So, You Didn't Make it to Wall Street… What's Next?

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Submitted in Partial Fulfillment
of the Requirements for
Graduation with Honors from the
South Carolina Honors College

May, 2020

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So, You Didn't Make it to Wall Street… What's Next?

Recruiting in Financial Services from an SEC School

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Abstract

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So, You Didn't Make it to Wall Street… What's Next?

Jobs in finance are hard to come by and often require much preparation with little time. Most of that preparation revolves around getting an investment banking internship without addressing the other fields of high finance. Many students aty the Ivy League institutions and top schools, such as Stanford, have access to resources that SEC students do not. This thesis aims to serve as a guide to fill in the gaps that are left by only preparing for investment banking and should help SEC students learn and prepare for the other jobs in finance. These areas are asset management, management consulting, hedge funds, corporate finance, private equity, and a foray into recruiting for a full-time role in investment banking. In order to obtain the information, we spent hors of time interviewing professionals at many financial institutions globally. Through these interviews and the advice we received, we compiled this guide.

Introduction:

This thesis is a guide on how to obtain non-investment banking, front-office, jobs in finance. Many students are interested in finance at a higher level and recruit for investment banking summer analyst positions but are not successful. For example, in 2016, Goldman Sachs saw 223,849 undergraduate applicants for its internships and new analyst positions globally; the bank hired less than 10%. Morgan Stanley saw 8,000 applicants for the investment banking division alone for only 100 spots. Bank of America only hired 3% of applicants in its investment bank as well (Noonan, 2016). While guides exist for helping students to obtain investment banking internships, we do not know of any similarly structured guides for other roles in high finance. The primary purpose of this guide is to help students. We are hoping to develop information that will help students and give back to the Finance program that has helped us so much. The idea for this guide occurred when Alan did not obtain a summer analyst internship in banking and he had to search for other opportunities. He looked for guides to help him, but he did not find one. To aid students in their search, we curated the limited literature available, as well as experts' opinions, about how to find non-investment banking "high finance" positions.

By "high-finance" positions, we mean positions in financial institutions and large corporations that involve activities such as mergers and acquisitions, raising capital, risk management, asset-liability management, and investment decisions. High finance also refers to the internal workings of Fortune 500 companies and how they stay afloat and the strategies employed at a C-Suite level. That is why this guide focuses on providing guidance for how to obtain front office roles in asset management, hedge funds, private equity, management consulting, corporate finance, and how to recruit for investment banking for a full-time role. These jobs take a lot of preparation and studying beyond the classroom. We hope this guide makes these high-level jobs more accessible to the students in the SEC and the Darla Moore School of Business in particular.

There is a disclaimer for readers; this thesis assumes that you recruited for banking and were adequately prepared for those interviews. This research assumes you have modelling experience, that you either learned on your own or through a program like Finance Scholars and have an in-depth knowledge of finance already. We assume you have read the *Breaking into Wall Street* guide or the *M&I 400* guide and understand those technicals. This guide will not be covering networking very extensively (unless there are nuances) and assumes you already understand how to successfully network.

Furthermore, our research focuses primarily on the technical aspects of recruiting for these roles. We want to call attention to this because by nature the document is dismissive of probably the most crucial element in interviewing, the human element. This is important not only in finance, but in any job hunt. Being genuine and showing interest are arguably the most important things for candidates to demonstrate. One of the reasons students fail to win offers or progress to "superdays" is that they are considered "fake."

The most important rule of interviewing is to be yourself. There is no framework for how to be yourself, yet it is the most important piece of the interview. Firms will not hire someone they do not like. Also, even though you might feel like you would take any offer in front of you; if you manage to get a job by not being yourself, that will mean you will never fit in with the group

culture. It might seem worth it now when you are searching for a job, but after a few months in the job you will likely regret not finding an organization in which you fit better.

Regardless of your technical skills, intelligence, investing acumen, or university pedigree, employers want people they like to work for them. Firms want candidates with a sense of self, good moral compass, flexibility in terms of role, and outside interests. Make sure to devote some time to your other interests as well as preparing for your interviews. The guide only addresses technical questions because there are numerous books about the human element of interviewing, as this concept is not finance specific. but remembering the “human capital” aspect to interviews is very important.

This guide includes a summary of the type of roles that one may pursue and high finance and gives some examples of the day to day in each of them. We provide our guide for six job areas. Each section pertains to a sector or sub-industry within the finance industry. While the list is not exhaustive, it should provide a foundation for interviewing. Each section contains the information about the technical questions used in that sector, much like the banking guides. These have been curated by people in the field in those respective sectors and checked by them. We discussed the feedback they received and the advice they have for undergraduate students, unfiltered and minimally edited for a more accurate perspective on what firms look for. Finally, each section ends with a list of firms that hire from the SEC and a rough timeline of when the recruiting occurs. Some of these are more thorough and complete than others, but this is a result of some areas of finance being far more secretive than others.

In the end, we hope this guide is helpful and we wish you the best of luck recruiting for these positions.

Section I – Asset Management

A. *Summary of Asset Management*

Asset management is the direction of all or part of a client's portfolio by a financial services institution, usually an investment bank, or an individual. Institutions offer investment services along with a wide range of traditional and alternative product offerings that might not be available to the average investor.

Unlike, banking, asset management interviews tend to be less "financially technical". You will not necessarily be asked to build someone an LBO (**l**everaged **b**uy**o**ut), but you will need to be able to explain strategies well. According to a first-year analyst at a large firm, you need to have a demonstrated interest in investing. He even went so far as to say that when he was networking, he would write investment reports and attach them to emails to portfolio managers to pick their brain. Another analyst in equities advised to put your own money into the market using coherent and defendable strategies. This really shows your interest and your willingness to learn along the way.

The day to day can look vastly different at many firms. At a general level, the hours are not as bad as banking, usually running an hour before the markets open until two hours after the markets close. Much of the day is spent writing investment memos, researching investment ideas, and going to meetings to discuss the portfolio. An investment memo is a short write-up on the performance of a portfolio or an investment at that point in time with comments on why the performance is what it is. They usually chronicle the events of one of the investments, like a bad earnings report for example.

One of the considerations you will need to consider is the size of the firm. Firms like Vanguard and BlackRock have massive portfolios with hundreds of billions of dollars in assets, with each vertical functioning somewhat independently of each other. Other firms are significantly smaller, with less than $5bn and have very small teams and must work together to best distribute capital.

