes worth more in pounds.
- 🐼 This means that the dollar strengthens compared to pound.
- 🐼 *If the United States' inflation rate is expected to fall relative to Great Britain's, relatively more pounds will be in circulation and dollars will be worth more pounds. This means that each dollar will cost more pounds than it did before inflation.*



Advanced

Below is a chart which explains the effect of changes in the exchange rate on the earnings of U.S. 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 U.S. 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's, when the government arbitrarily alters the exchange rate of its currency. Currency depreciation occurs in a system where currency is allowed to move with the currency exchange market, and the country's currency loses value on that market.*

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 stronger or weaker relative to the pound?

- 🦊 When the spot exchange rate is higher than the forward exchange rate, the dollar is expected to strengthen.
- 🦊 *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 price, or market index values. Some derivatives are futures contracts, forward 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, but does not force them to do so.
- If you sell a call option and the value of the asset drops below the exercise price (the price the option holder can buy the asset at) then the option is worthless (since they could buy the asset on the open market for a lower price) and you would profit the amount you sold the option for.
- 🐼 **Put Option:** Gives the holder the right to sell an asset for a specified exercise price on or before a specified expiration date, but does not force them to do so.
- If you sell a put option and the value of the asset rises above the exercise price (the price the option holder can sell the asset at) then the option is worthless (since they could sell the asset on the open market for a higher price) and you would profit the amount you sold the option for.
- 🐼 *Options are derivatives that give the bearer the "option" to buy or sell a security at a given date but without the obligation to do so. The buyer of the option pays an amount less than the actual value of the stock and has the OPTION to buy or sell the stock for a fixed price on or before a specified date.*

Call Option

Gives owner the "option" to purchase an asset at a fixed price before a specified 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 fixed price before a specified 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 strategy used by an investor or a company to try to mitigate the risks on an investment. Hedging usually involves investing in derivative products that will be profitable if the market moves in the opposite direction the investor expects. It usually lowers the upside potential return while providing downside protection.
- ☞ *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 on related businesses in the same industry.*

What are forward contracts?

- ☞ A forward is an agreement that calls for future delivery of an asset at an agreed-upon price.
- ☞ Forwards are similar to forward currency exchange contracts and are used in a similar fashion, but they are typically contracts for goods rather than for currencies.
- ☞ No money is exchanged initially. Forwards are designed to protect the parties 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 an agreed price.*

What are futures contracts?

- ☞ Futures contracts are almost the same as forward contracts, except that they are strictly defined quantities of certain products that are traded publicly.
- ☞ *Futures are a financial contract obligating the buyer to purchase an asset such as a commodity or another financial instrument at a specified price on a specified date. Futures have very strictly defined terms and are traded publicly on the exchanges.*

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

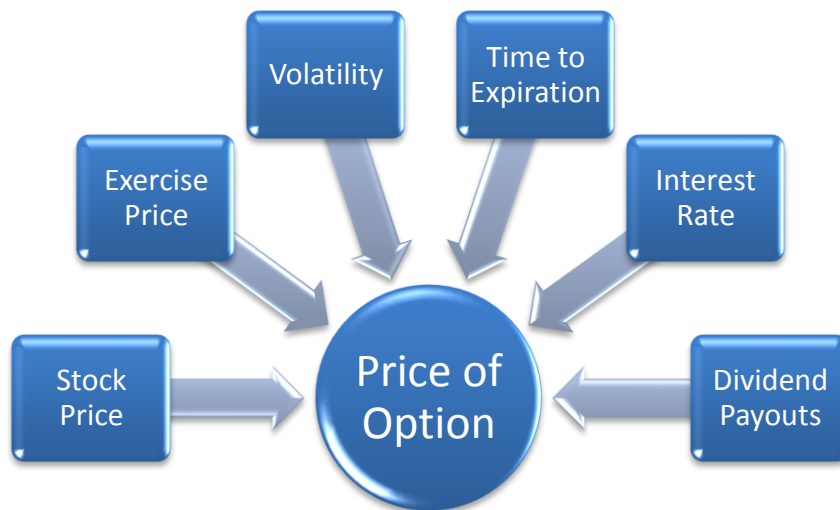
- ☞ There are a few slight differences between futures and forwards.
- ☞ Futures are traded on exchanges; forwards are traded over-the-counter.
- ☞ Futures are highly standardized, which is why they can be traded on exchanges.
- ☞ Forwards are privately negotiated, can be customized to the satisfaction of the parties, and can be revised throughout their duration with the consent of the parties.
- ☞ *Futures are highly standardized in all their terms so as to be traded publicly on the exchanges. Forwards are privately negotiated, customizable contracts that can be revised to suit the buyer and seller, which is why they must be traded over the counter.*



Intermediate

What factors influence the price of an option?

- Factors affecting option prices include current stock price, exercise price, volatility of the stock, time to expiration, interest rate, and dividend rate of the stock.
- Below is a chart of how these factors influence the price of an option.
- Look for online option pricing calculators you can play with to see how each variable affects the price.



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 immediately sell it at the (higher) 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 immediately sell it at the (higher) exercise price.
- 🐼 *When an investor exercises an option that is “in the money,” the difference between the exercise price and the market price will create value. A call option is in the money if the exercise price is below the market price and a put option is in the money when its exercise price when it is above the market price.*

What are swaps?

- 🐼 A swap is an agreement between companies that they will exchange future cash flows for a period of time. A swap can be an exchange 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 other company’s rate.
- 🐼 *A swap is an agreement to exchange future cash flows for a set period. The best known recent “swap” has been the credit default swaps issued by banks as a kind of insurance against companies not being able to repay their debt.*

Suppose you 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 your put worth and why?

- 🐼 *This put is worth \$10. It gives you the option to sell your shares at \$60, and you can buy them in the open market at \$50. You therefore would buy shares of Microsoft at \$50 per share and immediately sell them for \$60, 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 because the healthcare industry and large cap stocks in general are usually less volatile than small cap 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 because the later an option expires, the more valuable it is.*

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

- 🦉 *Interest rates matter due to net present value. A higher interest rate lowers an option's value because the PV of that option will be lower.*

What is the Black-Scholes Model?

- 🦉 The Black-Scholes model is a 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, your employer would have a program where you simply plug in the variables and it does the work for you!)
- 🦉 The equations of the Black-Scholes Model are listed here for reference, but more important is to remember that 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 (years)
 - **r**= Risk free rate (%)
 - **σ**= The Volatility of the Stock's Returns (%)
 - **d**= Dividend yield (%)

Equations of the Black-Scholes Model

- 🦉 *Price of A Call Option $C(S, t) = SN(d_1) - Ke^{-r(t)}N(d_2)$*

- 🦉 *Price of a Put Option $P(S, t) = Ke^{-r(t)} - S + (SN(d_1) - Ke^{-r(t)}N(d_2))$*



$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma\sqrt{t}$$

- ☛ After giving your summary answer (next bullet), be ready to answer follow-up questions like those that below about the definitions of the variables and the effect of an increase or decrease in any of the variables.
- ☛ If you are applying for a trading job or heavily quant-focused position, you should do additional research on the Black Scholes model so you are more comfortable speaking about it in depth. If you
- ☛ *The Black-Scholes model is the industry standard for pricing options. The formula is pretty complicated, with 6 inputs that affect the price. They are 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.*

What is Alpha?

- ☛ *Alpha is the risk-adjusted performance of an investment. It represents the return in excess of the return expected for the risk of the investment.*

Alpha > 0	The investment has returned more than expected for its level of risk
Alpha = 0	The investment has returned the appropriate amount for its level of risk
Alpha < 0	The investment has returned less than expected for its level of risk

What is Beta?

- ☛ Beta is the volatility of an investment compared with the market as a whole; it is used in the CAPM (Capital Assets Pricing Model) formula to determine the appropriate cost of equity.
- ☛ Beta is calculated using a regression of past returns compared to the returns of the market as a whole but can also be found on sources like Bloomberg, Yahoo! Finance, etc.
- ☛ Large, stable stocks tend to have a Beta less than one, while smaller, riskier stocks tend to have higher Betas.
- ☛ *Beta is the volatility of a given investment compared to the volatility of the market as a whole. Large, stable stocks tend to have a lower beta while smaller, riskier stocks tend to have a higher beta.*



Beta = 1.5	If the market rises 10%, the investment should rise 15%
Beta = 1	If the market rises 10%, the investment should rise 10%
Beta = 0.5	If the market rises 10%, the investment should rise 5%
Beta = 0	The investment moves completely independently of the market
Beta = -1	If the market rises 10%, the investment should fall 10%

Company	Equity Beta
Apple	0.87
Microsoft	1.13
GE	1.46
Ford	1.64

What would you expect to have a higher beta: a small-cap technology company or a large-cap manufacturer?

- ☛ *A small cap technology company is expected to be a riskier investment than a large manufacturing company. Therefore, all else equal, the technology company should have a higher beta.*

What is Delta?

- ☛ Delta is the relationship between the price of an option/derivative and the price of the underlying security.
- ☛ If a call option has a Delta of 0.5, then if the price of the stock rises by \$1.00, the price of the option will rise by \$0.50.

What is Gamma?

- ☛ Gamma is the first derivative of Delta and is used to gauge the price of an option relative to how far in or out of the money it is.
- ☛ When an option is well in or well out of the money, Gamma is very large; but when the option is on the verge of being in or out of the money, Gamma is very small.



What is Rho?

- 🦊 Rho measures the sensitivity of a derivative's price in relation to fluctuations in the risk-free interest rate.
- 🦊 If a derivative has a Rho of 10, every one-point rise in interest rates will be accompanied by a 10% rise in the price of the derivative.

What is Theta?

- 🦊 Theta measures how quickly a derivative's price will decline with the passage of time, as the instrument approaches its exercise date (Time Decay).
- 🦊 All else equal, the shorter the time to expiration of a derivative, the lower the option's value.

What is Vega?

- 🦊 Vega is a measure of how much a derivative's price will move with a 1% change in volatility of the market.
- 🦊 A more volatile market makes derivatives more valuable, therefore if Vega is high, the instrument's value will increase significantly as the market becomes more volatile.



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 (market share, economies of scale, economies of scope)
- 🦊 Vertical or horizontal integration (integrating either a supplier, vendor, or competitor into the purchasing company's operations)
- 🦊 Taxation (a company can obtain a non-profitable company's tax asset by purchasing it)
- 🦊 Diversification of product offerings
- 🦊 Gain patents, plant, 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 be the synergies the companies should create by combining their operations. However, some other reasons include gaining a new market presence, an effort to consolidate their operations, gaining brand recognition, growing in size, or gaining 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.
- 🦊 Investment banking fees associated with going through a merger.
- 🦊 *Often the synergies that a company hopes to gain by going through with a merger don't materialize. Additionally, a company may also be enticed to do a merger due to management ego and/or wanting to gain media attention. Finally, the investment banking fees associated with completing a merger can be prohibitive.*



What are synergies?

- ☛ Synergies are improvements that result from the combination of two companies. The idea is that the combined company can generate a higher EPS than the two standalone businesses could.
- ☛ 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 freedom 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. An example of this would be an automobile maker purchasing an auto parts supplier in order to gain more control of their COGS and keep costs down.
- ☛ **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 a company looking to buy another company in order to enhance the business strategically, through cost cutting, synergies, gaining property, etc. A financial buyer is traditionally a group of investors, such as a private equity firm, buying a company purely as an investment, looking to generate a return for their investors and carry for the fund.*

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 due to their willingness to pay a premium for the synergies of lowering costs, improving the 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 in mind two companies that you believe would benefit from merging, and have a well formulated rationale for a 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 trade.
- 🦉 *A stock swap is when a company purchases another company by issuing new stock of the combined company to the former 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 exercising the options and warrants.
- 🦉 *The most common way of determining the number of fully diluted shares is the treasury stock method.*
- 🦉 Note: More information on the treasury stock method is included later in this guide.

What is a cash offer?

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



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, those receiving it will have to pay taxes on it. Additionally, if the owners of the company being acquired want to be a part of the new company, they may prefer stock if they believe the new company will perform well and the stock will increase in value. Current market performance may also affect the stock/cash decision. However, if the market is performing poorly, or is highly volatile, the company being acquired may prefer cash for the stability it provides.*

All else equal, how would one company prefer to pay for another?

- ☛ *Since cash is the cheapest source of capital, it would be the preferred way to purchase another company if the purchaser had sufficient cash. On the other hand, a company wanting to keep a significant cash buffer would prefer other ways of financing the transaction. If a company feels its stock price is inflated, it would prefer to use that to pay for the acquisition. In short, the preferred means of payment always depends upon the circumstances of the acquisition, the company, and the market.*

What is a tender offer?

- ☛ *A tender offer occurs during a takeover, when the acquirer offers to purchase the shareholders' stock, usually at a higher price than the market, in an attempt to gain controlling interest in a company.*
- ☛ *Some tender offers may be hostile. 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 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 take ownership of the business as a whole.*
- ☛ *A tender offer is often a hostile takeover technique. It occurs when a company or individual offers to purchase the stock of the target company for a price usually higher than 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 explore 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 be simply the sum of the two companies' 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.*

What is the difference between goodwill and other intangible assets?

- ☛ Goodwill is normally the markup in a company's value through a merger or acquisition. With current accounting standards, goodwill is not amortized and is written down only if there is a goodwill impairment or another acquisition.
- ☛ Other intangible assets are assets that are not physical but are amortized over a set period of time. Since amortization is an expense, it will affect the Income Statement (reducing net income). Additionally, as the asset amortizes, its carrying amount on the Balance Sheet will go down by the amount of the amortization.
- ☛ *Goodwill and other intangible assets are similar in nature in that they are both non-physical assets carried on a company's Balance Sheet. The main difference between the two is that goodwill is only reduced in the event of a goodwill impairment or acquisition, whereas other intangible assets are amortized over a fixed number of years.*



Advanced

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

- Take a look at the following example:
- 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 the deal is accretive or dilutive depends on how much Company A pays for Company B, and how payment is made.
- For example, if Company A has a large amount of cash on hand, it may decide not to issue any new stock and simply pay cash for the Company B. In this case, 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 a deal will be accretive or dilutive is to use the respective 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. If Company B has the higher P/E ratio, the deal will be dilutive because the acquirer will pay less for the target per dollar of earnings.



☛ *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 it is purchasing, the merger will be accretive because the acquirer will pay less per dollar of earnings for the target company than where the target's stock is 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 that of 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 way of estimating the effects of employee stock options as well as convertible debt and preferred stock to calculate the number of "fully diluted shares outstanding."

☛ It is mainly used to estimate diluted EPS numbers.

☛ First, you must assume that those holding options that are in the money will exercise them.

☛ Also assume that all proceeds generated from the exercise of options will be used to repurchase company stock at the current price.

☛ Here is the methodology:

- Begin with the company's common shares outstanding. This can be found in its most recent 10-K or 10-Q. For this example, assume there are 1,000,000 shares outstanding.
- Then go to the 10-K or 10-Q and find the options chart. The options that will be exercised are those with 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. Now there will be 1,100,000 shares.
- That \$500,000 profit 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.*



If a company has 1,000 shares outstanding at \$5 per share and also has 100 options outstanding at an exercise price of \$2 per share, what is the company's fully diluted Equity Value?

- ☛ The answer below is correct if the exercise price is below the current price, meaning that the options can be assumed to be exercised. However, if the exercise price in this example were \$10 per share, you would assume that the options are *not* exercised and therefore have no effect on Equity Value.
- ☛ *Since there are 1,000 shares at \$5 each, the current market cap would be \$5,000. Since all the options are in the money because the exercise price is below the current price, you assume they are exercised. This means that there will be 1,100 shares in the market and another \$200 (\$2 exercise price x 100 options) given to the company. That \$200 is assumed to be used to buy back 40 shares (\$200/\$5 current price), leaving 1,060 shares in the market, at a price of \$5 per share, making the Equity Value \$5,300.*

Are most mergers stock swaps or cash transactions and why?

- ☛ *This varies. In strong markets many mergers are stock swaps mainly because the prices of company stock are so high, but also because the current owners may desire stock in the new company as they anticipate further growth in a strong market.*

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

- ☛ *If the competitor is a strategic buyer, you would expect the competitor to pay more for the company. A strategic buyer 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?