B. *Technical Questions*

Q: Can you walk me through the major financial ratios?

A: Be familiar with ROIC, FCF, EPS, PE Ratio, Working Capital Ratio, Debt to Equity Ratio. Be able to explain all these fully and probably have 2 to 3 more less traditional ones that you can draw on if they ask for additional.

Q: If you earn 6% a year using simple compounding, how would you calculate how much you would earn in a 90-day period?

A: 6% / 360 days (used as a good estimate) * 90 days = .015% every 90 days. Whenever you assume like this, you always need to ask the interviewer if that is

okay before you do this. Another common example is that the US tax rate is 21%, you should always ask the interviewer if it is okay to use 20%.

Q: Boeing announces that they will be issuing an additional 5,000,000 units at $150. Each unit is made up of 1 common share, 1 preferred share, and a warrant at 1/5 of a share. How many new common shares will be issued if the offering is successful and all warrants are exercised.

A: Here you are being tested on vocabulary. Do you know the difference in common and preferred, and do you know what a warrant is? A classic thing in finance interviews is to give more information than is necessary. The share price and preferred share count do not matter. If the warrants are all exercised, then you will have the 5,000,000 common shares + 1,000,000 (5,000,000 units * 1/5 of warrant) for 6,000,000 total common shares.

Q: The face value of a bond from AGG is $750 and has an 8% coupon rate, with a semi-annual payment. It matures in 2 years. If the bond is priced to yield 10% what is the Present Value of the bond?

A: Face Value of the bond is 750, CF is 750*.08 = 60, because semi-annual 60/2 = $30, N is 2*2 = 10, it is 10%/2 = 5%

30 * (1-(1+.05)^-10)/.05 + 750/(1+.05)^10

909.82

*If asked this question you may or may not be allowed to use a calculator, but you would probably at least be given a pencil and paper. If you are not able to do the math in your head, you should still write out all or as much of the equation as you know with the inserted numbers from the problem. Most in your head problems would have simpler numbers at an average firm, but top places will expect this level of mental mathematics.

Q: Why our Investment Strategy?

A: This is part research, part fit, part technical but it is a question you are very likely to get asked and should be prepared for. You need to know if the firm is growth, value, long-only, debt-focused, etc. Then you need to be able to speak to why that works best for you. Ideally you can speak to some of your personally trading, but you should know the upsides of whatever investment strategy the firm uses.

Q: Stock Pitch

A: This is much less in-depth than the hedge fund stock pitches you will see later in this guide. For these pitches you should pick a company that is not super well known but is still publicly traded. In other words, do not pick Apple, Alphabet, Boeing, Coca-Cola, etc. You want to aim for 2-3 minutes and tailor it to their investment strategy. You should have one pitch that you feel 100% confident you know everything needed about the company. You should also have two more that decently prepared, preferably a long and a short.

Here are two examples of successful stock pitches. One is slightly more technical whereas the other is a much more fundamental play. Both would be well received depending on the firm:

Case 1 Transocean (RIG): Before the spill, RIG was a leader in an industry with great long-term prospects, and only traded at a X multiple. The rig it lost was fully insured. It also had insurance for XX dollars for personal claims, and the Exxon Valdez spill only amounted to a fraction of this. These claims were also paid out 18 years later, drastically reducing the PV. Since it is likely fully insured for damages, the only explanation for loss in market cap is reduction in earnings. Apart from temporary ban (cannot go on forever), it only lost one rig, accounting for XX in earnings, so at a pre-spill multiple of X it should have reduced market cap by X. It lost XX in market cap, overstating the damage by X times. Huge overreaction. Catalysts are a stopping of the ban and legal results, which are likely to play out favorably for the following reasons… and the pitch would continue with further support for this claim

Case 2 Bed Bath & Beyond (BBBY) has taken a price hit much steeper than any loss in Retail earnings, triggered by a belief that amazon prime online shopping, the retail industry rival, is believed to be a significantly cheaper and offers many items sold at BBB&Y via online. However, truth be told, BBBY has invested substantially in technology to improve cost efficiencies in online services over their recent year, yet still the retailer did well earnings wise despite the non-recurring expenses clouding their recent year's net income and EPS figures and even more exacerbating a stock price waterfall that is now water under a bridge. I believe the rewards for the R&D expenses will pay off in improved sales among people who have instant product needs and want a tangible shopping experience, yet with technological online digital order systems such as the Simple human trashcan phone app. I believe that meeting other shoppers and physical office space will never take the hit to actual fundamental seen in projections and low

stock price valuations, thus I'd recommend a buy case for BBBY….in addition to the notion they can offer up dividends at any time.

BBBY is underrated, R&D expenses can translate into new sales on complementary accessories related to in-store purchases, improving return on sales in a time when most overvalued entities in retail are more significantly underperforming sales targets and declining in sales volumes over recent years. I believe we will see a stock rebound and should go long.

C. *Asset Management Advice*

A unique piece of advice we heard was from a 1st year analyst at a global asset management firm. He advised students to reach out and network with potential firms and to be honest and transparent. When he was searching, he was not sure about what he wanted to do so, and the people who he networked with pointed him in the direction of a rotational program at his firm and he loves it so far.

A key consideration in choosing where to work is what kind of role you want. Asset management is highly varied Personally, I was interested in stressed and distressed investments and received a role within high yield bond research. My firm, however, has numerous other focus areas, including private debt, real asset, high yield bonds, equities of all sizes and locations (E.M., MidCap, etc.), investment grade bonds, fund-of-fund investments, co-investments, and various kinds of real estate investments. Not all firms have these capabilities, especially the smaller ones. Having a really good story for why you want to work in real assets will not help you if the firm you are recruiting at only has equities.

A final key consideration is knowing who owns the firm. For example, working for a firm that is owned by an insurance company can limit the amount of risk and strategies you can implement.

D. *Asset Management Placement List (Not Comprehensive)*

Allianz

American Funds

Barings

Blackrock

Brown Brothers Harriman

Charles Schwab

Fidelity

HarbourVest Partners

Invesco

JP Morgan Asset Management

Legg Mason

Oaktree Capital Management

PIMCO

Raymond James

Retirement System Investment Commission (RSIC)

State Street Global Advisors

TIAA

T. Rowe Price

UBS Asset Management

Vanguard

E. *Asset Management Recruiting Timeline*

Asset managers with about $500b and up tend to recruit around September to November, which is a bit later than the banks according to a second-year associate at one such firm. Anything smaller than that will have a less structured recruiting process and will be on a case by case basis.