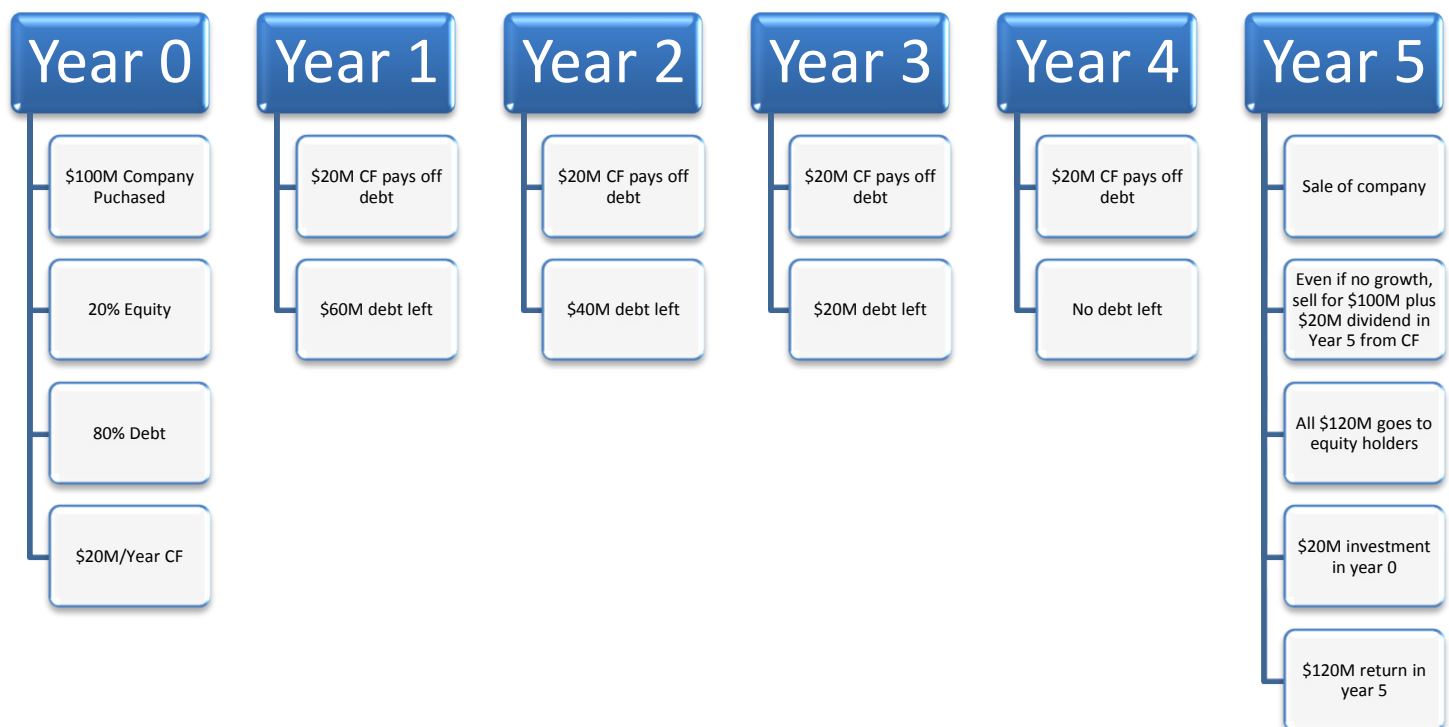
- ☛ An LBO is when a group, usually a private equity firm, purchases a company using a relatively high amount of financial leverage, meaning the purchase is financed using mostly debt, with a relatively low equity investment. Ideally, the company then pays off the debt over the investment horizon using 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 \$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 (\$100mm sale price plus \$20mm dividend from excess cash flows) on a \$20mm investment, a healthy return.



🐼 Essentially, an LBO takes place when a fund wants to buy a company using more debt than cash with the intention of exiting the investment usually within three to seven years perhaps after changing management to increase 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

Sample of How a Leveraged Buyout Works



What would be a real-life example of an LBO and what are the different pieces?

🐼 A good real-life example of an LBO is borrowing money to purchase an apartment to rent out. The down payment on the apartment is equivalent to the equity investment, while the mortgage loan is the debt or “leverage” in an LBO transaction. The interest payment on the mortgage would be interest payment on the debt, while the principal payments on the loan are made with the cash flows you receive from renting out the apartment which is similar to amortization of the debt. Finally, the sale of the property, hopefully for a gain, would be exiting the investment through either a sale or an IPO.



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, a number of drivers can be changed.
 - The most obvious way to increase potential return is to increase the sale price when the firm monetizes its investment.
 - In modeling the returns, you could increase your projections for the acquired company's earnings and cash flows.
 - The firm could negotiate a lower purchase price, which would have a similar effect to 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 investment. First, it could increase the sale price at the time of monetization either through an increase in operating profits or through multiple expansion. Up front, it could negotiate a lower purchase price or increase the amount of leverage used to purchase the company, which would imply a smaller equity check with a higher internal rate of return on the capital deployed.*

How do you pick purchase multiples and exit multiples for an LBO?

- 🦒 When a private equity firm is evaluating an investment, it is looking to acquire the company for the lowest multiple possible (all else equal), then improve the business through operational changes, and ultimately sell it for a higher multiple off of increased earnings.
- 🦒 These multiples are determined as in any other M&A transaction. The analysts working on the transaction will look at M&A comparable transactions and public company comparables. (See earlier descriptions of valuation techniques for more details.)
- 🦒 *Purchase and exit multiples for an LBO transaction are determined using many of the same techniques used in general valuations for an M&A transaction such as precedent transactions analysis or public company comparables analysis.*



What makes a company an attractive target for a leveraged buyout?

- 🦊 Most importantly, an LBO needs a steady stream of cash flows so it can pay down the debt used to purchase the business.
- 🦊 This means the company should be at the lower end of the risk spectrum, should have limited need for additional capital expenditures, and preferably should 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 the debt raised in the acquisition over the life of the investment horizon, with minimal bankruptcy risk. Some other attractive characteristics include strong or replaceable management, cost-cutting opportunities, and a non-cyclical industry.*

Why would a private equity firm buy a company that was considered more risky than a typical LBO candidate?

- 🦊 Many PE firms do purchase companies in distressed situations, where the target company may appear very “risky.”
- 🦊 If a company is in distress and may be at risk of defaulting on interest payments, or possibly is currently in the bankruptcy process, a PE firm may be able to negotiate a very attractive purchase price for the business and acquire it for a significant discount to what the company would cost if it were performing well.
- 🦊 In a bankruptcy situation, the PE firm would negotiate with existing lenders and possibly repay the existing debt-holders less than the par amount of their investment, while putting a new capital structure in place.
- 🦊 Through the acquisition, the PE firm would look to work with management, improve the business, and hope to resell the acquired company for a higher multiple and valuation in the future, creating a high return on their investment.
- 🦊 *Many private equity firms will look to purchase companies in distressed situations or out of bankruptcy. When they do this, they typically can negotiate lower purchase prices than for companies that are performing. The PE firm will put in place a new capital structure and then work with management to improve the business, hoping to resell the business for a higher multiple and valuation and earn a significant return on investment.*



What is a dividend recapitalization?

- 🦉 In an LBO transaction, a PE firm will put a large amount of debt on the company it is acquiring and will pay off that debt with free cash flow generated by the business over the life of the investment.
- 🦉 This pay down of debt will lower the leverage ratios and therefore the risk.
- 🦉 Eventually, the PE firm will look to fully exit its investment through a sale or IPO, but in the interim, the PE firm (along with the other owners of the company) may want to take earnings out of the business, rather than just further paying down debt.
- 🦉 One way to do this is a dividend recapitalization transaction. Here is an example of how this works:
 - Company purchased by a PE firm with \$500mm of debt and \$100mm Equity at 5.0x leverage on \$100mm of EBITDA.
 - Three years into the investment the business has grown and the company has paid down \$200mm of debt from free cash flow and has reduced leverage to 2.0x with \$300mm of debt on \$150mm of EBITDA.
 - Since leverage is now low compared to other similar companies, the owners may decide to do a dividend recap to realize part of their investment returns.
 - The company goes back into market, issuing \$750mm of debt, which returns the company to 5.0x leverage on \$150mm of EBITDA. The funds from this transaction repay the outstanding \$300mm of debt, and pay a \$450mm dividend to the owners of the business.
- 🦉 *A dividend recap typically occurs in the middle of a PE firm's investment in a company when that company has been performing and paying down debt, reducing leverage. The owners of the business (normally the PE firm) will go back to market looking to issue new debt both to repay the existing debt and to fund a distribution to shareholders.*

What are appropriate coverage and leverage ratios for a business through an LBO or other acquisition?

- 🦉 *This is completely dependent on the type of business. The appropriate levels are what the market is willing to bear for similar companies in similar industries, determined by what deals have been closed recently. All else equal, higher leverage or lower interest coverage is going to make investors demand a higher interest rate on the debt because the investment is considered more risky. However, in a typical LBO or M&A deal, the company most likely will be levered somewhere between 2x and 10x, depending on the industry.*

What is the “tax-shield” created by an LBO?

- 🦉 In an LBO, the company issuing the debt will be paying interest on that debt, which is an expense. Since this interest is an expense and is tax deductible, it therefore reduces the amount of taxes the company pays, creating the “tax-shield.”



What is Venture Capital?

- 🦉 *Venture capital is a specific type of private equity that provides financial capital to high-potential, high-risk startup companies. In exchange for providing this high-risk capital, the provider (usually a venture capital fund) will receive significant private equity ownership in the business. They will typically also get board seats and influence, in order to help these usually young businesses through the growth process. Many times these investments end up being worth nothing, but the goal for the VC firm is to hit a couple of home runs. For example, Accel Partners invested \$12.7 million in Facebook, which ended up growing to over \$8.5 billion in value.*

What are deferred tax assets (DTA's) and deferred tax liabilities (DTL's), and how are they created in an M&A transaction?

- 🦉 DTAs and DTLs are created in an M&A transaction through the write-up or write-down of assets.
- 🦉 If an asset is written up, the company is experiencing a gain and a DTL is created because the new asset will have a higher depreciation expense in the short term, which means the company will pay lower taxes. These taxes must be paid back at some point, which is why a liability is created.
- 🦉 The opposite is true when an asset is written down in value.

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 with too much debt in the capital structure.
- 🦉 Typically, an analyst will look at the amount of leverage on similar businesses in the past. The most common ratio an analyst looks at is Debt/EBITDA, or leverage. A company with less leverage may demand a lower interest rate and vice versa.
- 🦉 *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 ideally will result in synergies. A vertical merger is a merger with a supplier or distributor and ideally will 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 is an exchange ratio and why would a company use it?

- 🦉 An exchange ratio is one way of structuring an M&A transaction so that is funded either fully or partially with stock.
- 🦉 If Company A is going to purchase Company B, Company A may give the owners of Company B shares in the new company instead of cash. The owners of Company B will get X shares of Company A for each of their shares of Company B. That “X” is the exchange ratio.
- 🦉 This benefits the acquiring company because by assigning a share exchange ratio, rather than a dollar amount per share, they protect themselves if the stock price of Company A falls after announcement of the transaction. The selling company would prefer a fixed dollar amount in stock if they believe the stock is going to fall in value.
- 🦉 *An exchange ratio is a way of financing an acquisition by assigning a number of shares in the new company to be exchanged for each existing share in the original company. For example, Company A could acquire Company B and say, “We will give you 2 shares of the new, combined Company AB for each of your shares of Company B,” rather than saying, “You will receive \$XX of Company AB stock for each share of Company B.”*

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 that 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 that comes into the company which is the target of a hostile takeover with a friendly takeover offer.

What is a merger model?

- 🦉 *A merger model is a way to look at the financials of two companies, the purchase price, and how the purchase is made to determine whether it is accretive or dilutive to the buyer. The analyst will first make assumptions about purchase price and structure, and then project an Income Statement for the new company and calculate an EPS number for the combined entity.*

What kind of assumptions would you have to make when coming up with a new Income Statement for the combined company in a merger model?

- 🦉 *A big reason for combining two companies is the synergies that are realized through the merger. First are revenue synergies, which you would add to the revenue of the combined entity’s revenues. These could be due to leveraging each others’ customer base, cross-selling, etc. Another type of synergy is a cost-saving synergy. These synergies are normally added back to operating income and are the results*



of overhead consolidation, elimination of duplicate SG&A expenses, raw material price reduction due to economies of scale, etc.

Which type of synergy is most important?

- ☛ *Since cost-saving synergies such as a reduction in employees are typically more quantifiable than estimates on gains from things like cross-selling, cost savings synergies are normally taken a bit more seriously.*

If a company could acquire another company using cash only, why would they choose not to do so?

- ☛ *There are many reasons why a company may not simply finance a purchase with cash. Especially in times of economic turmoil, a company may want to keep a healthy cushion of cash on the Balance Sheet, so it can weather the storm. A company may not want to use cash if its stock is trading very strongly. If the buying company's stock is trading high, it gives the acquiring company a relatively "rich" currency with which to make acquisitions.*



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 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 acquiring other banks—JPMorgan buying Bear Stearns, Barclay's 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 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, mutual funds, and multi-family offices. 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 open only to high net worth individuals or institutional investors since they are limited to 100 or 500 investors. They use various strategies to hedge against risk with the goal of making a profit regardless of the market environment. These funds often take on high risk and are highly leveraged to give their clients the potential for higher returns. They have much more latitude in the kinds 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 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 tranches. 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 simultaneous buying and selling of two related assets in order to capture a guaranteed profit from the trade.
- 🐼 This opportunity occurs when two assets are inaccurately priced by the markets. Since markets today are so fast, traders require sophisticated computer software to monitor the investment universe, identify arbitrage opportunities, and take advantage of them, because they often exist only for a matter of seconds.
- 🐼 *Arbitrage occurs when an investor buys and sells related assets simultaneously in order to take advantage of temporary price differences. Because of the technology now employed in the markets, the only people who can truly take advantage of arbitrage opportunities are traders with sophisticated software since price inefficiencies often close in a matter of seconds.*



Brain teasers

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 that 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 correctly.
- ☛ Think 17×17 is just 17×10 plus 17×7 . You know 17×10 is 170. Now 17×7 is 10×7 and 7×7 . This gives you $170 + 70 + 49$, or 289. Whatever you do, don't panic!
- ☛ Now see if you can do 18×22 : $18 \times 20 + 18 \times 2$. Easy, $360 + 36 = 396$.
- ☛ As far as brainteasers go, this is a rather common one. You will do better if you have practiced these types of questions.

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 $\frac{1}{4}$ of an hour, or 15 minutes.

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

- ☛ It could be 26 (letters in the English alphabet), but it is actually only 24 because I & M are saved 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, 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, and no other limitations, how tall would you build it?

- ☛ This question is similar to the question above in that there is no right or wrong answer.
- ☛ Your interviewer is not looking for an actual height in feet but rather what kinds of things you would think about in determining the height.
- ☛ Here are 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 construct/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 resident of one of the towns standing at the crossroads but 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 which both guys would have to answer the same way. If you ask him to point out which town he is from, either of them would point to the Town of Truth.



You have a five gallon container and a three gallon container with no markings on either. 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 going to be this problem and this answer.
- ☞ First you fill the 5 gallon container; then you 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.

You have 50 black balls and 50 white balls (total of 100) and two buckets. How would you split the balls between the two buckets to maximize the chance of selecting a black ball when one ball is chosen from one of the buckets at random?

- ☞ *The best way to maximize the chances of selecting a black ball would be to put one black ball in one of the buckets and all the rest of the 99 balls in the other bucket. Since you have a 100% chance of selecting a black ball if you choose the first bucket, and a 49.5% chance of selecting a black ball if you choose the other ($\frac{49}{99}$), the overall chances of selecting a black ball is $(50\% \times 100\%) + (50\% \times 49.5\%) = 74.7\%$.*

What is the sum of all the numbers from 1 to 100?

- ☞ As with most brainteasers your interviewer is looking to see how you think through problems. The way you do not want to answer this question is by sitting there and saying “Ok, 1+2 is 3, 3+3 is 6, 6+4 is ten...” This is extremely inefficient.
- ☞ Answer 1: Fake pause... *Well, between 1 and 100 there are 50 sets of 101, for example 100 and 1, 99 and 2, 98 and 3, and so on. 50 sets of 101 is 5,050; so the sum of 1 to 100 would be 5,050.*
- ☞ Answer 2: Fake pause... *So the average of all of those numbers 50.5. If you take the average and multiply it by the number of numbers, you get 100 times 50.5 or 5,050.*



What is the probability that the first business day of a month is a Monday?

- ☛ *Each day has a 1 in 7 chance of being the first day of the month. However, if the month starts on a Saturday or a Sunday, the first business day of the month will be a Monday. Therefore, the chances of the first business day being a Monday is 3 in 7 since if the month starts on Saturday, Sunday or Monday, the first business day is a Monday.*

You are given 12 balls and a scale. Of the 12 balls, 11 are exactly the same weight and 1 weighs slightly more. How can you find the heavier ball using the scale only three times?

- ☛ *1. Weigh 5 balls against 5 balls. If the scale is balanced, then discard those 10 balls and weigh the remaining 2 against each other (Second Use of Scale). The heavier ball is the one you are looking for.*
- ☛ *2. If one of the first two groups is heavier, then discard the lighter group. Of the heavier group, weigh 2 against 2. If they are equal, then the 5th ball, the one that was not weighed, is the one you are looking for.*
- ☛ *If one of the pairs of balls is heavier, then weigh the heavier pair against each other (Third Use of Scale). The heavier ball is the one you are looking for.*

A room with no windows has 3 light bulbs. You are standing outside with 3 switches that control the three bulbs. If you can only enter the room one time, how can you determine which switch controls which bulb?

- ☛ *First turn on two switches: call them Switch 1 and Switch 2. Leave them on for a couple minutes to let them get nice and hot. Then, turn off Switch 1 and enter the room. The bulb that is lighted should be the one that is controlled by Switch 2. Of the remaining two bulbs, the one that is hot is the one controlled by Switch 1. The last one, off and not hot, is controlled by Switch 3..*

What is the greatest dollar value in coins you can have in your hand and still not be able to make change for a dollar?

- ☛ *Start with quarters since they have the highest value. Then descend in value from dimes to nickels to pennies, taking the maximum number of each that you can have without reaching a dollar. The maximum you can take will be 3 quarters, 4 dimes, 0 nickels and 4 pennies. Remember that you can't take a nickel because 3 quarters, 2 dimes and a nickel would add up to a dollar. The total value of these coins is \$1.19.*

You have a large cube (10x10x10) made up of small cubes (1x1x1). If I were to remove all of the small cubes with a surface on the exterior, how many small cubes would be left?

- ☛ *If you remove all of the small cubes on the exterior you would be left with an 8x8x8 cube and therefore there would be 512 small cubes remaining.*



Appendix A: 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.



Appendix B: 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 and 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.



Appendix C: 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

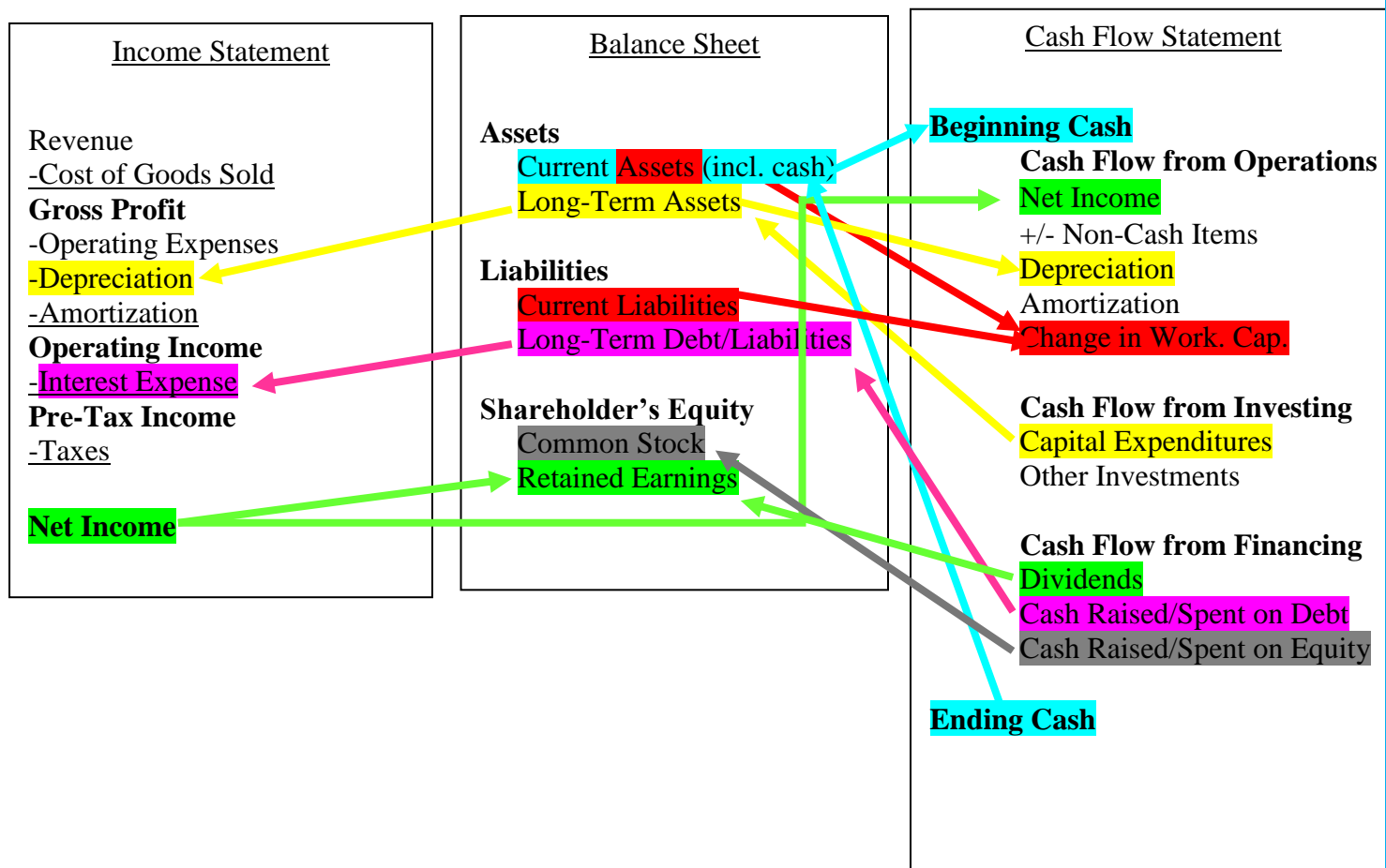
One of the most important things that you will use the cash flow statement for is the calculation of free cash flow for a discounted cash flow valuation. As stated earlier in the guide, FCF is the amount of cash a firm generates after paying the required amount necessary to maintain its assets, and is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



Appendix D: Links Between Financial Statements



The provided Excel model also shows how the statements are interconnected.



Appendix E: DCF Valuation and Financial Statement Links

See the Technical Guide's Excel spreadsheet for a sample DCF analysis with a full Balance Sheet, Income Statement, and Cash Flow Statement, as well as a comparable company valuation analysis and Black-Scholes option pricing model.



Wall Street Oasis Firm Interview Insights

From the WSO Company Database we have compiled statistics based on thousands of *actual* interviews that have been completed by our members. From the data, we have been able to pull together invaluable statistics that aren't available anywhere else in the world. For the major banks listed below, we broke down the questions into those asked to Summer Analysts (or other college-level interns), Summer Associates, Full Time Analysts and Full Time Associates+ (including Associates, VPs and Others). For each category within each bank we attempted to include 5 relatively unique questions to give you a feel for the types of things that each bank likes to ask candidates.

Additionally, this compilation of data allowed us to more solidly define some of the most common interview questions across all levels and across all banks. These are the questions you are most likely to receive and the ones you should be 100% prepared for. Some of those questions are as follows:

1. Walk me through your resume/tell me about yourself.
2. Any variation of the "How many ____ can I fit into ____" or "How many ____'s are there in ____" question.
3. Walk me through a DCF.
4. How does \$XX of depreciation expense flow through the three financial statements?
5. How would you invest \$XXX right now?
6. What is your biggest weakness/what are your three biggest weaknesses?
7. Why [whatever firm you are interviewing at]?
8. Why should I hire you over any of the other candidates?
9. What are some ways you can value a company?
10. Pitch me a stock/what are your top three stock picks right now?



Bank of America Merrill Lynch

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
55%	6%	21%	3%	2%	13%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
79%	15%	3%	3%

Outcome		
No Offer	Accepted Offer	Declined Offer
45%	40%	16%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
6%	24%	47%	20%	2%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
22%	43%	25%	7%	3%



Overall the questions in the BAML interviews are all over the map, as are most Bulge Brackets since they are so large. A general consensus is to know your resume very well. Multiple applicants reported interviewers asking trivial questions about BAML itself. Additionally, the standard technical and behavioral questions from the WSO Behavioral and Technical guides come up over and over again, so make sure you study! Even those with no finance background reported getting technical questions (even for Summer Analyst positions). BAML had the second lowest rejection rate of all the Bulge Brackets, with over 55% of candidates in our survey receiving offers.

Summer Analyst:

- 🦁 SUMMER ANALYST: “Focus on studying your resume and the BAML culture rather than your technicals”
- 🦁 SUMMER ANALYST: What’s the first number whose letters, when spelled out, are in alphabetical order?
- 🦁 SUMMER ANALYST, S&T: If you were Ben Bernanke what policies would you pursue and why?
- 🦁 SUMMER ANALYST, S&T: Pitch me a vacation destination.
- 🦁 SUMMER ANALYST, S&T: If you had \$1,000,000 where would you invest it and why?

Summer Associate:

- 🦁 SUMMER ASSOCIATE, Investment Banking: How does accelerated depreciation create a DTL, how does it affect the firm value derived from a DCF, and why does the government allow it for tax purposes?
- 🦁 SUMMER ASSOCIATE: Would you use the current 10-year treasury rate as your risk free rate in a WACC calculation or do you think it's necessary to pad it a little since it is extremely low?
- 🦁 SUMMER ASSOCIATE: What is the P/E multiple of cash.
- 🦁 SUMMER ASSOCIATE: Do you expect Greece to leave the Euro? Why or why not?
- 🦁 SUMMER ASSOCIATE: I am a first year Investment Banking Analyst and you are mentoring me on how to build an LBO model, how would you do it?

FT Analyst

- 🦁 ANALYST: How many tennis balls can you fit into a 747?
- 🦁 ANALYST: How many gas stations in the US?
- 🦁 ANALYST, Investment Banking: If pennies were stacked as tall as the empire state building, could all those pennies fit in my office?
- 🦁 ANALYST, Investment Banking: If I receive bi-weekly paychecks, how many months of the year will I receive more than 2 paychecks?



- 🦋 ANALYST, LEV FIN: What is our stock price as of this morning?
- 🦋 ANALYST, LEV FIN: What is the worst decision that our company made in the past 5 years?

Associate, VP+:

- 🦋 ASSOCIATE: Explain how any line item flows through all of the three financial statements.
- 🦋 ASSOCIATE: “Be prepared to discuss your leadership abilities fluidly. If you aren't comfortable talking about yourself, this can be tough!”
- 🦋 VP: Do you think you will be an MD in 5 years?
- 🦋 VP: Are you willing to put in more hours as a VP than as an Associate?
- 🦋 Senior VP: Tell me something about yourself I wouldn't know from reading your resume.



Barclays

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
58%	9%	22%	3%	1%	7%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
70%	19%	8%	3%

Outcome		
No Offer	Accepted Offer	Declined Offer
52%	36%	12%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
1%	15%	60%	22%	2%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
17%	48%	25%	8%	2%



While respondents reported both technical and fit questions in Barclays interviews, Barclay's tended to rely a bit more on the fit questions. A few applicants reported interviewers asking them "what is your favorite song" which is unique to Barclays. Additionally, many across all levels and divisions reported being asked numerous current events questions and brainteasers. The standard technical and behavioral questions from the WSO Behavioral and Technical guides come up over and over again, so make sure you study! Overall, Barclays was rated slightly more difficult than average and nearly all responders had a neutral or positive interview process. Below are some tricky technical questions, brain teasers and general advice that came up in actual Barclays interviews.

Summer Analyst:

- 🦉 SUMMER ANALYST, FX Forwards: What is 56×27 , figure it out without writing anything down, you have 90 seconds, go.
- 🦉 SUMMER ANALYST, Investment Banking: How many windows are there in Manhattan?
- 🦉 SUMMER ANALYST: If I hand you a dice and give you one roll in which you get the amount of money back shown on the dice, how much would you pay for that roll? If I told you that after the first roll you would get to roll a second time for free if you didn't like your first roll, but then had to accept that second roll, how much would you pay then?
- 🦉 SUMMER ANALYST: What are the top three banks you would want to work for and why?
- 🦉 SUMMER ANALYST: What is the fed funds rate and how does it affect markets?
- 🦉 SUMMER ANALYST: Why would a company like Apple, with plenty of cash, issue debt?

Summer Associate:

- 🦉 SUMMER ASSOCIATE, Investment Banking: A few Summer Associates reported being given a written finance quiz reviewing basic accounting finance and accounting questions.
- 🦉 SUMMER ASSOCIATE: If you got an offer would you take it?/If you got offers from GS, JPM, MS and Barclays, why would you come here?
- 🦉 SUMMER ASSOCIATE: "The most difficult question was certainly the case study. I had 30 minutes to walk through a set of questions based on a made-up company. I had their financials, and had to use that to answer questions related to the BS, IS and CF statement.
- 🦉 SUMMER ASSOCIATE: Why are you switching careers?/Why investment banking?
- 🦉 SUMMER ASSOCIATE: You have a European company with shrinking revenues and margins which leases its buildings in emerging markets; how would you grow the company?

Full Time Analyst:

- 🦉 ANALYST, TMT: If a stock goes up and down by 50% 5 times, where is it going to end?
- 🦉 ANALYST, Equity Research: If you had a time machine what would you do?



- 🦁 ANALYST, S&T: What class did you have your worst grade in and what was it?
- 🦁 ANALYST: How did the recession of 2008 happen?
- 🦁 ANALYST: “I was put through a group interview and then asked to review my own performance and the performance of the others in the group.”
- 🦁 ANALYST: What is your favorite song?/What is a song that defines your life?

Associate, VP, Other:

- 🦁 ASSOCIATE: Why didn't you go to a better school?
- 🦁 ASSOCIATE, Equity Research: Rank your writing, quantitative and intrapersonal skills.
- 🦁 ASSOCIATE, Equity Research: If you could speak to one dead person who would it be and what would you ask?
- 🦁 ASSOCIATE: What is your favorite book?
- 🦁 OTHER, Commodities Trading: How are the market fundamentals in your market changing in the next year?





Citi

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
55%	7%	35%	2%	2%	7%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
76%	21%	2%	1%

Outcome		
No Offer	Accepted Offer	Declined Offer
53%	32%	15%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
1%	16%	51%	30%	1%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
17%	41%	29%	11%	2%



More interviewers at Citi specifically referenced an “intense” interview, with Citi being ranked as the bulge bracket with the second most difficult interviews. Some applicants mentioned rapid fire questions to see how they would handle under pressure. Additionally, many applicants said that they were asked why [this group] over [that group] or other specific questions about Citi/the group they were interviewing for. Overall, Citi was rated slightly more difficult than average and slightly more responders had a negative feeling coming out of their interview. A slightly higher percentage of offers to work at Citi were turned down than offers to other big firms.

Summer Analyst:

- 🦁 SUMMER ANALYST, Capital Markets: Why should Amazon trade at a higher PE ratio than Apple?
- 🦁 SUMMER ANALYST: Why do you think you got rejected at XXX bank (after asking where else they had applied/interviewed).
- 🦁 SUMMER ANALYST: If you were Paulson what would you have done to prevent the crisis.
- 🦁 SUMMER ANALYST: You come from a non-finance background, how will you use your other skills to add enough value to the firm in order to make-up for the extra effort we will have to take in training you? This was then followed up with a criticism of every response.
- 🦁 SUMMER ANALYST: In order from least to greatest, which of the following would you be most worried about if you were investing in their stock: Intel, Krogers, or Boeing?

Summer Associate:

- 🦁 SUMMER ASSOCIATE: Why not management consulting?
- 🦁 SUMMER ASSOCIATE: Who else do you know that works at Citi.
- 🦁 SUMMER ASSOCIATE: What are the affects of DTL and DTA in a merger situation?
- 🦁 SUMMER ASSOCIATE: What is a reverse triangle merger?
- 🦁 SUMMER ASSOCIATE: What was a complex analysis you did at your previous job?

Full Time Analyst:

- 🦁 ANALYST, Sales and Trading: Make me a market in a simple dice game.
- 🦁 ANALYST: Why are manhole covers round?
- 🦁 ANALYST, Capital Markets: How do you handle boredom?
- 🦁 ANALYST, Capital Markets: Please explain how recent events in the news will impact the capital markets?
- 🦁 ANALYST: What is the cost of capital for Citi? What is Citi’s beta?

Associate, VP, Other:

- 🗣️ ASSOCIATE: What would you do if you figure out if you made a mistake in a model after you have submitted it?
- 🗣️ VICE PRESIDENT, How does goodwill affect Basel 3 capital calculation?
- 🗣️ OTHER: Tell me about our group's recent accomplishments.
- 🗣️ OTHER: What would you tell your client if Greece defaulted tomorrow?



Credit Suisse

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
57%	7%	26%	6%	0%	4%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
71%	24%	4%	2%

Outcome		
No Offer	Accepted Offer	Declined Offer
57%	30%	13%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
5%	14%	57%	23%	1%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
20%	40%	28%	12%	0%



Overall, Credit Suisse applicants had a slightly quicker interview process, about average difficulty level relative to other bulge brackets, and a slightly more positive impression of the overall interview process. Respondents largely said that while there were technical questions, more of the interview was fit/behavioral, why Credit Suisse, why this specific group. Although, the “walk me through an LBO” question was mentioned a number of times, even in Summer Analyst interviews. A number of those coming out of the Credit Suisse interview process reported that they took part in group interviews at some point.

Summer Analyst:

- ☞ SUMMER ANALYST: What do you think of the Macau casino sector?
- ☞ SUMMER ANALYST: “Valuation questions were pretty in depth for a Summer Analyst position”
- ☞ SUMMER ANALYST, Equity Research: Why is a country having a large debt-to-GDP ratio “bad”?
- ☞ SUMMER ANALYST, Investment Banking: What is a Capitalized Lease?
- ☞ SUMMER ANALYST, Investment Banking: “Technical questions were not conventional. I was asked to draw WACC curves, received some definitional questions, and was asked to explain concepts intuitively.”
- ☞ SUMMER ANALYST: What are the biggest weaknesses of Credit Suisse?

Summer Associate:

- ☞ SUMMER ASSOCIATE: What is the formula for CAGR?
- ☞ SUMMER ASSOCIATE, Sales & Trading: “Sell me on a trade” then follow up of, “How would you hedge that trade?”
- ☞ SUMMER ASSOCIATE, Sales & Trading: What is 2% of 9?
- ☞ SUMMER ASSOCIATE: Tell me about a deal in the market you have been following and why it interests you.
- ☞ SUMMER ASSOCIATE: Tell me about the different effects of LIFO vs. FIFO accounting.

Full Time Analyst:

- ☞ ANALYST, Equities: “I was asked for a stock pitch, but the interviewer grilled me on the specifics of the company to the point that I couldn't answer.”
- ☞ ANALYST, Investment Banking: A bag of potatoes weighs 200lbs and consists of 99% water. It sits in the sun all day and when you weigh it the next day, it's only 98% water... How much does the bag of potatoes weigh after it's been in the sun?
- ☞ ANALYST, Investment Banking: What is your favorite function in Excel?
- ☞ ANALYST, Investment Banking: Tell me a joke.



- 🐭 ANALYST, Investment Banking: Walk me through an NOL calculation and how it impacts the income statement.

Associate, VP, Other:

- 🐭 ASSOCIATE: How would you calculate the amount of cash available for debt prepayments by looking at the financial statements?
- 🐭 ASSOCIATE: How would you grow shareholder value at Walt Disney theme parks?
- 🐭 ASSOCIATE, Equity Research: Rank these in order of importance if you were working as an equity research associate: Companies (your research), Internal Clients, and External Clients.
- 🐭 ASSOCIATE, Investment Banking: How did you value XX deal that you worked on? How did you determine which comps to use?
- 🐭 OTHER: Why don't you want to work at a hedge fund?
- 🐭 OTHER: Explain warning signs you are looking for in Europe and how you think the debt ceiling and sequester will be resolved.