Section II – Management Consulting

A. *Summary of Management Consulting*

Management consulting is at its core driving change for clients. Clients bring complex business problems to management consulting firms -- new market entry, new product launch, profitability issues, questions about M&A (mergers and acquisitions) -- and the consultants are tasked with developing solutions to the most pressing issues facing their clients (Tantalus Group, n.d.). The role involves a combination of analytical and communication skills and offers countless opportunities for personal and professional development through investment in the employees. A good consultant is a problem solver, results-oriented, has strong communication skills, an ability to synthesize information, and analytical reasoning skills (Lande, 2019). Of course, consultants also need to be open to a flexible lifestyle - often the career involves 60-70-hour work weeks, travelling Monday through Thursday. Management consulting gives a transferable skill set to employees in addition to exposure to a broad range of industries and services, which opens doors to unique exit opportunities (PE, private equity and IB, investment banking, included) and preparation for top graduate schools.

The most appropriate personality characteristics differ slightly than in banking. While bankers at a junior level field phone calls and answer questions, management consultants from an early stage interact with the clients in person. You need to be personable and able to relate to very senior personnel in companies. Rather than banking, where analysts generally field questions over the phone that are strictly deal related, management consultants can expect small talk and more exposure to their clients at a personal level. People who are more outgoing with the ability to think on their feet will and have high emotional intelligence (the ability to read emotions) do well in this environment.

B. *Management Consulting Specific Technical Questions (Case Interviewing according to a 1st Year Analyst at an MBB Firm)*

Consulting firms are known for their case interviews, but each firm has a different style of case interviewing. Cases can be interviewer-led, interviewee-led, presentation-based, group interviews, or have written components. The two most common types are interviewer-led and interviewee-led, while the rest are used mainly by boutique firms. Interviewer-led cases are conducted by McKinsey and Bain. In these interviews, the interviewer asks questions to the interviewee and thus directs the flow of conversation. In interviewee-led cases, practiced by BCG, interviewees are given an initial question with little to no assistance throughout. Candidates are expected to use their innate curiosity to drive the case forward. Once the format is selected, the question types can range greatly across a variety of industries. The main case types include growth strategy, profit and loss, market entry, M&A, market sizing, and pricing.

In completing a case interview, there are many different components to cover. In order to do this, it is best to focus on the Interviewer-Led cases. The flow of a

case interview is as follows: problem, issue tree, math analysis, brainstorming, and synthesis. The math analysis and brainstorming can occasionally be switched, but more or less a case will follow this format:

Problem: The steps here include receiving the problem, backbriefing, and asking clarifying questions. In receiving the problem, the candidate must listen carefully, write furiously, and use shortcuts to prepare for the backbrief. This is when the candidate paraphrases the problem statement back to the interviewer with relevant data to ensure accuracy. Following this, there is an opportunity for questions. This is how to differentiate an experienced caser. Good clarifying questions identify other objectives and metrics for success, but excellent clarifying questions will also influence the candidate's issue tree.

Issue Tree: The most important thing when constructing an issue tree is to make it mutually exclusive and collectively exhaustive (MECE). The first box in the tree states your hypothesis. Let us say our client wanted to know if they should expand into the Argentinian wine market. Our hypothesis would be that yes, they should, proving our analysis of our three main reasons is sound. The three supporting MECE factors are addressed in layer one. Say these layers were Market Demand, Profitability, and Internal Capabilities. From there, we would want to further expand into each area. For Market Demand, we want to look at both the target customer in Argentina, as well as the competitive landscape. That would be our second layer. The third layer builds further off this: in the target customer, maybe we would like to see a breakdown in income for Argentina to appropriately size our market if it has not already been done. The candidate will then proceed through each layer of the tree. An experienced candidate will take no less than 90 seconds to set up their issue tree.

Math Analysis: Following the Argentinian wine example, say in the math analysis that the interviewer does want you to calculate the market size in Argentina. The candidate then will state all assumptions they are using the ensure accuracy in calculation - this is where the interviewer may give new numbers or assumptions, or even challenge the interviewee's assumptions. The candidate must be able to defend assumptions but yield when necessary. From there, the candidate must structure and write out their problem-solving steps while showing and talking the interviewer through each step. Following the calculation, the candidate must interpret any final number to the interviewer. If the candidate calculated a market size of 2 million people, they would then say, "with a target market of 2 million people, this seems to be a large venture with high impact in a new market, this would be a great idea to continue pursuing". It is important to always refer to the initial hypothesis. Common mistakes here include incorrect calculations, misspeaking (million v. billion v. trillion). No calculator is allowed at any point.

Brainstorming: This is the part of the interview where candidates can let their creativity fly and truly differentiate themselves. It is expected that the average candidate takes 30 seconds to prepare in response to a brainstorming question.

Here, candidates must present creative, MECE solutions in an impactful way. For Argentinian wine, maybe the client wants to know how you would go about marketing the product. This could be an opportunity for a candidate to bring up creating a different brand label and call upon case studies conducted by P&G, where they differentiate the brand of home product based on the country. From here, candidates have full creative freedom. It is important to draw on personal experiences and play to your own strengths here.

Synthesis: The last question in a case interview is the synthesis. This is where candidates must prove that they can condense information to a level that a CEO would expect. This question is most phrased as: "you enter the elevator and the CEO of Wine Co. wants an update on your project. What do you tell her? Start talking now." The recommended format for synthesis questions is final recommendation, 2-3 supporting reasons, risks, possible next steps, and restating the final recommendation. Within the supporting reasons, it is important to draw on facts and figures from the case. This usually involves your calculated numbers. Possible next steps are a crucial addition but often forgotten but less experienced casers. This step shows an interviewer that you are capable of forward thinking, and more than that, you can sell continuous work.

Overall, each firm looks for different aspects in case interviews, and some nuances are required from firm to firm (for example, not beginning with a recommendation in your synthesis won't ding you at McKinsey but it will at Bain). The most important thing to do is to research your desired firms to understand their interview style, and then practice. It is recommended that you practice at least 25 case interviews before entering the real thing. As each case interview takes 45 minutes, when added with time for feedback, this means over 40 hours of preparation. Some books advocate for 50 cases. The initial starting spots for anyone looking to learn the art of case interviewing is through preparation books. The most referenced among beginners are "Case in Point" by Marc Cosentino and "Case Interview Secrets" by Victor Cheng. "Embrace the Case" by Mark Schiller is recommended once candidates reach 20 interviews and begin to plateau. Additional resources to avoid plateauing are alumni in the field, as well as assigned case mentors in firms as part of the interview process.