Deutsche Bank

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
56%	4%	27%	9%	0%	5%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
82%	16%	2%	0%

Outcome		
No Offer	Accepted Offer	Declined Offer
50%	32%	18%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
4%	16%	56%	21%	4%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
21%	44%	24%	6%	5%



A higher percentage of those submitting their experiences to the job database were applying for Summer Analyst/Full Time Analyst jobs than some of the other major banks. A number of people specifically mention being asked a question along the lines of “why investment banking, especially with the amount of fire bankers have been coming under recently”. Additionally, many reported being asked very detailed questions about specific projects or jobs that were listed on their resume. Some mentioned that they had a 2-1 “good cop, bad cop” style interview at DB.

Summer Analyst:

- ☞ SUMMER ANALYST: Do you have more girlfriends or boyfriends?
- ☞ SUMMER ANALYST: What is the sum of all the numbers from 1 to 100?
- ☞ SUMMER ANALYST: “Make sure you can explain EVERY single word on your resume.”
- ☞ SUMMER ANALYST: Name five types of transactions a company could do with excess cash on the balance sheet.
- ☞ SUMMER ANALYST: How many ties are sold in the United States every year?

Summer Associate:

- ☞ SUMMER ASSOCIATE: Why did you choose XX school?
- ☞ SUMMER ASSOCIATE: Why do you want to do banking after doing XX for YY years?
- ☞ SUMMER ASSOCIATE: Walk me through your resume in 30 seconds.
- ☞ SUMMER ASSOCIATE: How would you value a depleting asset?

Full Time Analyst:

- ☞ ANALYST, Commodities: “The most difficult question I received had to do with a natural gas demand forecast I put together for an econometrics project. It was in two parts "what is the functional form" and "what are the pitfalls of a monthly series" I stumbled a bit on the first question, but was eventually able to describe the ARMA forecasting model. I missed the second question, and the answer he was looking for was "you have to divide monthly demand by the number of days to normalize between months like JAN and FEB" The next most difficult question I received was I was asked to calculate the profit margin for a company I did some quickbooks work for over the summer. I was really unsure about their P&L, but made up the revenue and cost numbers on the fly and just converted that into a percentage.”
- ☞ ANALYST, Investment Banking: Who are the most influential leaders in global politics right now and why? Respond using first and last name, and limit responses per leader to one sentence.
- ☞ ANALYST, Investment Banking: How would you convert 25% of a company’s debt into equity?
- ☞ ANALYST: Which would you expect to have higher gross margins; a traditional software company like Microsoft or a Software as a Service company like Salesforce?



Associate, VP, Other:

- 🐼 ASSOCIATE: Do you always wear a suit to work?
- 🐼 ASSOCIATE: Do you think publicly traded companies in the US are fairly valued, undervalued or overvalued in the context of US history right now?
- 🐼 ASSOCIATE: How will a hollow ball roll compared to a solid ball?
- 🐼 ASSOCIATE: If you were to do a debt offering for Walmart, what percent would you charge them given their risk profile and size?
- 🐼 ASSOCIATE: If a company paid a cash dividend today, what would be the impact on the stock price?



Goldman Sachs

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
48%	5%	40%	5%	1%	1%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
75%	18%	6%	2%

Outcome		
No Offer	Accepted Offer	Declined Offer
65%	25%	10%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
4%	16%	43%	30%	5%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
19%	44%	27%	8%	2%



Goldman Sachs had the highest number of interviewers participate in the WSO database. With that, Goldman had the highest rejection rate (65%), most difficult interviews and a lowest percentage of people receiving offers and turning them down (10%) of the bulge brackets. A significant number of respondents reported receiving the “What are your greatest strengths and weaknesses” question. A significant percentage of interviewees also reported receiving challenging brain teasers. Since there are so many of them, we listed them in a separate section of the bottom to give you an idea of the types of questions they ask. Interviews seemed to be especially difficult in the Global Investment Research (GIR) group. Know Goldman, know the group, know why they should hire you over any of the other candidates; what makes you unique.

Summer Analyst:

- 🦁 SUMMER ANALYST, Asset Management: How would you explain the derivative of a curve to a 7th grader?
- 🦁 SUMMER ANALYST, Investment Banking: “They gave me a private company and asked me how I would value it.”
- 🦁 SUMMER ANALYST: “Prepare to get grilled very hard on your stock pitches... know your sh** cold. Know all the multiples, why the market is wrong, potential catalysts and be extremely humble if you don’t know something.”
- 🦁 SUMMER ANALYST, Investment Banking: If you were any piece on a chess board which would you be and why?
- 🦁 SUMMER ANALYST, Investment Banking: You are now the president of the United States, how do you solve unemployment?
- 🦁 SUMMER ANALYST, Sales and Trading: You have 30 seconds to sell me this phone sitting on the table, go.

Summer Associate:

- 🦁 SUMMER ASSOCIATE: If you could meet any CEO of any company today who would it be?
- 🦁 SUMMER ASSOCIATE: What’s your thesis?
- 🦁 SUMMER ASSOCIATE: What would you pay today to receive \$1 in 10 years?
- 🦁 SUMMER ASSOCIATE: Tell me what you are most afraid of.
- 🦁 SUMMER ASSOCIATE: What is the latest trend in M&A?

Full Time Analyst:

- 🦁 ANALYST: What is the approximate loan-to-value of each tranche of debt in a traditional capital structure?
- 🦁 ANALYST: Why might the price-to-book valuation be appropriate for banks and financial institutions?



- 🦁 ANALYST: What do you think is the most significant risk to Goldman in the US economy right now?
- 🦁 ANALYST: Which investment is more risky; a thriving luxury fashion designer or metals producer?
- 🦁 ANALYST, Equity Research: Define and describe the 5 part DuPont analysis.
- 🦁 ANALYST, Fixed Income Product Management: How can you offset changes in interest rates?
- 🦁 ANALYST, Global Investment Research: “The grilled me on my stock pitch. They asked about market share, valuation, growth projections, etc. and then had detailed follow up questions.”

Associate, VP, Other:

- 🦁 ASSOCIATE: How would you change the perception of Goldman Sachs to the public?
- 🦁 ASSOCIATE: How many ways can a CFO use excess cash, and what are they?
- 🦁 ASSOCIATE, FIG: How would you value me?
- 🦁 ASSOCIATE, Investment Banking: Would you rather own a gold mine or gold?
- 🦁 VP: When you are hiring someone what are your main concerns with a potential candidate?
- 🦁 OTHER: Can enterprise value be negative?

Brain Teasers, All Levels:

- 🦁 “They randomly would throw me brain teasers and tricky math questions in the middle of a conversation”
- 🦁 Estimate how many people have ever lived on earth.
- 🦁 How many gas stations are there in New York City?
- 🦁 How many people leave Hong Kong from the airport every day?
- 🦁 Value the Sydney Harbour Tunnel to the nearest million dollar figure. Please use actual estimated traffic figures, toll prices, margins, etc.
- 🦁 If an all-star hits 44 home runs in his career, how many baseballs would you have to line up end to end to measure this distance?
- 🦁 What is $49 \times 13 \times 7$?
- 🦁 If I dip a $10 \times 10 \times 10$ cube in a tub of paint, how many sides of the cube will not be covered in paint.
- 🦁 What is the square root of 52?
- 🦁 What is the square root of 150 down to 2 decimal place, you have 15 seconds, go.
- 🦁 If there is a 1 foot lily pad in the middle of a pond that doubles every single day, and the pond is exactly 100 square feet, on what day would the pond be exactly 50% covered by the lily pad?
- 🦁 You have 50 blue balls and 50 red balls with 2 buckets. How do you maximize your chance of randomly selecting blue balls?



J.P.Morgan

J.P. Morgan

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
57%	4%	34%	4%	1%	0%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
76%	20%	4%	1%

Outcome		
No Offer	Accepted Offer	Declined Offer
57%	32%	11%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
3%	17%	57%	21%	2%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
23%	46%	22%	7%	2%



JP Morgan was relatively average in all of the statistical categories. Respondents repeatedly mention getting all of the standard fit and technical questions mentioned in the WSO guides (how does depreciation flow through the financial statements, what are the valuation methodologies, biggest strengths and weaknesses, why JP Morgan, why this position, etc.). A number of people specifically mentioned receiving the “How would you invest \$XXX today?” question. A few candidates for Summer Analyst positions even mentioned being given a short case study during one of their interviews.

Summer Analyst:

- 🦁 SUMMER ANALYST: “We were asked to prepare a one-page stock pitch and deliver that to the interviewer.”
- 🦁 SUMMER ANALYST, Investment Banking: If you are a debt investor, would you prefer a high growth but volatile business or a slow, steady low-growth business?
- 🦁 SUMMER ANALYST, Investment Banking: How do oil prices affect the convenience store around the corner?
- 🦁 SUMMER ANALYST: Tell me about a time you broke the rules. Tell me about a time you lied.
- 🦁 SUMMER ANALYST: How would you value a private mom & pop coffee shop with no access to their financials?

Summer Associate:

- 🦁 SUMMER ASSOCIATE, Investment Banking: All things being equal, will the Internal Rate of Return for an LBO be higher after three or five years and why?
- 🦁 SUMMER ASSOCIATE: If a company decides to repurchase its shares, what will be the impact of this action on the company's P/E ratio?
- 🦁 SUMMER ASSOCIATE: If you were to buy a local business in this town, which one would it be, why, and how would you value it?
- 🦁 SUMMER ASSOCIATE: They want to know why your professional path has gone like it has, they want insight into your decisions, and how those experiences set you apart from your peers.

Full Time Analyst:

- 🦁 ANALYST: “Prepare for a rapid fire of technical questions during the one-on-one”
- 🦁 ANALYST: Tell me about something that is NOT on your resume.
- 🦁 ANALYST: How many cabs are in Manhattan right now?
- 🦁 ANALYST, Investment Banking: How long until my money doubles if I invest it at 7%?
- 🦁 ANALYST, Asset Management: You lost a lot of your client’s money in 2008, what would you say to them to convince them to stay with you?



Associate, VP, Other:

- 🦊 ASSOCIATE: Explain the relationship between rate and yield.
- 🦊 ASSOCIATE: What is your forecast for the yield curve?
- 🦊 ASSOCIATE: If company A has ROE of 10% and Company B has ROE of 20%, who should acquire who in an all stock deal to make it accretive?
- 🦊 VP: How do you get the best out of people?
- 🦊 VP: Why were you let go from your last job?



Morgan Stanley

Morgan Stanley

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
54%	6%	35%	6%	0%	0%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
75%	19%	6%	1%

Outcome		
No Offer	Accepted Offer	Declined Offer
62%	27%	12%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
4%	16%	48%	29%	4%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
18%	47%	26%	9%	1%



Morgan Stanley was also relatively average in all of the statistical categories except for the fact that the respondents from Morgan Stanley were more junior than other firms and the interviews were slightly more difficult. Many responses indicated that the interviews were mostly fit in nature and also focused around your background and resume; but that the WSO guides contain the answers to most of the relevant questions. Numerous interviewees at the analyst reported specifically “there were no particularly challenging questions” or something along those lines. One specifically responded “nothing special; all can be prepared. Be sure to be familiar with your own CV and can tell a story for every line in it.”

Summer Analyst:

- 🐼 SUMMER ANALYST: What is the most bullshit thing on your resume?
- 🐼 SUMMER ANALYST: Tell me about a time you have to turn in an imperfect work.
- 🐼 SUMMER ANALYST: If you have two sand-glass timers, one with 7 minutes worth of sand and another with 4 minutes worth of sand, how do you use both to precisely time 12 minutes?
- 🐼 SUMMER ANALYST: Why would a Private Equity fund NOT use WACC as the discount rate when valuing a potential LBO target?
- 🐼 SUMMER ANALYST: How many cows do you think a single taco bell store uses in one day?/How many cows do you think a typical McDonalds runs through in a day?

Summer Associate:

- 🐼 SUMMER ASSOCIATE: “They asked detailed follow-up questions about my stock pitch. Market share, dividend yield, consensus growth estimates, management guidance, etc.”
- 🐼 SUMMER ASSOCIATE: “I was given a case study of an actual company's 10K in front of the interviewer. He wanted to walk through the financial statements and made me think aloud and state my conclusions.”
- 🐼 SUMMER ASSOCIATE: How does operating leverage affect asset beta?
- 🐼 SUMMER ASSOCIATE: What is the market cap of [specific company mentioned during the interview]?
- 🐼 SUMMER ASSOCIATE: Where would you invest \$100mm dollars? (Asked multiple times)

Full Time Analyst:

- 🐼 ANALYST: You are one of the junior people on the desk and have a great trading idea, and one of your seniors tries to steal it from you; what do you do?
- 🐼 ANALYST: Its 1am and everyone in the office is exhausted but you have three more hours of work, what song do you put on?
- 🐼 ANALYST: You have four people that need to cross a bridge in the dark but you only have 1 flashlight. The bridge can only support two people at a time. The four people get across the bridge at



different speeds (1 min, 2 min, 5 min, and 10 min), what's the shortest amount of time to get all four people across the bridge?

- 🦒 ANALYST: If 0 is hardworking and 10 is smart, and you cannot pick the middle, what would you be on the scale?
- 🦒 ANALYST: What skills from your favorite hobby that you do in your free time have you learned that would help you be an exceptional asset to our team?

Associate, VP, Other:

- 🦒 ASSOCIATE: What is the cubed root of 729?
- 🦒 ASSOCIATE: "Excel Case study was difficult. Took a few hours to find an error in the case, answer questions, and present it from beginning to end."
- 🦒 ASSOCIATE: Why do you want to work on the sell side?
- 🦒 ASSOCIATE: What other banks are you interviewing with and where on that list does Morgan Stanley rank for you?





UBS

Position Applying For					
S. Analyst	S. Associate	FT Analyst	FT Associate	VP +	Other
55%	3%	34%	9%	0%	0%

Length of Process			
Less than 1 Month	1-2 Months	2-3 Months	3-4 Months
74%	23%	4%	1%

Outcome		
No Offer	Accepted Offer	Declined Offer
41%	37%	22%

Difficulty				
Very Easy	Easy	Average	Difficult	Very Difficult
8%	23%	49%	16%	4%

Overall Impression of the Interview Process				
Very Positive	Positive	Neutral	Negative	Very Negative
25%	44%	26%	3%	5%



UBS had among the fewest responses to the WSO interview survey among the major banks. UBS interviews were rated among the easiest with only 20% of interviewees responding that the interview was “difficult” or “very difficult”. That said, this is a smaller sample set so don’t assume you can walk into a UBS interview unprepared! Additionally, UBS had the highest acceptance rate of the Bulge Brackets, with nearly 60% of candidates in our survey receiving an offer, and 22% of candidates actually rejecting an offer.

Summer Analyst:

- 🐼 SUMMER ANALYST, Equity Research: How are you going to deal with your team leader working much shorter hours than you, but making much more money?
- 🐼 SUMMER ANALYST: What do you think the average daily revenue of [XXX restaurant] is?
- 🐼 SUMMER ANALYST: Please describe the structure of a pitchbook.
- 🐼 SUMMER ANALYST: What is a VLookup?
- 🐼 SUMMER ANALYST: If we were in a state of hyperinflation, would you expect the crime rate to be higher or lower than now?

Summer Associate:

- 🐼 SUMMER ASSOCIATE: What is our greatest risk in hiring you?
- 🐼 SUMMER ASSOCIATE: Company B has EBITDA of \$10. Company A acquires company B for 10x EBITDA. 5 years later, the standalone EBITDA of company B is \$100. Company A decides to sell company B for 10x EBITDA. Did company A generate positive cash flow by buying and selling company B?
- 🐼 SUMMER ASSOCIATE: What is the difference between cash and accrual accounting?

Full Time Analyst:

- 🐼 ANALYST: What is the average cost of constructing a building in the most expensive zone of the city?
- 🐼 ANALYST: Can you tell me an IPO that UBS has recently led?
- 🐼 ANALYST: What do you think the future of Apple is?
- 🐼 ANALYST, Investment Banking: “I was given a print out of a bunch of Excel tables and asked how I would best summarize them for a management presentation.”
- 🐼 ANALYST, Investment Banking: If a company’s enterprise value is \$1,000 and raised \$200 in debt what's the enterprise value?



Associate, VP, Other:

- 🐭 ASSOCIATE: How many miles of subway track are there in Manhattan?
- 🐭 ASSOCIATE: With the recent negative news about us, why do you want to work here?
- 🐭 ASSOCIATE: What is your method for landing the multi-million dollar client?
- 🐭 ASSOCIATE, Mining Investment Banking: Name me the different methods to value a mine.



BMO

- 🦊 SUMMER ANALYST: Tell me about yourself without referencing anything on your resume.
- 🦊 SUMMER ANALYST: Name some of the conditional functions you may use in excel.
- 🦊 SUMMER ASSOCIATE: Please describe a time in business school where you found yourself forced to work on a strategy you did not agree with and how did you cope?
- 🦊 ANALYST, Investment Banking: “One interviewer asked me to pitch a stock. After listening to my pitch, the interviewer spent the next ten minutes discussing the company with me, questioning me about the business model. I found this to be more intense than usual. I was asked a number of accounting based questions that were slightly more involved than the typical questions. One of which involved classifying items as capital expenditures or expenses and then following each through the financial statements.”
- 🦊 ANALYST: How does a depreciation schedule impact each of the three financial statements?
- 🦊 ANALYST: What is the main purpose of purchase price accounting?
- 🦊 ANALYST, Investment Banking: “A company purchases a \$200 million machine with \$100 million in new debt and \$100 million in cash. There is a 5% transaction fee to raise debt. After the 2nd year, the machine breaks down and written off. Walk me through the 3 statements after Year 1 and Year 2.”
- 🦊 ANALYST, Public Finance: How much debt could a bridge service based on cash flows from its tolls?
- 🦊 ASSOCIATE: What do you expect your hours to be?
- 🦊 ASSOCIATE: Tell me about a quantitative or analytical project you worked on that will impress me.