See Appendix I for example of full case.

C. *Management Consulting Advice*

Start networking and start networking early. Build connections that are genuine and have intention. (These people do not have many free moments in their day, and they want to hear insightful questions that reflect your personality, not some script.) Network for mentors, not for interviews. (Starting a year or two in advance is not uncommon.) The rest will fall into place from there.

Find commonalities with your mentors. The easiest way to do this is to reach out to alumni, but that does not have to be the case. “One of my strongest advocates at an MBB firm was not someone that I had known, nor was she someone that went to [School Name], but she was another student from a non-core school that had made the pivot from advisory to strategy a year before me. She proved instrumental in my interviewing process across all firms.” Non-core schools tend to help each other significantly because they understand the uphill battle. SEC will feel an allegiance.

“Through networking, identify your priority firm list. It is unwise to only apply to one firm - network and find your champions at each firm that you are planning on applying to.” Once you have identified your priority firms, become familiar with their interview processes for each firm, both in terms of case and behavioral format.

You do not need an internship in consulting summer after your junior year in order to be eligible for a full-time strategy consulting position. Some firms may prefer it, but if you can prove that you have made a lasting impact wherever you interned, this is what will matter most to an interviewer.

Practice cases before you have the interview. By the time you find out that you have advanced to a case interview, you will have two weeks maximum as a notice. Even if you found people willing to case with you twice a day up until your interview, you likely would not be able to perform well. “The best thing to do is begin your case preparation at least 6 months in advance in order to learn the format and perfect your style of casing.”

If your priority firm has a different type of behavioral interview, do not leave those until the week of to prepare. For example, at McKinsey behavioral interviews are called "Personal Experience Interviews" (PEIs). For each interviewer, only one PEI will be asked - "tell me about a time where you had to solve a complex problem in a group setting". You then will have to speak at length about the event, taking up to 15 minutes to walk through the entire situation. This is a notable thing where consulting interviewing is just different than at a banking job. While you would be penalized in a normal interview for going on that long, it is a required thing in consulting. Many of these interviews have hidden rules and unless you know them it is impossible to succeed.

“Attend any and every networking event put on by the firm. This should be a no-brainer, but I have seen people actually turn down Happy Hour invites for top firms because they are "too busy" or "won't know anyone there". Every event is an opportunity to meet a champion.”

D. *Management Consulting Placement List (Not Comprehensive)*

Accenture

Bain & Company

Booz Allen Hamilton

Boston Consulting Group

CIL Management Consultants

Deloitte Strategy & Operations Consulting

KPMG Management Consulting

McKinsey & Company

Mercer

Oliver Wyman

PwC Management Consulting

PwC Deals Consulting

Roland Berger

Simon Kutcher

*All Big 4 General Consulting (EY, PwC, KPMG, Deloitte)

E. *Consulting Recruiting Timeline*

According to an analyst at an MBB (McKinsey, Bain, or Boston Consulting Group) who worked at a Big 4 (Deloitte, KPMG, EY, PWC) prior, timelines vary firm to firm. The overall timeline starts in late August/early September, and most offers will be sent out by mid-October. Between MBB and the Big 4 for management consulting, here is a sample timeline:

MBB Full Time: happy hour events in July, application and resume due early September, 1-3 week wait, interview 1, within 48 hours invited to round 2 in following week, interviews in late September/early October, offers immediately following

MBB Intern: happy hour events in July, application and resume due by late September, 1-3 week wait, interview 1, within 48 hours invited to round 2 in following week, interviews in late October, offers immediately following

Big 4 Full Time: happy hour events in July, interview at happy hour event, offers 1-2 weeks following in July/August (note: happy hours are essentially the only way you can get in from a non-core school due to their algorithm)

Big 4 Intern: begins slightly later than MBB, but has the same timeline once started

Section III – Corporate Finance

A. *Summary of Corporate Finance*

"Corporate finance is the division of finance that deals with financing, capital structuring, and investment decisions. Corporate finance is primarily concerned with maximizing shareholder value through long and short-term financial planning and the implementation of various strategies." (Kenton, 2020)

Corporate finance is a very diverse field with many kinds of programs. Some of the most common types of corporate finance positions are management/rotational development programs and financial analyst roles.

An example of one of the development programs is the following from Oshkosh Corporation:

> The Financial Rotational Development Program will provide a broad domestic and international finance experience by supporting various departments within Oshkosh Corporation's Treasury group. These various departments include Treasury, Risk Management, Credit, and International Shared Services (Finance and Sales Administration). This role will have the opportunity to rotate among respective Treasury departments every 12-18 months, based on business needs, with a 12-month minimum commitment to the program. Benefits of the program include development in the following key skill areas: critical thinking, communication/collaboration, problem solving, project management, financial analysis, and finance/accounting (Financial Rotational Analyst, 2020).

Below is a description of a financial analyst role at Amazon.

> Amazon seeks a Financial Analyst to be a key member in our Operations Finance team. This role will have heavy impact and high visibility to essential, business-critical processes, and will require interactions with Directors and VP's within Operations and Finance. This is an exciting opportunity to join one of the most innovative and fastest growing businesses of Amazon, in a role where you will have regular interaction with executives and various business units across the organization. The successful candidate will be a self-starter with strong interpersonal and communication skills, data mining and modeling capabilities, keen attention to detail, sound logical reasoning, and the ability to manage multiple projects effectively.
>
> Primary responsibilities:
>
> - Providing support for month end reviews, forecasts, and annual operating plans

- Work closely with the Operations & Supply Chain team and be responsible for tracking associated expenses
- Own and manage component price true up (Purchase Price Variance) reporting and analytics
- Leading and participating as the key finance stakeholder in cross functional teams
- Building financial models, presenting analyses and recommendations to senior leadership
- Developing scalable and efficient financial processes that support the business
- Deriving meaningful insights and recommendations from large data sets
- Partnering across the finance organization to drive continuous improvement in financial and operational performance
- Developing, maintaining, and tracking key operations metrics
- Producing ad-hoc analyses and assisting in various projects
- Driving automation of reporting and analytics (Finance Analyst, 2020)

As you can see, these roles can vary greatly and should be evaluated on a firm by firm basis. We would highly recommend, if possible, getting into the leadership or management rotational programs. After conversations with more senior corporate financial experts, it seems that almost all promotions come out of these programs if they are internal. If you go for specific roles, you risk getting pigeonholed and having to leave a company in order to advance.