CIBC

- 🐭 SUMMER ANALYST: How would a private equity firm extract cash from an investment?
- 🐭 ANALYST: What characteristics would you be most interested in a company that came to you looking for a revolving credit facility?
- 🐭 ANALYST: If you were to create a computer program that solved sudoku puzzles, walk me through how you would do that (no coding expertise needed, just theoretically, what would you make the program do).
- 🐭 ANALYST: What do you think the effect of Google cars, which drive themselves, would be in general and on who?
- 🐭 ANALYST: What television shows do you watch?
- 🐭 ANALYST, Investment Banking: Given that China is the single largest holder of U.S. bonds, if China decided they wanted to affect deal volume in the U.S., how would they accomplish this?
- 🐭 ANALYST, Sales and Trading: Draw me the gamma of a binary call option?
- 🐭 SUMMER ASSOCIATE: Tell me five drawbacks of the CAPM model.
- 🐭 OTHER: Tell me three reasons why we shouldn't hire you.





Cowen Group

- 🐼 Nearly all respondents mentioned being asked questions about Cowen itself, why Cowen, etc.
- 🐼 Most of the questions were very standard fit and technical questions mentioned in the Wall Street Oasis guides. Questions about the financial statements, valuation techniques, etc. There were a few unique questions which are listed below.
- 🐼 SUMMER ANALYST, Equity Research: What was one thing you think you should have done during your prior internship?
- 🐼 SUMMER ANALYST: What will you do to get used to working the long hours?
- 🐼 ANALYST, Investment Banking: Would you rather be the best analyst, or the most well-liked?



DUFF & PHELPS

Duff & Phelps

- 🦁 A few responses mentioned a group case interview. Nearly every respondent said that the interviews were not too difficult and there were very few unexpected questions. Some of those asked not mentioned in the guides are below.
- 🦁 ANALYST: “There was no modeling test but they will ask pointed questions to determine if you know how to model.”
- 🦁 ANALYST: What is a section 338 election?
- 🦁 ANALYST, Investment Banking: “We were divided into groups of 3 and provided a basic case study in which we were asked to value a provided company, create a few PowerPoint slides and then present to a room of employees.”
- 🦁 ANALYST, Investment Banking: How would you value a company with an asset that does not produce any revenue or cash flows, and how would you compare it to a company without said asset?
- 🦁 ANALYST, Investment Banking: What would cause a company with consistent cash flows, solid management, and steady growth to not be desired in a deal?
- 🦁 ANALYST: “1st round was all technical. Superday was all about fit and selling yourself.”
- 🦁 ANALYST, Valuation: How would you value this pen?



EVERCORE

Evercore

- ☛ Many of those that interviewed at Evercore reported being asked brain teasers. Some of those brain teasers are shown below, others are listed elsewhere within this guide. The interviewers will focus on your prior deal experience if you have any, and a general consensus seems to be that the interviews are very technical in nature and more difficult than average.
- ☛ SUMMER ANALYST: If I give you two companies with the same revenues, but one has an EBITDA margin of 20% and the other has an EBITDA margin of 40%, and they are trading at the same EBITDA multiple, which company would you purchase and why?
- ☛ SUMMER ANALYST: Graph WACC vs. cost of debt. Now cost of debt vs. cost of equity.
- ☛ SUMMER ANALYST: How does a better brand impact the financial statements?
- ☛ ANALYST: You have a cube with sides of length 12. The cube consists of smaller cubes, each with length 1. How many cubes can you see?
- ☛ ANALYST: What was the single most exciting event in your life?
- ☛ ANALYST: How would the cost of equity differ between similar companies if one was private and one was public?
- ☛ ANALYST: “I was a summer analyst elsewhere and the interviewer spent a great deal of time going over the 2 live deals I worked on that summer and went into not only what I did (e.g. modeling, profiles) but also went into the strategic rationale for each deal, what were the drivers of growth and risk in the deals, etc.
- ☛ ANALYST: What is the dollar change of the S&P 500 from January 1st to now? What percent change is that?
- ☛ ASSOCIATE: “They drilled me on specifics and eventually got into some of the greys and what they represent.”
- ☛ ASSOCIATE: Walk me through a pitch book for a sell-side where our client is an insurance company.
- ☛ ASSOCIATE: Suppose a company has a loss on sale of \$100. Walk us through the financial statement impacts.



Greenhill

Greenhill

- 🦊 A vast majority of those interviewing at Greenhill mentioned that they were asked the most common of the banking interview questions. These included “why banking,” “what are some of the ways you can value a company,” “walk me through a DCF” and “how does X flow through the three financial statements. If you are applying to Greenhill, make sure you have the basics down cold even if you are from a non-finance background. We also encountered a report of one of the strangest brain teasers we have ever seen (see below).
- 🦊 SUMMER ANALYST: “Despite coming from a non-finance background (math and physics double major at a small liberal arts college), I got fairly technical questions.”
- 🦊 SUMMER ANALYST: How do you calculate the beta factor from scratch?
- 🦊 SUMMER ANALYST: Why would you want to work in a smaller bank than a BB?
- 🦊 SUMMER ANALYST: What was the most difficult thing you have ever done?
- 🦊 SUMMER ANALYST: During WWII on the Pacific front, some planes would get shot once or twice and get destroyed, the remains dropping into the ocean and irrecoverable. Others would return to base full of bullet holes but still working fine otherwise. If you were an engineer, what would be the most efficient way to find out what was wrong with the planes and how would you do it?”
- 🦊 ANALYST: Why would you prefer to work at Greenhill to a bulge bracket investment bank where you will be able to see other operations than M&A?
- 🦊 ANALYST: “Seemed to value someone who knows the technicals but can also explain it in a very concise, clear, and articulate manner. Take it with a grain of salt as its just one experience but they really like well spoken people.”
- 🦊 ANALYST: How much does EV change if WACC changes by 1%?
- 🦊 ANALYST: What do you think people will think about you when you say you're a banker?
- 🦊 SUMMER ASSOCIATE: “They asked me why do you want to work here? This is super important at a small bank like Greenhill. You should be able to clearly articulate what about the firm attracts you and why you think you'll be able to be successful there. Ideally this should include past experience in banking.”



Bulge Bracket Summary Statistics

<u>Level of Applicant</u>	<u>S. Analyst</u>	<u>S. Associate</u>	<u>Analyst</u>	<u>Associate</u>	<u>VP</u>	<u>Other</u>
BAML	55.1%	6.4%	21.4%	2.7%	1.6%	12.8%
Barclays	58.3%	9.1%	22.0%	3.0%	0.8%	6.8%
Citi	55.6%	6.4%	34.5%	1.8%	1.8%	0.0%
Credit Suisse	57.3%	7.3%	26.4%	5.5%	0.0%	3.6%
Deutsche Bank	56.1%	3.7%	26.8%	8.5%	0.0%	4.9%
Goldman Sachs	49.1%	5.0%	40.5%	4.7%	0.4%	0.4%
JP Morgan	56.5%	3.8%	34.4%	3.8%	1.4%	0.0%
Morgan Stanley	54.1%	5.6%	34.7%	5.6%	0.0%	0.0%
UBS	55.2%	2.6%	33.6%	8.6%	0.0%	0.0%

<u>Length of Process</u>	<u>Less than 1 month</u>	<u>1-2 months</u>	<u>2-3 months</u>	<u>3-4 months</u>
BAML	79.1%	15.0%	2.7%	3.2%
Barclays	70.2%	19.1%	7.6%	3.1%
Citi	76.3%	20.7%	1.8%	1.2%
Credit Suisse	70.9%	23.6%	3.6%	1.8%
Deutsche Bank	81.7%	15.9%	2.4%	0.0%
Goldman Sachs	74.5%	17.6%	5.8%	2.2%
JP Morgan	75.6%	20.1%	3.8%	0.5%
Morgan Stanley	74.5%	18.9%	5.6%	1.0%
UBS	73.9%	22.6%	3.5%	0.0%

<u>Outcome of Process</u>	<u>No Offer</u>	<u>Accepted Offer</u>	<u>Declined Offer</u>
BAML	44.9%	39.6%	15.5%
Barclays	51.5%	36.4%	12.1%
Citi	53.2%	31.6%	15.2%
Credit Suisse	57.3%	30.0%	12.7%
Deutsche Bank	50.0%	31.7%	18.3%
Goldman Sachs	64.5%	25.4%	10.0%
JP Morgan	57.1%	31.9%	11.0%
Morgan Stanley	61.7%	26.5%	11.7%
UBS	41.4%	37.1%	21.6%



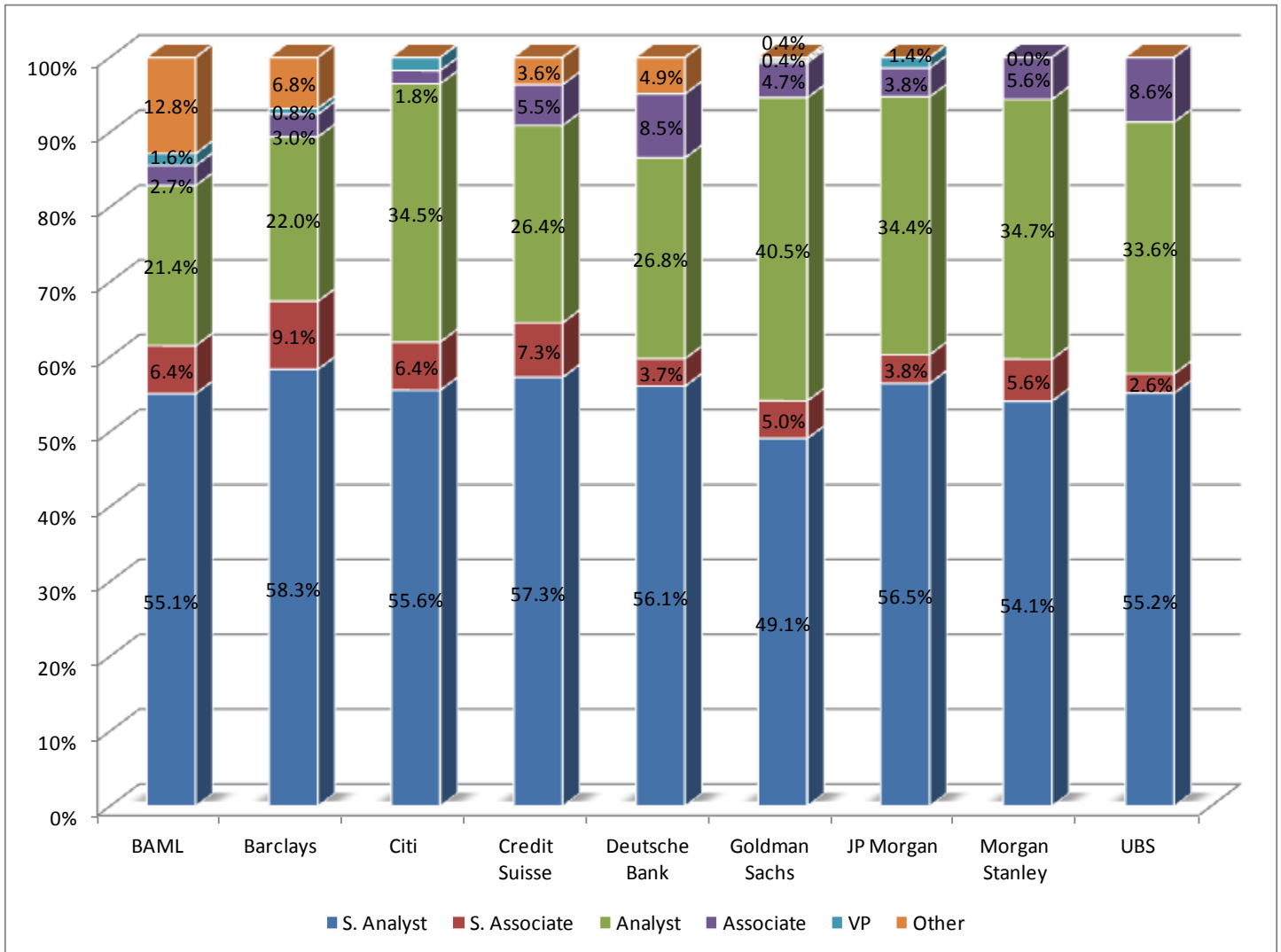
<u>Difficulty of Interviews</u>	<u>Very Easy</u>	<u>Easy</u>	<u>Average</u>	<u>Difficult</u>	<u>Very Difficult</u>	<u>Average score out of 5*</u>
BAML	6.4%	24.1%	47.1%	20.3%	2.1%	2.88
Barclays	0.8%	15.2%	59.8%	22.0%	2.3%	3.10
Citi	1.2%	16.4%	50.9%	30.4%	1.2%	3.14
Credit Suisse	5.5%	13.6%	57.3%	22.7%	0.9%	3.00
Deutsche Bank	3.7%	15.9%	56.1%	20.7%	3.7%	3.05
Goldman Sachs	4.3%	16.5%	43.4%	30.5%	5.4%	3.16
JP Morgan	3.3%	16.7%	56.7%	21.4%	1.9%	3.02
Morgan Stanley	3.6%	15.8%	48.0%	29.1%	3.6%	3.13
UBS	7.8%	23.3%	49.1%	15.5%	4.3%	2.85

* A point value (1 for very easy, 2 for easy, 3 for average...) was assigned and this is the average level of difficulty. Goldman was the hardest, UBS was the easiest, but not by a lot. 3.0 would be "Average".

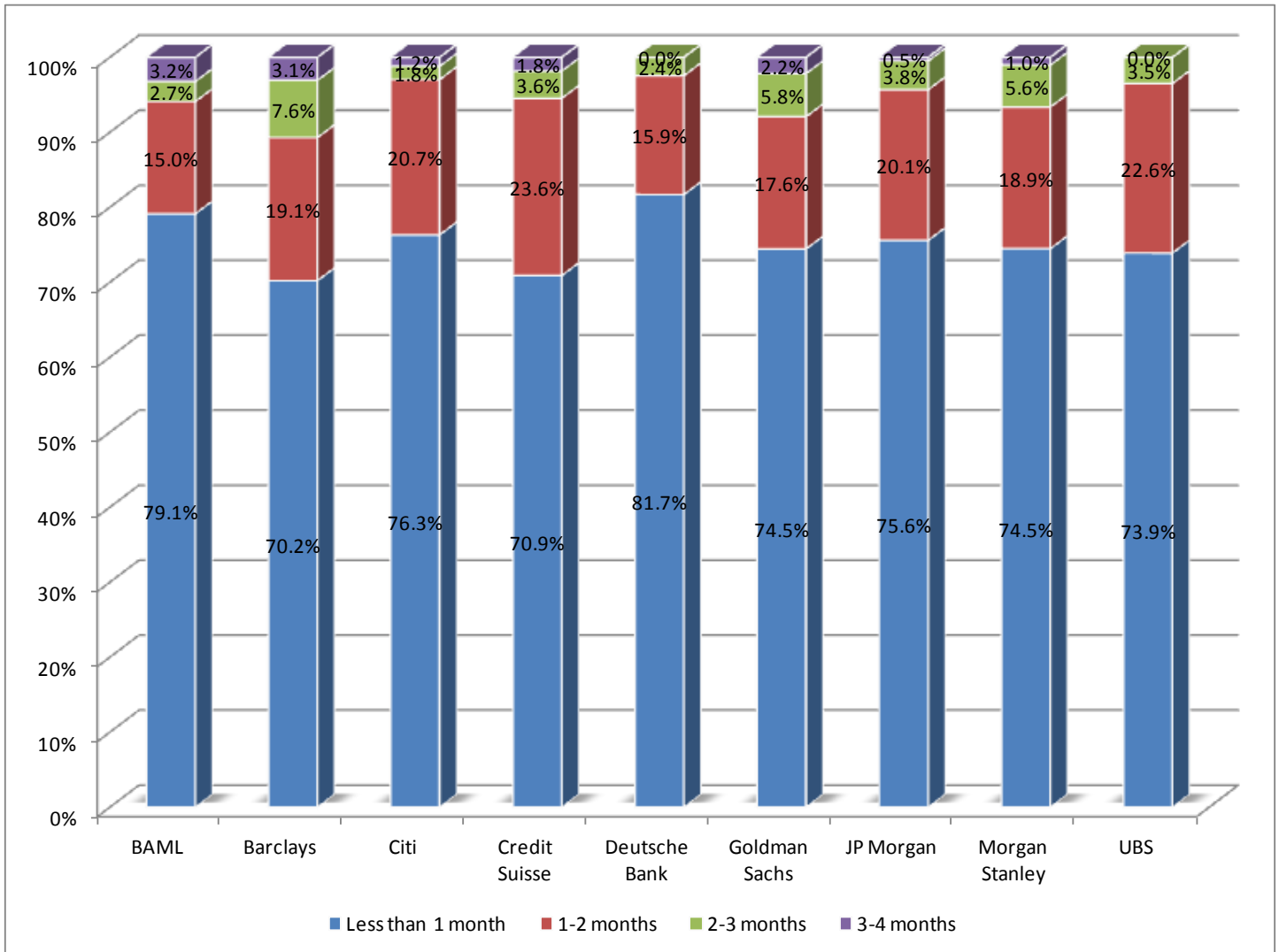
<u>Overall Impression of Process</u>	<u>Very Positive</u>	<u>Positive</u>	<u>Neutral</u>	<u>Negative</u>	<u>Very Negative</u>
BAML	22.5%	43.3%	24.6%	7.0%	2.7%
Barclays	17.4%	47.7%	25.0%	7.6%	2.3%
Citi	17.0%	40.9%	28.7%	11.1%	2.3%
Credit Suisse	20.0%	40.0%	28.2%	11.8%	0.0%
Deutsche Bank	20.7%	43.9%	24.4%	6.1%	4.9%
Goldman Sachs	19.4%	43.7%	27.2%	7.5%	2.2%
JP Morgan	23.3%	46.2%	21.9%	6.7%	1.9%
Morgan Stanley	17.9%	46.9%	25.5%	9.2%	0.5%
UBS	25.0%	44.0%	22.4%	3.4%	5.2%



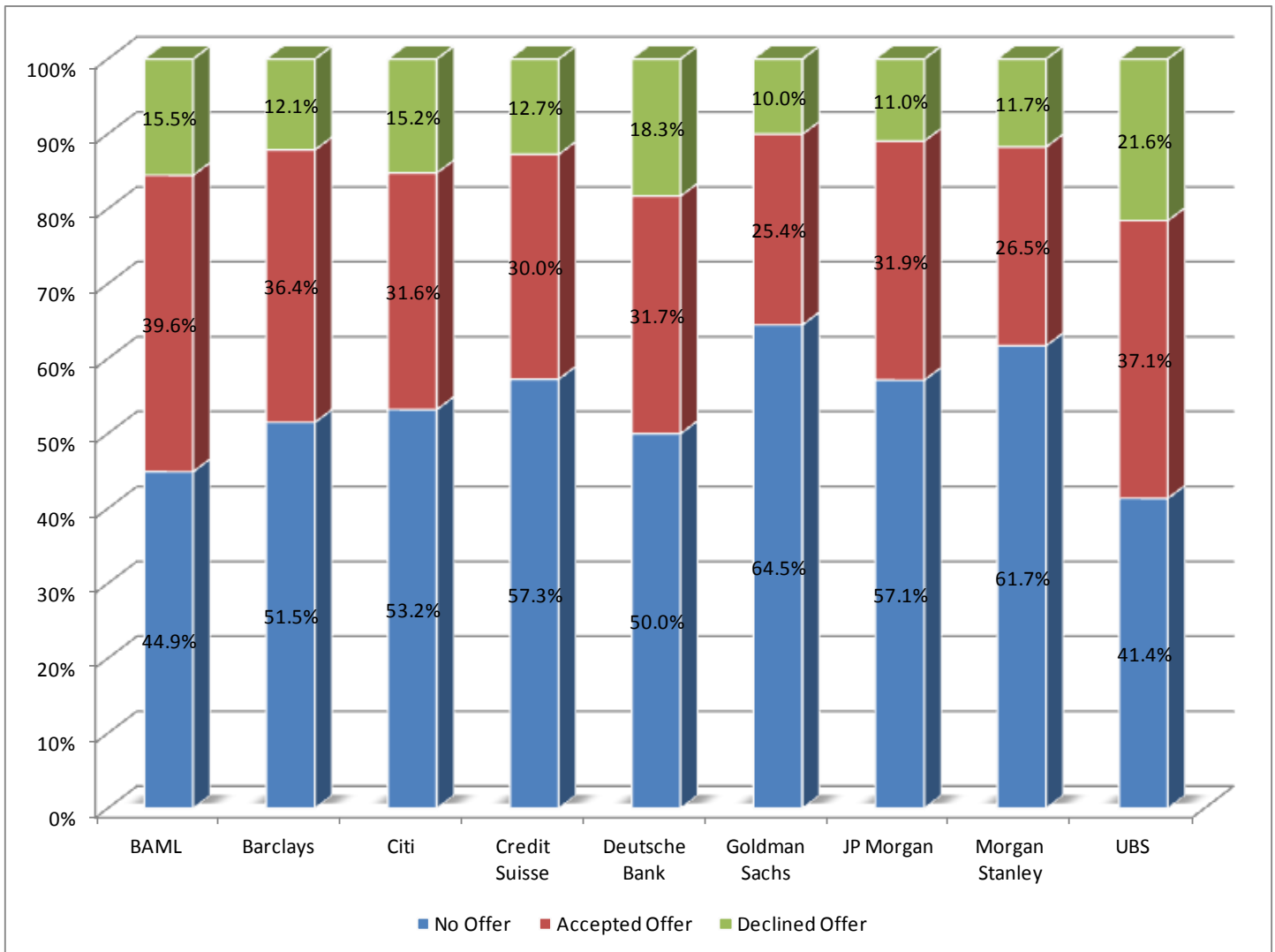
Level Interviewing For Chart



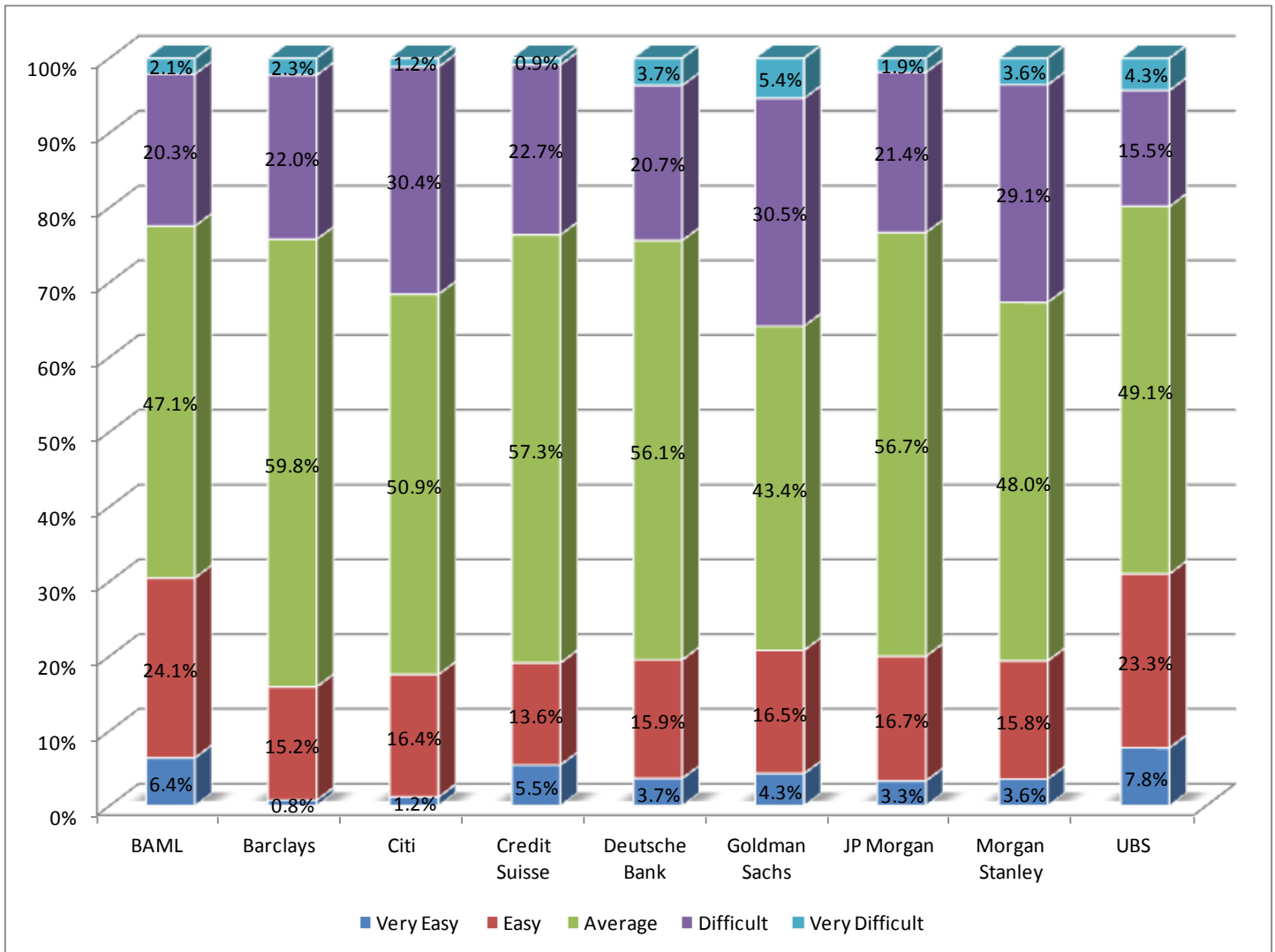
Length of ProcessChart



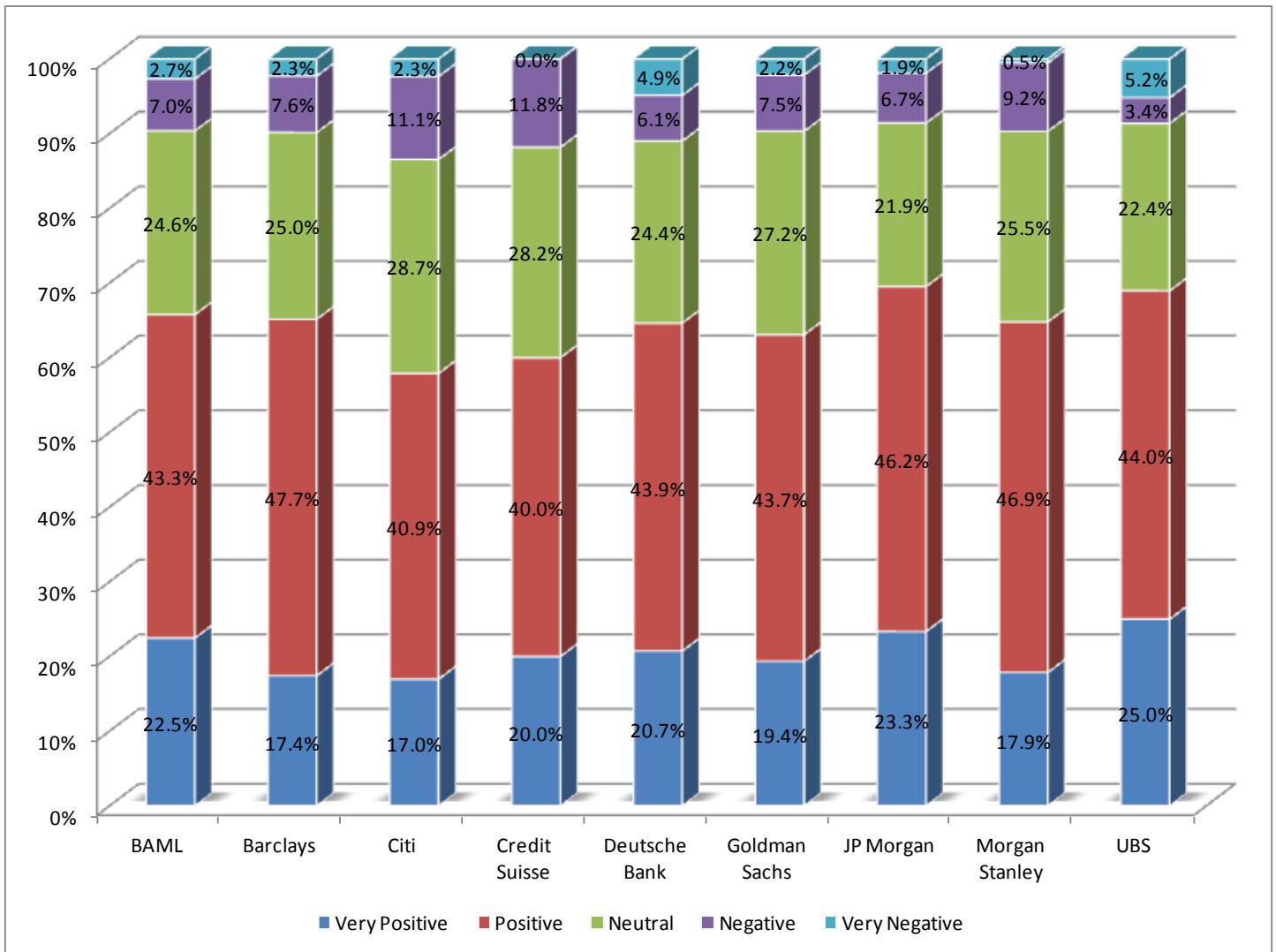
Outcome of Process Chart



Level of Difficulty Chart



Overall Impression Chart





Thank you for purchasing the Wall Street Oasis Technical Guide with flashcards. We hope the flashcards on the following pages, which highlight some of the most common interview questions, will help you to prepare for your interviews.

In order to print the flashcards, you will need a double sided printer. Most school libraries have one or you can have the cards printed at a local Fedex Kinkos or any other copy center. In the printer setup options, select the option to print in portrait mode, double sided, open to top. Then print pages 160-251 of this PDF and this will correctly print the flashcards. Once printed, you will need to cut the cards along the dotted lines. If you would like the cards to be a bit more sturdy, we recommend printing this document on cardstock.

Each of the questions on the cards is included in the body of the Technical Guide. There you can find additional information related to most of the questions.

Good luck!



Financial Reporting Basics

What is a 10-K?



Financial Reporting Basics

What is a 10-Q?



Financial Reporting Basics

What is a Proxy Statement?



Current Event Related

What is a Mortgage-Backed Security?



- 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.

- A security that pays its holder a periodic payment based on the cash flows from the underlying mortgages that fund the security.
- They pay periodic payments that are very similar to coupon payments from bonds. These cash flows come from a package of mortgages that have been bought up by a bank.
- 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 all at once, across the entire country. Unfortunately, we now know that housing values are highly correlated and the AAA rating these MBS were given has proven to be unfounded.

- 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.

- 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.

Current Event Related

What is a Collateralized Debt Obligation (CDO)?



Current Event Related

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



Current Event Related

What is a Credit Default Swap?



Accounting, Finance, Valuation: Basic

What are the three main financial statements?



- 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.

- Income Statement
 - Revenues – COGS - Other Expenses = Net Income
- Balance Sheet
 - Assets = Liabilities + Equity
- Statement of Cash Flows
 - Beginning Cash + CF from Operations + CF from Investing + CF from Financing = Ending Cash

- A CDO is the broad asset class in which a number of interest paying assets (mortgages, student loans, etc.) 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.

- 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, Valuation: Basic

How are the three main financial statements connected?



Accounting, Finance, Valuation: Basic

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



Accounting, Finance, Valuation: Basic

Walk me through the major line items on the income statement.



Accounting, Finance, Valuation: Basic

What is EBITDA?



Revenues

- Cost of Goods Sold

Gross Margin

- Operating Expenses

Operating Income

- Other Expenses

- Income Taxes

Net Income

- EBITDA stands for earnings before interest, taxes, depreciation, and amortization and is a good metric to evaluate a company's profitability and is sometimes used as a proxy for free cash flow.
- EBITDA=Revenues – Expenses (Excluding tax, interest, depreciation and amortization)
- A very common valuation methodology is to use the EV/EBITDA multiple, which will estimate enterprise value of a company using a multiple of its EBITDA.
- See the valuation section for further explanation of multiples analysis.

- Below are SOME of the connections.
- On the IS, the last line item is net income. Net income is added to cash flow from operations on the CF statement.
- Beginning cash on CF is from the BS 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.
- 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 net working capital on the cash flow statement is calculated from changes in current assets and current liabilities on the balance sheet.

- Cash from Operations
 - Cash generated from the normal operations of a company
- Cash from 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
- Cash From 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.

Accounting, Finance, Valuation: Basic

What is Enterprise Value?



Accounting, Finance, Valuation: Basic

If Enterprise Value is 150 and Equity Value is 100, what is net debt.?



Accounting, Finance, Valuation: Basic

Why do you subtract cash from Enterprise Value?



Accounting, Finance, Valuation: Basic

What is valuation?



- Assuming no cash, minority interest or pref stock...

$$TEV = \text{Equity Value} + \text{Net Debt}$$

$$\text{So net debt} = 50$$

- Total Enterprise value is the value of an entire firm, both debt and equity. The equation is below.

$$\begin{aligned} \text{Enterprise Value} \\ &= \text{Market Value of Equity} + \text{Debt} + \text{Preferred Stock} + \text{Minority Interest} \\ &\quad - \text{Cash} \end{aligned}$$

- 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.

- Cash is already accounted for within the market value of equity.
- 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.

Accounting, Finance, Valuation: Basic

What are some ways you can value a company?



Accounting, Finance, Valuation: Basic

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



Accounting, Finance, Valuation: Basic

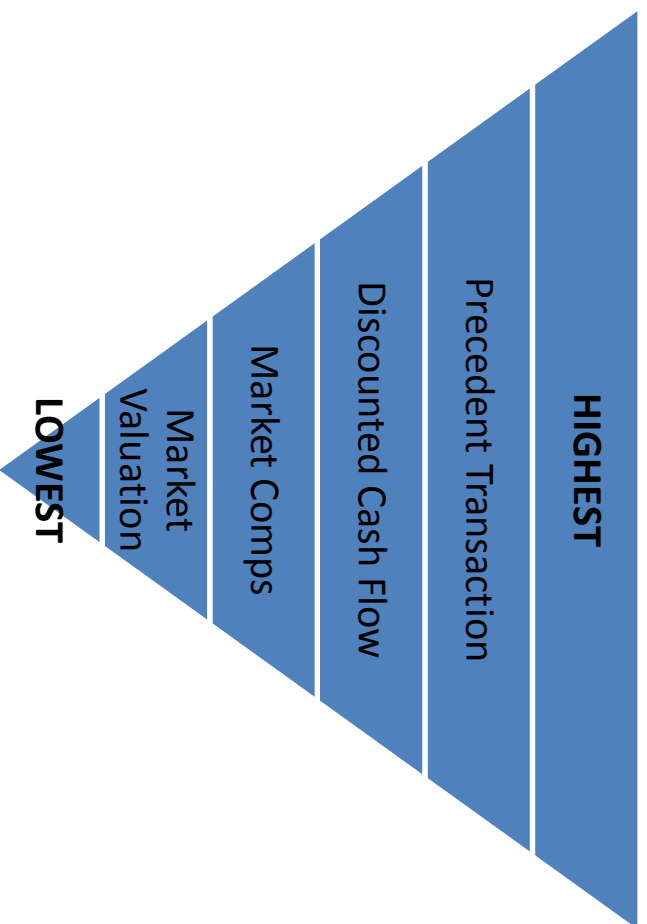
What does “spreading comps” mean?