B. *Corporate Finance Specific Technical Questions*

After multiple discussions, there seems to be extremely little emphasis on technical questions in corporate finance interviews. Most people we talked with had no technical component to the interview, and if they did it was typically only a basic question that would directly relate to material learned in an intro finance or corporate finance course. Therefore, technicals have not been included because if you have recruited for banking, you have a much larger technical base than you would need for these interviews.

C. *Corporate Finance Advice*

A financial analyst at a large consumer products company told us that "financial analyst roles are what you make of them, unlike banking where there is a very linear promotion structure, things aren't like that at [the company]. We promote based more so on merit and candidates' willingness to be agile/flexible". Our source then proceeded to give us the advice that her boss gave her. She said the role is not as demanding as banking, but it is what you make of it. Candidates who are willing to put in more hours and work harder climb faster. She also said that if the company taps you to move locations or even internationally, to take the opportunity, most of the senior leadership that was promoted through the company had international assignments.

D. *Corporate Finance Placement List (Not Comprehensive)*

Corporate Finance in Fortune 500 companies has a robust enough Human Resources driven process with a wide net. Most companies will have some SEC students across Corporate Development or Finance roles in general.

E. *Corporate Finance Recruiting Timeline*

We noticed that these were varied but significantly later than banking. We saw first rounds starting in late fall (often late October to Mid-November). We saw an average of 3 to 4 rounds for companies such as Amazon, PepsiCo, and Johnson & Johnson (though there can be more, we saw one company have 6 rounds). These interviews are not very technical and are mostly over the phone or Skype with the final round being a Superday in person. These are different from banking Superdays as they include speakers and meals as well as the interviews. These Superdays can happen as early as November to as late as March/April.

Section IV – Hedge Funds

A. *Summary of Hedge Funds*

"A hedge fund is just a fancy name for an investment partnership that has freer rein to invest aggressively and in a wider variety of financial products than most mutual funds. It's the marriage of a professional fund manager, who is often known as the general partner, and the investors, sometimes known as the limited partners. Together, they pool their money into the fund" (Gad, 2016). In essence, hedge fund is a catchall term used to describe an investment portfolio that follows a particular strategy which often uses leverage. There are many kinds of hedge funds: event driven, fund of funds, emerging markets, long-short, arbitrage, global funds, quantitative funds, and activist funds are some of the most common. It is worth noting that hedge funds are extremely secretive. The nature of the work is very bespoke and proprietary. Most of an analysts' day is spent researching and pitching ideas. In some cases, analysts answer and make calls, follow leads about information, and even meet with management of their potential investment, though this varies greatly from firm to firm.

B. *Hedge Funds Specific Technical Questions*

Hedge Fund interviews are very different than investment banking interviews. Hedge Fund interviews are case based and take place over an extended timeframe (roughly 1 to 2 months). While the first few interviews are behavioral, you are quickly given an extended case study for a pitch. These are not like the management consulting cases that are meant to be conducted in one-sitting.

These pitches are very robust and require hours of research and prep. The cases we have included are for a REIT and a pharmaceutical company (see Appendices I and II respectively), however the type of security pitched will vary greatly. These cases in the appendix were suggested by an associate at an activist fund, but an associate at a credit focused fund said she had to pitch a credit. Other examples include distressed securities, sovereign bonds, and exotic derivatives. How the pitch is structured is, a PowerPoint, a written analysis, and a model.

As you will see in the examples, the PowerPoint is less than 15 slides and the write-up is relatively short as well (though very number heavy). A strong understanding of valuation is necessary. A key point to understand is the pitch needs to be updated almost daily as securities prices often change daily (though not always) and a large price swing can easily derail your pitch.

C. *Hedge Funds Advice*

Personalities vary greatly, but from our conversations, a common theme is bookishness and a cerebral personality. Many of the people we talked to were very interested in the strategies they worked in and really enjoyed research. One person in particular who is an associate at a multibillion-dollar activist fund said he would have been a professor if he could not work at his fund, because he was mostly interested in research. Rather than banking, where you often must be a salesman or a people person, hedge fund analysts and above do not really interact with investors. According to one source, the only people who every interact with the clients are the founder and the sales team. Very rarely will a portfolio manager field calls unless it is a truly exceptional case.

Some things to consider when you work at a hedge fund are compensation and autonomy. Hedge funds are almost devoid of all regulation and therefore give employees a wider range of freedoms when building and deploying a strategy. This makes choosing the fund you work for and the people you work with more important than other careers. If the portfolio manager is reckless, you may find the fund shut down and yourself unemployed in a few quarters. Compensation is almost entirely "eat what you kill" and "eat what your PM kills". Rather than banking, where fees are generated and that's how compensation is paid out, hedge fund compensation is derived by fund performance. This generally means lower salary but higher bonus. Students need to be aware of this variable compensation when planning their careers.

D. Hedge Funds Placement List (Not Comprehensive)

AQR Capital Management

The Baupost Group

Balyasny Capital Management

Bridgewater Associates

Citadel Securities

Davidson Kempner Capital Management

Renaissance Technologies

Two Sigma

E. Hedge Funds Recruiting Timeline

As we were advised, besides a few of the largest funds (Citadel, Bridgewater, Etc.) no formal timeline exists. Hedge funds almost always hire on a case by case basis and a need basis. A good strategy for applying to hedge funds is networking with some employees and asking them to notify you when they have an opening. Headhunters are also common, though our sources were hesitant to recommend them as networking is always better.

Section V – Private Equity

A. *Summary of Private Equity*

Private equity is "equity—ownership or an interest in an entity—that is not publicly listed or traded" (Segal, 2020). Essentially, private equity is the use of capital through formal agreements that circumvent the markets. There are many kinds of private equity such as venture capital, leveraged buyouts, growth equity, PIPE placements (**P**rivate **I**nvestment in **P**ublic **E**quity), and special situations.