Accounting, Finance, Valuation: Basic

Walk me through a discounted cash flow model.





**** See the full technical interview guide for much more information on answering this question**

- Comparable Companies/Multiples Analysis
- Market Valuation / Market Capitalization
- Precedent Transactions
- Discounted Cash Flow Analysis
- LBO Valuation

**** See the full technical interview guide for much more information on answering this question**

- First, project free cash flows for a period of time, usually five to ten years. Free cash flow is EBIT times (1- the tax rate) plus Depreciation and Amortization minus Capital Expenditures minus the Change in Net Working Capital.
 - Next predict the free cash flows for the years beyond the five or ten years we have projected. To do this we must establish a terminal value, as is detailed in the next question below.
 - Now we must calculate the present value of those cash flows. To do this we must establish an appropriate discount rate. This discount rate is the WACC. The calculation of WACC is described in detail in the full technical guide.
 - To find the present values of the cash flows (which is equal to the company's enterprise value), discount them by the WACC
 - The final cash flow in the analysis will be the sum of the terminal value calculation and the final year's free cash flow.
- ** See the full technical interview guide for much more information on answering this question**

- “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.

Accounting, Finance, Valuation: Basic

What is the formula used for finding the present values of future cash flows in a DCF valuation?



Accounting, Finance, Valuation: Basic

How do you calculate a firm's WACC?



Accounting, Finance, Valuation: Basic

What is WACC?



Accounting, Finance, Valuation: Basic

How do you calculate a firm's terminal value?



- E = Market Value of Equity
- D = Value of Debt
- P = Preferred Stock
- K_e = Cost of Equity
- K_d = Cost of Debt
- K_p = Cost of Preferred Stock
- T = Corporate Tax Rate

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

****** See the full technical interview guide for much more information on answering this question

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

- 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.

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

- WACC stands for Weighted Average Cost of Capital. It is used as the discount rate in a discounted cash flow analysis to calculate the present value the company's cash flows and terminal value and reflects the overall cost of a company raising new capital, which is also a representation of the riskiness of an investment in 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.

Accounting, Finance, Valuation: Basic

How do you calculate free cash flow?



Accounting, Finance, Valuation: Basic

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



Accounting, Finance, Valuation: Basic

What is Net Working Capital?



Accounting, Finance, Valuation: Basic

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



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

- 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

- 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.

- Net Working Capital = Current Assets – Current Liabilities
- An increase in net working capital is a “use of cash” which could take the form of investing in current assets like inventory or increasing accounts receivable due to slower collections, for example. A decrease in net working capital is a “source of cash”, which would include changes such as increasing accounts payable or a drop in inventory. This is why in calculating free cash flow you subtract an increase in net working capital. If net working capital went up a company must have “used” cash to cause this increase (for example, they purchased more inventory than they sold).

Accounting, Finance, Valuation: Basic

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



Accounting, Finance, Valuation: Basic

What is the link between the balance sheet and the statement of cash flows?



Accounting, Finance, Valuation: Basic

What is the link between the balance sheet and the income statement?



Accounting, Finance, Valuation: Basic

Why might there be multiple valuations of a single company?



- 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 other links, but the above are the main connections.

- 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.

- 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.
- Some additional items included on the cash flow statement could be issuance or repurchase of debt or equity, capital expenditures or other investments. Amortization and depreciation will be reflected on the balance sheet, but will be added back to net income on the cash flow statement since they are expenses, but not actually a use of cash.

- 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 minus 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.

Accounting, Finance, Valuation: Basic

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



Accounting, Finance, Valuation: Basic

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



Accounting, Finance, Valuation: Basic

What is an Initial Public Offering (IPO)?



Accounting, Finance, Valuation: Intermediate

What is the Capital Assets Pricing Model?



- 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 high 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.

- 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 may give that more weight, if you are extremely confident in your DCF you may give that more weight. Valuing a company is as much an art as it is a science.

- 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 U.S. 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.

$$Re = Rf + B(Rm - Rf)$$

- 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.

Accounting, Finance, Valuation: Intermediate

Where do you find the risk free rate?



Accounting, Finance, Valuation: Intermediate

What is Beta?



Accounting, Finance, Valuation: Intermediate

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



Accounting, Finance, Valuation: Intermediate

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



- 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%.

$\beta < 1$	$\beta > 1$
Consumer Staples	Wireless Networking
Large Health Care	Growth Biotech
Utilities	Computer-Related
Tobacco	E-Commerce
Petroleum Products	Entertainment Tech.

- 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.

**** See the full technical interview guide for much more information on answering this question**

- 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 U.S. government is considered to be a risk-free borrower meaning the government should never default on its debt.

- 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.

Accounting, Finance, Valuation: Intermediate

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



Accounting, Finance, Valuation: Intermediate

What is the market risk premium?



Accounting, Finance, Valuation: Intermediate

What kind of an investment would have a negative beta?



Accounting, Finance, Valuation: Intermediate

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



- 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 minus the risk free rate (current yield on a 10-year treasury)

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

- Since you have no information about historical or projected performance, as well as no details about the firm’s capital structure, it would be impossible to do a DCF analysis.
- Assuming you know the firm’s industry, and can identify a group of comparable companies, your best bet would be to do a multiples analysis using the ratios from those comparable companies that are most relevant to the given industry.

- An investment with a negative beta is one which moves opposite the stock market as a whole. In other words, if the stock market moves up, the value of the negative beta investment would drop.
- Gold is a type of investment that would have a negative beta. When the stock market goes up, the price of gold typically drops as people flee from the “safe haven” of gold. The opposite happens when the market goes down, implying a negative correlation.

Accounting, Finance, Valuation: Intermediate

How would you value a company with no revenue?



Accounting, Finance, Valuation: Intermediate

What is the difference between APV and WACC?



Accounting, Finance, Valuation: Intermediate

Describe a company's typical capital structure.



Accounting, Finance, Valuation: Intermediate

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



- 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

- If their stock price is inflated, they would raise a relatively significant amount of capital for the percentage of ownership sold
- New projects the company plans on investing in may not produce immediate or consistent cash flows to make interest payments
- The company may want to adjust its capital structure, or pay off debt
- The company's owners may want to have the ability to sell off a portion of their ownership and monetize their investment

- 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 construct 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.

- A company's capital structure is made up of debt and equity, but there may be multiple 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. Debt may consist of bank loans (which are normally most senior in the capital structure) and/or bonds which can be issued to the general public. 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 if the company is public. 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. Those shareholders are the owners of the company and have the rights to the firm's profits, which may be paid out in the form of dividends or reinvested back into the business.

Accounting, Finance, Valuation: Intermediate

When should an investor buy preferred stock?



Accounting, Finance, Valuation: Intermediate

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



Accounting, Finance, Valuation: Intermediate

What is operating leverage?



Accounting, Finance, Valuation: Intermediate

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



- 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.

- 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.

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

- Preferred stock could be looked at as a cross between debt and equity. Preferred stock will normally provide investors with a fixed dividend rate (like a bond), but also allow for some capital appreciation (like a stock). Preferred is also senior to common stock within the company's capital structure.
- In 2010 for example, Warren Buffet made a large investment in Goldman Sachs in the form of preferred stock

- 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.
- If a company has a high amount of operating leverage, it means that if they have an increase in their revenues, much of that increase will fall straight to the bottom line in the form of profit, because the incremental cost of producing another unit is so low.
- For example, a swim club is a business which operates with a high amount of operating leverage. Once the club is built and opened the costs are relatively fixed. If the club goes from 500 members to 510 members, they most likely would not have to spend any additional money for those 10 new members. They can have the same amount of staff, same size pool, same locker rooms, etc. Nearly 100% of the membership fees collected from the 10 new members will turn into profit.

Accounting, Finance, Valuation: Intermediate

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?



Accounting, Finance, Valuation: Intermediate

What is goodwill and how does it affect net income?



Accounting, Finance, Valuation: Intermediate

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



Accounting, Finance, Valuation: Advanced

How/why do you lever/unlever Beta?



- Many people would think that having excess cash on hand is not a bad thing. While it is good to have a cash buffer (especially in a time of economic turmoil), holding too much cash means you are giving up potential earnings from investing that cash elsewhere.
- A firm needs to be aware of its cash needs, and keep enough cash to cover itself in the event of a downturn, but excess 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 CDs which allows a firm to earn interest, while only locking up the investment for a short amount of time.
- Often, 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, expansion to new markets, etc.

- 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 (i.e. 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.

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

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

- The public company will most likely 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 should be priced higher would be the transparency the firm is required to have in order to be listed on a public exchange. Publicly traded companies are required to file their financial statements, allowing investors to view them.

- Goodwill is a line item found on a company's balance sheet in the assets section.
- Many times, goodwill arises 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" as an expense on the income statement 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.

Accounting, Finance, Valuation: Advanced

How would you calculate an equity beta?



Stocks: Basic

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



Stocks: Basic

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



Stocks: Basic

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



- This question is unique to you and is particularly common in Sales and Trading interviews.
- Do some research and find a few stocks you believe are good buys at their current market price. You must 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. Many schools will have access to them through their library website. 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 speaking we have found you are better off picking a less known company so your interviewer has less of an ability to cross-examine you on your reasoning. If they know the stock well, they will be able to really test you and push you on specifics about the stock.
- You could go through the process of valuing the stocks yourself using any of the valuation techniques if you are feeling ambitious.

- 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.

- 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, therefore creating disappointment.

- 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/indices, as well as if they were up or down and why will show your interviewer that you keep track of what is going on in the world of finance.

Stocks: Basic

What does it mean to short a stock?



Stocks: Basic

What is liquidity?



Stocks: Basic

Is 15 a high P/E (price to earnings) ratio?



Stocks: Intermediate

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



- Liquidity is how freely an asset or security can be bought and sold on the open markets by an investor.
 - Money market accounts, publicly traded large cap stocks and bonds, ETF's and open ended mutual funds are very liquid.
 - Micro-cap stocks, bonds, loans, or investments in privately owned companies could be considered relatively illiquid due to the limited market 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 because it would take the owner of the plant a long time to sell the plant and convert it into usable cash.
- A more liquid investment is relatively safer, all else equal, since the investor can sell it at any time.

- 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, promising to return the stock to the loaner at a later date.
- "Naked" short selling occurs when an investor sells the stock without having any of the stock actually borrowed.

- This is another question that you can use to show your interest in the markets. There is no right or wrong answer since 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* as to 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.
- Do some research prior to your interview, see what writers for major newspapers are saying and predicting, and then use some of their reasons in your explanation.
- Stick to your reasoning. Your interviewer may try to challenge you and challenge your reasoning. If you have come up with solid reasoning behind your response, be confident in your answer and try and explain your rationale. If your logic makes sense, do not change your opinion just to agree with your interviewer.

- 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 current earnings. For a large pharmaceutical company, however, a P/E of 15 may be considered high, since their earnings growth may be expected to be slow but steady in future years.

Stocks: Intermediate

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



Stocks: Intermediate

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



Stocks: Intermediate

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



Stocks: Intermediate

What is insider trading and why is it illegal?



<ul style="list-style-type: none"> • Past performance is not an indication of future results. This is the disclaimer that you hear at the end of nearly every commercial which presents a fund's past performance as a selling point. • The reason for this is because a specific investment type could perform remarkably well one year and then significantly underperform in the following year. • 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 MBSs collapsing. 	<ul style="list-style-type: none"> • This is a question you need to do some research for around the time of your interview. • 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, but is beginning to pick back up. • A couple recent IPOs include Tesla Motors, K.K.R. and Agricultural Bank of China.
<ul style="list-style-type: none"> • Someone buying or selling public securities based on information that is not available to the general public. • Examples of this include an investment banker buying or selling the stock of a company before an M&A deal is announced or a CEO buying or selling stock prior to a major company announcement. 	<ul style="list-style-type: none"> • 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.

Stocks: Intermediate

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



Stocks: Intermediate

How can a company raise its stock price?



Stocks: Intermediate

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



Stocks: Intermediate

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?



- A company could repurchase stock which lowers the number of shares outstanding.
- It could improve operations to 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.

- 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.

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

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

- The stock with the higher growth potential is most likely the stock with the lower market cap.
- If the \$5 stock has 1billion shares outstanding and the \$50 stock has 10,000 shares outstanding, the \$50 stock would most likely have higher growth potential.

Stocks: Intermediate

What is correlation?



Stocks: Intermediate

What is diversification?



Stocks: Intermediate

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



Stocks: Intermediate

What is the difference between technical analysis and fundamental analysis?



- 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.

- 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."

- 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.

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

Stocks: Advanced

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



Stocks: Advanced

When should a company buy back stock?



Stocks: Advanced

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"?



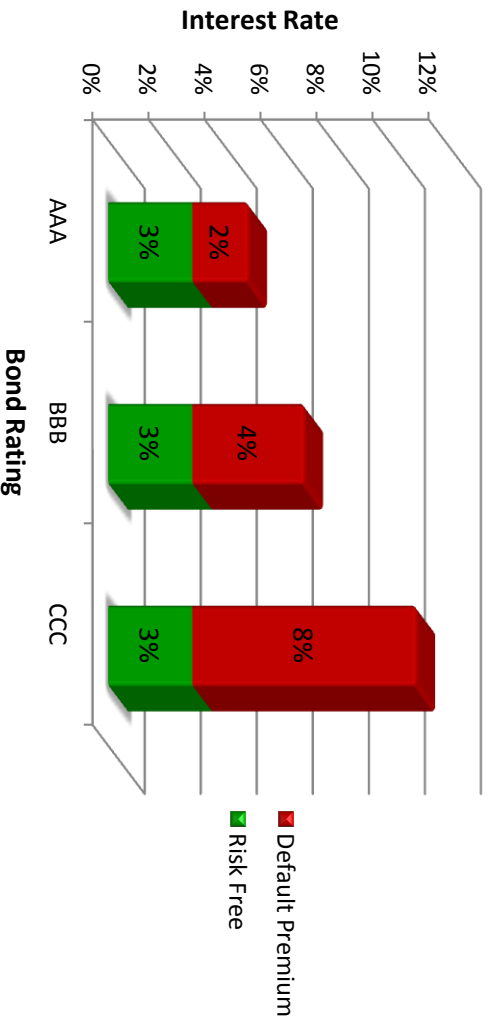
Bonds and Interest Rates: Basic

What is the default premium?



- If it believes the stock is undervalued
- When it has extra cash
- If it believes it can make money by investing in itself
- If 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.

- 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.



- 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.

- 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 risk?



Bonds and Interest Rates: Basic

What is "face value"?



Bonds and Interest Rates: Basic

What is the coupon payment?



Bonds and Interest Rates: Basic

What is the difference between and investment grade bond and a "junk bond"?



- 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.

- The default risk is the risk of a given company not being able to make its interest payments or pay back the principle amount of their debt.
- The higher a company's default risk, the higher the interest rate a lender will require them to pay.

- An investment grade bond is one that has a good credit rating, a low risk of bankruptcy and therefore pays a low interest rate. These are usually low risk, fundamentally sound companies which produce steady, reliable cash flows significantly greater than their interest requirements.
- 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. These companies usually are characterized as having less consistent cash flows, or they may be in relatively more volatile industries.

- 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 x the face value of the bond.
- For example, the coupon payment on an annual 10% bond with a \$1,000 face value is \$100.

Bonds and Interest Rates: Basic

What is the difference between a corporate bond and a consumer loan?



Bonds and Interest Rates: Basic

How do you determine the discount rate on a bond?



Bonds and Interest Rates: Basic

How do you price a bond?



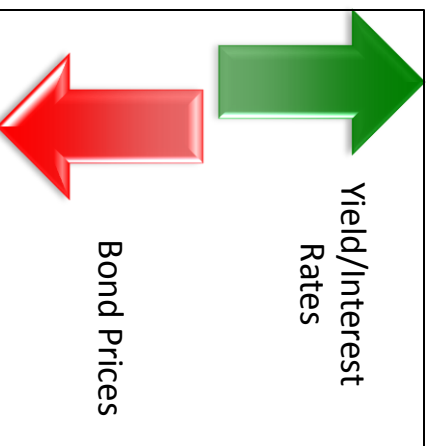
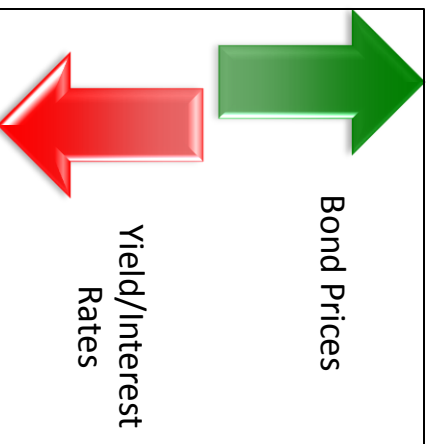
Bonds and Interest Rates: Basic

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



- 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
 - The amount of current debt outstanding

- 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.