Private equity interviews are highly technical, especially LBO and special situations focused groups, more so than banking. These technical interviews differ slightly from banking interviews in that they focus more on depth less on breadth of knowledge. While we discuss the technical aspects below, it is important to note that many of these are math and model based and will often have a take home portion or an Excel test. Moreover, a complex understanding of debt is required (especially for LBO and special situations) and a deep understanding of macroeconomic trends is necessary as well (especially PIPE, venture capital or VC, and growth equity).

The role varies by type of fund as well. In general, the hours are slightly better (with some exceptions) and more predictable. The day to day changes per the fund's mandate, but most days begin around ten in the morning and end twelve hours later. The job is very research heavy at the junior level, analysts split their time chiefly among research, listening to pitches from investment banks, meetings with their portfolio managers, and pitching investment ideas.

The personalities and characteristics of successful analysts across this sector vary. However, based on the research we conducted, the people are very personable and analytical simultaneously. They must be very good at working with people and numbers. This may be one of the rarer skill sets, but those who enjoy numbers but do not want to stare at a computer all day will do well in this role.

When working in private equity, as with any firm, group culture is incredibly important. However, unlike other firms, in PE you need to choose what kind of fund you want to work for. For example, LBO's tend to be more financial engineering than trend focused while something like VC requires a great deal of knowledge, deep understanding of trends, and an ability to read people. Additionally, making sure you understand the fund's mandate is crucial. Working for a megafund (like KKR or Apollo) looks very different than working in the lower middle market and they look at very different metrics.

B. Private Equity Specific Technical Questions

Accounting:

These questions are going to be remarkably similar to the ones you saw in banking interviews but will probably be slightly harder. If you have your basic accounting concepts down you should be fine, but if not review your accounting coursework and IB guides. These questions are typically geared in a little more open-ended fashion and you should use real examples to support your claims when possible.

Q: If a company has seasonal working capital, is that a deal killer?

A: Working capital is current assets fewer current liabilities. Seasonal working capital applies to firms whose business is tied to certain time periods. For instance, UGG mostly manufactures snow boots. In the winter, demand is higher, so the firm must build up inventories to meet this demand at this time, increasing current assets. Since more cash is tied up, this can increase the liquidity risk; like if UGGs suddenly go out of fashion, then the company is stuck holding the inventory.

Also, if people frequently pay with credit for the company's products, the amount is listed as accounts receivable, which represents future profits but is noncash. Therefore, if the company cannot collect this owed cash in time to pay its creditors, it runs of the risk of bankruptcy. This is an issue to note and watch. All that considered, it is not a deal killer if you have an adequate revolver and can predict the seasonal WC requirements with some clarity. In general, any recurring event is fine if it continues to perform as planned. The one-time massive surprise event is what can kill an investment.

You can note that with this response, the interviewee showed full grasp of all the topics asked in the question and provided an example to support and further demonstrate knowledge of the subject.

Q: There is usually a "simple" and "complex" way of projecting a company's financial statements. Is there a real advantage to using the complex method? In other words, does it give us better numbers?

A: In short, no. The complex methods give you similar numbers most of the time – you are not using them to get better numbers, but rather to get better support for those numbers. If you just say, "Revenue grows by 10% per year!" there is not

much evidence to back up that claim. But if you create a bottoms-up revenue model by segment, then you can say, “The 10% growth is driven by a 5% price increase in this segment, a 10% increase in units sold here, 15% growth in units sold in this geography” and so on.

Finance:

Q: What do you think is the best method of valuation?

A: Depends on the situation. Ideally, you would like to triangulate all three main methods: precedents, trading comps and DCF. However, sometimes there are good reasons to heavily weight one over the others. A company could be fundamentally different from its peers, with a much higher/lower growth rate or risk and projections for future cash flows is very reasonable, which makes a good case to focus on the DCF. Or you may prefer trading comps over precedents because there are few precedents available or the market has fundamentally changed since the time those precedents occurred (i.e., 2006 was an expensive year due to the availability of leverage).

Q: Company A has assets of $100 million versus Company B which has $10 million. Both have the same dollar earnings. Which company is better?

A: Company B has a higher return on assets (“ROA”) given that both companies had the same earnings, but Company B was able to generate it with fewer assets and is, thus, more efficient. Something to think more about is if Company A was primarily debt financed whereas Company B was entirely equity financed. From a return on equity or investment (“ROE” & “ROI”) perspective, Company A might be a better company but it would be riskier from a bankruptcy perspective so the “better” company would be less black and white in this situation. Based on what you are given, Company B is better because it is more efficient with its assets, but you should address this other possibility and see if the interviewer gives you additional information.

Q: You have a company with $500 million of senior debt and $500 million of junior debt. The senior debt has an interest rate of L+ 500 and, in default, would recover 70 percent; the junior debt would recover 30 percent in default. What should the interest rate be on the junior debt?

A: Loss on default * Probability of default = incremental interest that needs to be paid. So, 70% loss * 5% probability (an assumption you must make) = 350 basis points over the senior debt or L + 850.

Investment/LBO:

Technical questions in this area differ the most from those in banking. Private Equity has somewhat a different way to look at companies and thinking and these questions are meant to test that thought process. In private equity you are tasked with picking the investment as opposed to just trying to facilitate a transaction.

Q: In an LBO, if cost of debt is 10 percent, what is the minimum return required to break even?

A: Since interest is tax deductible, the break-even return is the after-tax cost of debt. Assuming tax rate of 20%, the break-even return is 8%.

Q: What are some characteristics of a company that is a good LBO candidate?

A: Ideally, LBO'd companies have steady cash flows, strong management, opportunities for earnings growth or cost reductions, high asset base (for collateral to raise more debt), low business risk and low need for ongoing investment (e.g. capex and working capital). The most important characteristic is steady cash flows because sponsors need to be able to pay off the relatively high interest expense each year.

Q: Let us say you run an LBO analysis and the resulting return is below the required return threshold of your PE firm. What drivers to the model will increase the return?

A: Some of the things that will boost return are: 1) increase leverage (debt), 2) reduce purchase price, which decreases the amount that the firm has to pay, 3) increase exit/sale price or multiple, which increases the return on the investment, 4) increase the growth rate, which raises operating income/cash flow/EBITDA in the projections, and 5) decrease costs, to also raise operating income/cash flow/EBITDA in the projections.

Q: A company has $100 million of EBITDA. It grows to $120 million in five years. Each year you paid down $25 million of debt. Let us say you bought the company for 5.0x and sold it for 5.5x. How much equity value did you create? How much is attributed to each strategy of creating equity value?

A: The purchase price is $500 million = $100 million * 5.0x. It exits at $660 million = $120 million * 5.5x. This is a profit of $160 million, plus you paid down debt of $125 million = $25 * 5, so your total equity value increased by $285 million = $160 million + $125 million. Obviously the $125 million of the total equity value is due to debt paydown. $100 million comes from the EBITDA growth, ($120 million - $100 million) * 5. Finally, the rest of its equity value increase is attributed to multiple expansion, (5.5x – 5.0x) * $120 million = $60 million. Totaling these up, $125 million + $100 million + $60 million is the $285 million of equity value increase that matches what we calculated earlier.

Q: It is Friday and you are given 10 potential companies to invest in. You need to present two at Monday's investment meeting. The companies are in the following industries: biotech, paper products, hotel chain, utility, fast-food chain, pharmaceutical, luxury retailer, discount retailer, computer manufacturer and a conglomerate (General Electric). How do you go about evaluating these?

A: This question is tough, but quickly gauges your interest in the market. You need to display your breadth in various industries, efficiency in understanding what makes a good investment, and lots of common sense. You don't have all day to answer this question, and you only have a weekend to review these ideas, so you want to state that you'd like to eliminate as many companies as you can in the beginning so you can just focus on a few investment ideas to present. Throw out General Electric, given there is way too much to look at and it is so heavily covered by analysts that you will not find anything new in a weekend. Based on the current depression, throw out the luxury retailer and hotel chain. Before the workday ends, call up research analysts at various investment banks for as much information as you can get, like research reports, comps, and their personal opinions. After reviewing that information plus historical stock price charts, company filings, and recent news, you will want to call those contacts up again to answer any more questions that may have arisen. Now, hopefully, you have eliminated a lot more companies. After discussing what the general steps are to evaluate an investment, you will want to ask your interviewer questions that will help you narrow the field more. The answer is not exactly which two industries you pick—it is the depth and breadth of your thinking process.

Brainteasers:

This section is almost identical to investment banking. You can easily use the same guides that you used to prepare for IB brainteasers.

Q: You have 100 balls (50 Blue and 50 Red) and two buckets (bucket A and bucket B. If you randomly select a bucket and then randomly select a ball out of that bucket, how would you divide the balls between the buckets to maximize the chances of getting of a red ball?

A: One red ball in bucket A and the other 99 balls in bucket B. You have a 50% of having 1/1 odds and a 50% of 49/99 odds. Giving you a 74.7% to grab a red ball.

Q: You have a 10 x 10 x 10 cube made up of smaller 1 x 1 x 1 cubes (think a Rubix Cube). If you dip the larger cube in paint, covering the outside, how many cubes will have paint on them?

A: 10 x 10 x 10 = 1,000 is the total number of cubes. If the outside is covered that means one cube off each side of the cube is now covered in paint. So, the number of clean cubes is equal to 8 x 8 x 8 or 512. 1,000 - 512 = 488.

One major part of many PE interviews is to be able to build what is called a paper LBO. See Appendix IV for an illustrative walkthrough of a paper LBO.

C. *Private Equity Advice*

Working in PE requires an amalgamation of a lot of skills. Making sure you enjoy the team you are on is paramount. Unlike banking where you get staffed and can work across multiple MD's, private equity does not work like that. You are often staffed under the same MD running the same Portfolio Companies. While starting off in PE with just an undergraduate degree is difficult, it is doable. However, staying in private equity with just an undergraduate degree is very rare. Most people at the senior level, especially at the megafunds (Blackstone, KKR, Carlyle) have their MBAs. The reason for this is you often must run a company or help run company post acquisition. This is relatively unique for the financial sector as many are either PhD or undergrad degree focused. To get involved with PE requires the same extracurriculars and organizations as banking, but there also needs to be a demonstrated interest in investing. As with asset management or a hedge fund, the things you decide to do deals on "become your problem" so to speak. It is not like banking where you make a recommendation then wash your hands. You need to be able to have a long-term view of what to do and that can be demonstrated by talking about personal investments. One of the key points in talking about your investments is the ability to talk about the company qualitatively. In private equity, the financials are important, but once a company is taken over, we can change those financials. You must be able to articulate a vision, that is what separates decent candidates from great candidates.

D. *Private Equity Placement List (Not Comprehensive)*

Apollo

Ares Management

Blackstone

Clayton Dubilier Rice

King Street Capital Management

KKR

Neuberger Berman

Vista Equity/Credit

E. *Private Equity Recruiting Timeline*

The recruiting timeline is less formal as PE firms (besides the Megafunds) do not have large analyst classes. This is because of low turnover in PE compared to banking. PE firms are looking to occasionally fill one or two positions firm-wide, rather than bringing on a dedicated analyst class. These cases are more informal, and relationship driven, but most hiring is during the banking window (summer before senior year and that fall for full-time). That said, in general recruiting usually picks up sometime in September and continues in full force through January or February.

Section VI – Still Want to Work in Investment Banking?

A. *Summary of Full-Time Recruiting*

A full-time analyst role and a summer analyst role are largely the same. Analysts get more experience in the models and absorb the PowerPoint responsibilities once the summer analysts leave. The main difference is in the recruiting process. Recruiting for full-time investment banking positions is very similar to summer analyst recruiting, only harder. People want to talk to you less, there are fewer spots available, competition is stiffer, and the technicals are harder. As you will see in the technicals section of this guide, they are much more difficult. Be prepared for model tests and advanced technicals. Be prepared to have concrete examples of industry trends to back up your answers and be prepared to perform company analysis on the fly. When recruiting, you will not likely be recruiting for a generalist role as in a summer analyst role. You will need a story for the vertical you are interviewing for, and you will have to choose strategically. You will need relevant finance experience and need to be able to tie it in to banking. Some of the stronger experiences are asset management, wealth management, capital markets at F500, and private equity. However, the best experience to recruit full-time is IB experience from a smaller IB. These are the main differences.

B. *FT Banking Technical Questions*

In this section you can expect questions similar to those you got when interviewing for a summer analyst role. However, with full-time recruiting the standard is significantly. Softball questions are much rarer, so these examples are meant to represent more difficult questions. It does not mean you should not still study your fundamentals though, as many of these still find their roots in the basic questions.