- 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 while 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.
- 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 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.

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

**** See the full technical interview guide for much more information on answering this question**

Bonds and Interest Rates: Basic

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?



Bonds and Interest Rates: Basic

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



Bonds and Interest Rates: Basic

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



Bonds and Interest Rates: Basic

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



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

- Price moves inversely to interest rates
- If you believe interest rates will fall, bond prices will rise, and therefore you should buy bonds.

- 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.

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

Bonds and Interest Rates: Basic

How many basis points equal 0.5 percent?



Bonds and Interest Rates: Basic

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



Bonds and Interest Rates: Basic

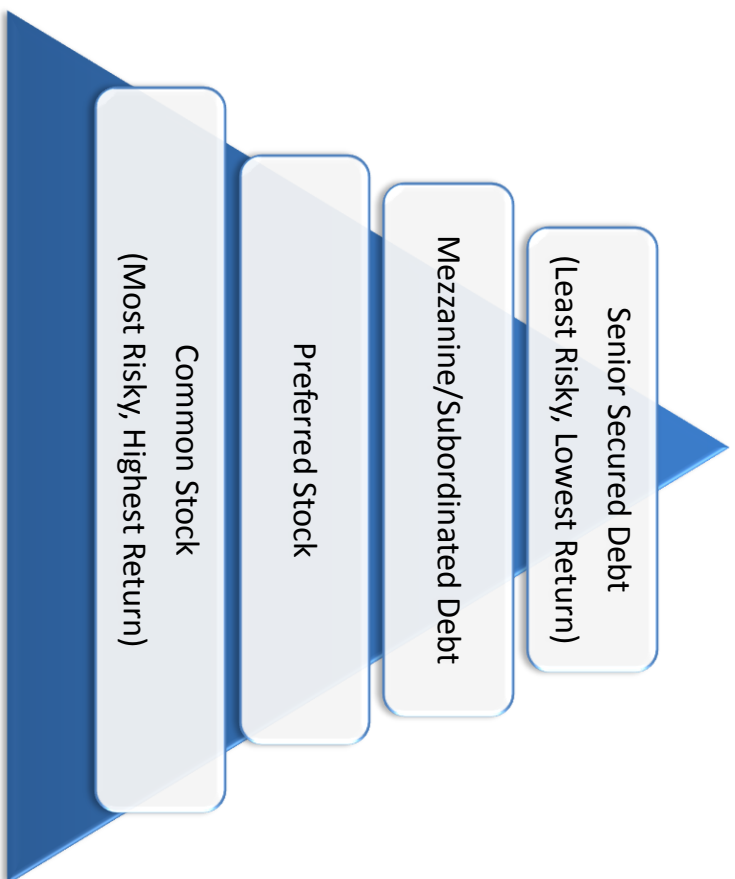
Why could two bonds with the same maturity, same coupon, from the same issuer be trading at different prices?



Bonds and Interest Rates: Basic

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.
- Recently, ratings agencies have faced some skepticism over their ratings techniques since so many MBSs were given very high ratings and actually ended up defaulting.
- The lower the grade, the more speculative the stock, and all else equal, the higher the yield.

*** See the full technical interview guide for much more information on answering this question*

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

- One of the bonds could be callable
- One of the bonds could be puttable
- One of the bonds could be convertible

Bonds and Interest Rates: Intermediate

What is the yield to maturity on a bond?



Bonds and Interest Rates: Intermediate

What is the difference between yield to maturity and yield to worst?



Bonds and Interest Rates: Intermediate

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



Bonds and Interest Rates: Intermediate

What is a Eurodollar bond?



<ul style="list-style-type: none"> Yield to maturity assumes the debt holder will maintain their investment through its maturity date, collecting all interest payments and is repaid in full at the time of maturity. Yield to worst is the lowest potential yield an investor can earn on their debt investment without the issuer defaulting. This means that if a bond is callable, or has other provisions, an investor could earn less than the yield to maturity if the company exercises a prepayment option to get out of the bond early. 	<ul style="list-style-type: none"> The yield to maturity (YTM) is the rate of return on a bond if it is purchased today for its current price and held through its maturity date and is paid off in full at maturity. Normally, the yield to maturity is expressed as 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.
<ul style="list-style-type: none"> A Eurodollar bond is a bond issued by a foreign company, but issued in U.S. Dollars rather than their home currency. Note that a Eurodollar bond does not have to be issued by a company actually in Europe, it can be a bond issued by any foreign company. 	<ul style="list-style-type: none"> If interest rates rise, newly issued bonds offer higher yields to keep pace. Existing bonds with lower coupon payments are less attractive, and the price must fall to raise the yield to match the new bonds.

Bonds and Interest Rates: Intermediate

What is a Callable Bond?



Bonds and Interest Rates: Intermediate

What is a Put Bond?



Bonds and Interest Rates: Intermediate

What is a Convertible bond?



Bonds and Interest Rates: Intermediate

What is a Perpetual Bond?



- A put bond is 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 (usually at face value) prior to the maturity date.

- A callable bond has a price (or prices) built into the bond indenture that specify the issuer can buy back the bond on a certain date (or dates) usually for a premium to the face value of the 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.

- Within the bond indenture of a convertible bond is a specified number of shares of equity that each bond can be "converted" into at a time of the bondholders' choosing.
- If the value of those shares exceeds the value of the bond the investor typically will convert the bond into equity.

Bonds and Interest Rates: Intermediate

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



Bonds and Interest Rates: Intermediate

When should a company issue debt instead of issuing equity?



Bonds and Interest Rates: Intermediate

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



Bonds and Interest Rates: Intermediate

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



- A company will normally prefer to issue debt since it is cheaper than issuing equity.
- 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.

- A perpetual bond is one that pays coupon payments every period for eternity, with no repayment of principal (par value).
- The value of the bond will be coupon payment divided by the current interest rate.

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

- 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.

- The price of a zero-coupon bond is more sensitive to fluctuations in interest rates and the price moves in the opposite direction of interest rates.
- So, when interest rates fall, the price of the zero-coupon bond will rise more than the price of the coupon bond.
- If you believe interest rates will fall, you should purchase the zero-coupon bond.

****** See the full technical interview guide for much more information on answering this question

Bonds and Interest Rates: Intermediate

Why can inflation hurt creditors?



Bonds and Interest Rates: Intermediate

How would you value a zero-coupon perpetual bond?



Bonds and Interest Rates: Intermediate

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



Bonds and Interest Rates: Intermediate

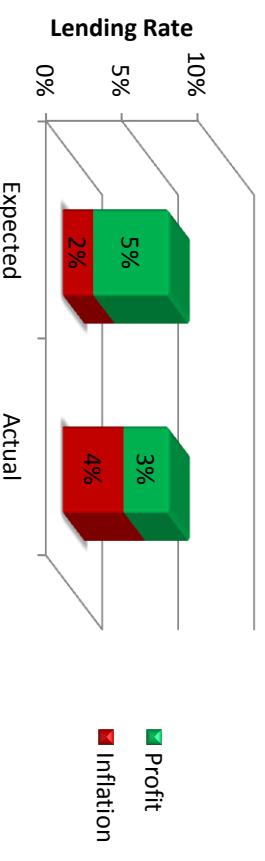
What are some ways to determine if a company poses a credit risk?



- This is a trick question.
- A perpetual bond has no maturity date and is not redeemable; therefore it pays only coupon payments.
- A zero-coupon bond makes no interest payments, it just pays back the face value at maturity.
- If a zero-coupon bond is also a perpetual bond, it will never pay out anything, and is therefore worth nothing.

- The easiest way to determine a company's credit risk is to look at their credit rating which is provided both Standard & Poor's and Moody's.
- If one wanted to perform their own analysis, some metrics to look at would be the Current Ratio, and Quick Ratio.
- One can also look at longer term measures like the long term debt ratio (total debt/EBITDA), debt/equity and interest coverage ratio (EBITDA/Interest Expense) which shows the company's ability to pay its interest expense with its cash flows..
- Compare these ratios to other similar companies in their industry.
- You can also look at a company's cash flows and how steady/consistent they are. A company with predictable cash flows poses far less default risk.

- Inflation cuts into the real percentage return that creditors make when they lend out money at a fixed rate.
- When a bank sets its lending rate, it projects a certain rate of inflation, and then assigns an appropriate level of return (based on the riskiness of the borrower) to capture over and above the inflation rate.
- For example, if a bank lends at 7%, expecting 2% inflation, they expect to make a 5% real gain based on the riskiness of the loan. However, if inflation increases to 4%, they are only making a 3% real return on their loan.



- 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.

Why is a firm's credit rating important?



What steps can the Fed take to influence the economy?



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



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



- 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.

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

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

- See the full technical guide for charts explaining this question

Bonds and Interest Rates: Advanced

What is duration?



Bonds and Interest Rates: Advanced

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



Bonds and Interest Rates: Advanced

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



Currencies: Basic

What is the spot exchange rate?



- 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.

- 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.

- Duration is how sensitive a bond's price is to changes in interest rates and is expressed as a number of years. The calculation is relatively complicated and requires present value, yield, coupon, final maturity, and any call features. However, duration is normally presented to investors in a presentation, and is not something they typically calculate on their own.

- The duration of a bond or bond fund allows an investor to evaluate the investment's interest rate risk. If an investor believes there is a great risk that interest rates will rise (and therefore prices will fall) they will want to shy away from bonds or funds that have a high duration due to their sensitivity to these interest rate fluctuations.
- 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.

- 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 forward exchange rate?



Currencies: Basic

What factors affect foreign exchange rates?



Currencies: Basic

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



Currencies: Intermediate

What are some ways the market exchange rate between two country’s currencies determined?



- Differences in interest rates
- Differences in inflation
- Budget deficits
- Public debt
- Trade policies
- Capital market equilibrium

- 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.
- The rates of inflation in the two countries:
 - If inflation in Country A is expected to be higher than in Country B, Country A's currency will become less valuable (theoretically, all else equal).

- 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 and lock in a future exchange rate.
- For example, a company which will be receiving payment for a product or service in the future (in a foreign currency) may want to budget itself. If they are not able to lock in an exchange rate for those incoming cash flows in the future, they will have a more difficult time setting an accurate budget. However, with a forward exchange rate contract, a company can enter in an agreement to exchange those future cash flows of foreign currency, for their local currency, at a set rate, therefore eliminating their foreign exchange risk.

- A strong currency is one whose value is rising relative to other currencies.
- A weak currency is one whose value is falling relative to other currencies

Currencies: Intermediate

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



Currencies: Advanced

What is the difference between currency devaluation and currency depreciation?



Currencies: Intermediate

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



Currencies: Intermediate

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?



- 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.

- Generally speaking, when the U.S. dollar weakens, the interest rates in the U.S. 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.

- 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.

- 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.

Options and Derivatives: Basic

What is a derivative?



Options and Derivatives: Basic

What are options?



Options and Derivatives: Basic

What is hedging?



Options and Derivatives: Basic

What are forwards contracts?



- Call Option: Gives the holder the right to purchase an asset for a specified exercise price on or before a specified expiration date, but does not force them to do so.
 - If you sell a call option and the value of the asset drops below the exercise price (the price the option holder can buy the asset at) then the option is worthless (since they could buy the asset on the open market for a lower price) and you would profit the amount you sold the option for.
- Put Option: Gives the holder the right to sell an asset for a specified exercise price on or before a specified expiration date, but does not force them to do so.
 - If you sell a put option and the value of the asset rises above the exercise price (the price the option holder can sell the asset at) then the option is worthless (since they could sell the asset on the open market for a higher price) and you would profit the amount you sold the option for.

- Forwards are an agreement that calls for future delivery of an asset at an agreed-upon price.
- These are similar to forward currency exchange contracts, and are used in a similar fashion, but are typically contracts for goods rather than foreign currencies.
- No money is changed initially. They are designed to protect each party from future price fluctuations.

- 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

- Hedging is a strategy used by an investor or a company to try and mitigate the risks on an investment.
- This usually involves investing in derivative products which will be profitable if the market moves in the opposite direction the investor expects.
- It usually lowers the upside potential return of an investment, but also provides downside protection.

What are futures contracts?



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



What factors influence the price of an option?



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



- 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 contracts are almost the same as forwards contracts, except for the fact that they are strictly defined amounts of very certain products which are traded publicly.

- 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.

- 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.
- There are many option pricing calculators you can play with online to see how each variable affects the price.

*** See the full technical interview guide for much more information on answering this question*

What are swaps?



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?



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?



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



- This put is worth \$10.
- 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 would buy shares of Microsoft at \$50 per share and instantaneously sell them for \$60, therefore making a profit of \$10 per share.

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

- A swap is an agreement to exchange future cash flows for a period of time. 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.

- 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.

Options and Derivatives: Advanced

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



Mergers and Acquisitions: Basic

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



Options and Derivatives: Advanced

What is the Black-Scholes Model



Mergers and Acquisitions: Basic

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



- The Black-Scholes model is one way to value asset options (puts and calls)
- Them model contains a number of equations and variables and is quite complicated

*** See the full technical interview guide for much more information on answering this question*

- The “synergies” they are looking to gain through the merger simply will not occur.
- The merger is more about the management team’s ego and growing the business in order to gain the marketability and media attention associated with a merger.
- Investment banking fees associated with going through a merger.

- Interest rates matter due to net present value
- Higher interest rates lower the value of the options because the present value of that option will be lower

- Synergies
- New market presence
- Consolidate operations
- Gain brand recognition
- Grow in size (economies of scale, economies of scope)
- Vertical or horizontal integration
- Taxation
- Diversification of product offerings
- Gain different assets
- Management ego

Mergers and Acquisitions: Basic

What are synergies?



Mergers and Acquisitions: Basic

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



Mergers and Acquisitions: Basic

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



Mergers and Acquisitions: Intermediate

Can you name two companies that you think should merge?



- Strategic buyer: A corporation that wants to acquire another company for strategic business reasons such as synergies, growth potential, etc. An example of this would be an automobile maker purchasing an auto parts supplier in order to gain more control of their COGS and keep costs down.
- 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.

- 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.

- 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 two 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.

- 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.

Mergers and Acquisitions: Intermediate

What is a stock swap?



Mergers and Acquisitions: Intermediate

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



Mergers and Acquisitions: Intermediate

How do you calculate the number of fully diluted shares?



Mergers and Acquisitions: Intermediate

What is a cash offer?



- 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.

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

- 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.

- 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.

Mergers and Acquisitions: Intermediate

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



Mergers and Acquisitions: Intermediate

Why pay in stock versus cash?



Mergers and Acquisitions: Intermediate

What is a tender offer?



Mergers and Acquisitions: Intermediate

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



- If a company pays in cash, those receiving cash will need to pay taxes on the amount received.
- If the owners of the company being acquired want to be a part of the new company, they may prefer to gain stock if they believe the new company will perform well and the stock will increase in value.
- 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 for the stability it provides.

- 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.

- 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.

- A tender offer occurs during a takeover, when the acquirer offers to purchase the shareholders' shares of a company, usually at a higher price than the market price in an attempt to gain controlling interest of a company.
- Some tender offers may be hostile. 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 take ownership of the business as a whole.

Mergers and Acquisitions: Intermediate

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



Mergers and Acquisitions: Advanced

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?



Mergers and Acquisitions: 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?



Mergers and Acquisitions: Advanced

What is the treasury stock method?



- 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.
- 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.

****** See the full technical interview guide for much more information on answering this question

- The Treasury Stock Method is a way of estimating the effects of employee stock options as well as convertible debt and preferred stock to calculate the number of "fully diluted shares outstanding"
- 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

****** See the full technical interview guide for much more information on answering this question

- 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.

- 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.

Mergers and Acquisitions: Advanced

Are most mergers stock swaps or cash transactions and why?



Mergers and Acquisitions: Advanced

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?



Mergers and Acquisitions: Advanced

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



Mergers and Acquisitions: Advanced

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



- 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.

- 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.

- This varies.
- In strong markets many mergers are stock swaps mainly because the prices of company stock are so high, as well as the fact that the current owners may desire stock in the new company, anticipating further growth in a strong market.

- 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.

*** See page 76 of the full technical interview guide for much more information on answering this question*

Mergers and Acquisitions: Advanced

What makes a company an attractive target for a leveraged buyout?



Mergers and Acquisitions: Advanced

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



Mergers and Acquisitions: Advanced

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



Mergers and Acquisitions: Advanced

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



- 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.

- 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.

- 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.

- The three types of mergers are horizontal, vertical and conglomerate.

- 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.

- 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.

Other

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



Other

What are some recent trends in investment banking?



Other

What is an institutional investor?



Other

What is a hedge fund?



- 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

- 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.

- 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.

- 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, mutual funds and multi-family offices.
- They act as specialized investors who invest on behalf of their clients.

Other

What is securitization?



Other

What is arbitrage?



Brainteasers

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



Brainteasers

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



- 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.

- 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 $\frac{1}{4}$ of an hour, or 15 minutes.

- 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 tranches.
- One of the reasons for the recession has been the mortgage-backed securities market which is made up of securitized pools of mortgages.

- 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 17×10 plus 17×7 . Break 17×7 down into 10×7 and 7×7 . 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 18×22 , break it down. Do $18 \times 20 + 18 \times 2$. Easy, $360 + 36 = 396$.
- As far as brainteasers go, this is a rather common one.

✂

Brain teasers

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



✂

Brain teasers

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?



✂

Brain teasers

How many gas stations are in the United States?



✂

Brain teasers

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?



- 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.

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

- 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

- 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.

Brain teasers

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?



Brain teasers

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



Brain teasers

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.



Brain teasers

A stock is trading at 10 and 1/16. There are 1 million shares outstanding. What is the stock's Market Cap?



- 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.

- 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.

- 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).

- 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.