Accounting

Q: How is GAAP accounting different from tax accounting?

A:

1. GAAP is accrual-based but tax is cash-based.
2. GAAP uses straight-line depreciation whereas tax accounting uses accelerated depreciation
3. GAAP is more complex and more accurately tracks assets/liabilities whereas tax accounting is primarily concerned with revenue/expenses in the current period and income tax a company owes.

Q: What are DTAs and DTLs and how do they arise?

A: They arise because of temporary differences between what a company can deduct for cash tax purposes vs. what they can deduct for book tax purposes. Deferred Tax Liabilities arise when you have a tax expense on the Income

Statement but haven't actually paid that tax in cold, hard cash yet; Deferred Tax Assets arise when you pay taxes in cash but haven't expensed them on the Income Statement yet. The most common way they occur is with asset write-ups and write-downs in M&A deals – an asset write-up will produce a deferred tax liability while a write-down will produce a deferred tax asset.

Q: Walk me through how to create a revenue model for a company.

A: There are two ways you can approach this – a bottom-up build or a top-down build

• Bottom-Up: Start with individual products / customers, estimate the average sale value or customer value, and then the growth rate in sales and sale values to tie everything together.

• Top-Down: Start with "big-picture" metrics like overall market size, then estimate the company's market share and how that will change in coming years, and multiply to get to their revenue.

Of these two methods, bottoms-up is more common and is taken more seriously because estimating "big-picture" numbers is almost impossible.

Q: What is the most accurate way to project depreciation and CapEx for a company?

A: Create a PP&E schedule that splits out different assets by their useful lives, assume straight-line depreciation over each asset's useful life, and then assume CapEx based on what the company has invested historically.

Valuation

Q: Walk me through an IPO valuation for a company about to go public.

A: Unlike normal valuations, for an IPO valuation we only care about public comparable companies. So we first select our comps, then we decide on the most relevant multiple to use to estimate our EV. Once we have the EV we work backwards to get to Equity Value and also subtract out the IPO proceeds because this is new cash. Last, we divide by the total number of shares to get a per-share price.

Q: Explain how you would Calendarize data if you are conducting your analysis in the beginning of Q3 of 2019.

A: Here you are looking for TTM (Trailing Twelve Months). TTM = Most Recent Fiscal Year + New Partial Period – Old Partial Period. In this example you would take the FY'18 report, subtract out earnings in the Q1'18 and Q2'18 and add in earnings for Q1'19 and Q2'19.

Q: Both the M&A premiums and precedent transaction analyses involve looking at previous M&A transactions. What is the difference in how these transactions are selected?

A:

1. All Sellers in the M&A premiums analysis must be public
2. Usually there is a broader set of transactions for M&A premiums – we might use fewer the 10 precedent transactions, but we might have dozens of M&A premiums.
3. The industry and financial screens are less stringent.

Q: I have one company with a 40% EBITDA margin trading at 8x EBITDA, and another company with a 10% EBITDA margin trading at 16x EBITDA. What is the problem with comparing these two valuations directly?

A: There's no "rule" that says this is wrong or not allowed, but it can be misleading to compare companies with dramatically different margins. Due to basic arithmetic, the 40% margin company will usually have a lower multiple – whether or not its actual value is lower. In this situation, we might consider screening based on margins and remove the outliers– you would never try to "normalize" the EBITDA multiples based on margins.

DCF

Q: If you are working with a public company in a DCF, how do you calculate its per-share value?

A: Once you get to Enterprise Value, ADD cash, and then subtract debt, preferred stock, and minority interest (and any other debt-like items) to get to Equity Value. Then, you need to use a circular calculation that considers the basic shares outstanding, options, warrants, convertibles, and other dilutive securities. It is circular because the dilution from these depends on the per-share price – but the per-share price depends on number of shares outstanding, which depends on the per-share price. To resolve this, you need to use iterative calculations in Excel so that it can cycle through to find an approximate per-share price.

Q: We are creating a DCF for a company that is planning to buy a factory for $100 in cash (no debt or other financing) in Year 4. Currently the present value of its Enterprise Value according to the DCF is $200. How would we change the DCF to account for the factory purchase, and what would our new Enterprise Value be?

A: In this scenario, you would add CapEx spending of $100 in year 4 of the DCF, which would reduce Free Cash Flow for that year by $100. The Enterprise Value, in turn, would fall by the present value of that $100 decrease in Free Cash Flow.

The actual math here is messy but you would calculate the present value by dividing $100 by ((1 + WACC)^4) (the "4" just represents year 4 here). Then you would subtract this amount from the Enterprise Value.

Q: What discount period numbers would I use for the mid-year convention if I have a stub period – e.g. Q4 of Year 1 – in my DCF?

A: The rule is that you divide the stub discount period by 2, and then you simply subtract 0.5 from the "normal" discount periods for the future years. Example for a Q4 stub:

	Q4	Year 1	Year 2	Year 3	Year 4	Year 5
Normal Discount Period with Stub	.25	1.25	2.25	3.25	4.25	5.25
Mid-Year Discount Period with Stub	.125	.75	1.75	2.75	3.75	4.75

*note that using the mid-year convention artificially inflates the value of companies significantly.

Q: How does the terminal value calculation change when using the mid-year convention?

A: When you are discounting the terminal value back to the present value, you use different numbers for the discount period depending on whether you are using the Multiples Method or Gordon Growth Method:

• Multiples Method: You add 0.5 to the final year discount number to reflect the fact that you are assuming the company gets sold at the end of the year.

• Gordon Growth Method: You use the final year discount number as is, because you are assuming the cash flows grow into perpetuity and that they are still received throughout the year rather than just at the end.

Merger Models

Q: Walk me through a concrete example of how to calculate revenue synergies.

A: Let us say that Microsoft is going to acquire Yahoo. Yahoo makes money from search advertising online, and they make a certain amount of revenue per search (RPS). Let us assume this RPS is $0.10 right now. If Microsoft acquired it, we might assume that they could boost this RPS by $0.01 or $0.02 because of their superior monetization. So to calculate the additional revenue from this synergy, we would multiply this $0.01 or $0.02 by Yahoo's total # of searches, get the total

additional revenue, and then select a margin on it to determine how much flows through to the combined company's Operating Income.

Q: How do you consider NOLs in an M&A deal?

A: You apply Section 382 to determine how much of the seller's NOLs are usable each year. Allowable NOLs = Equity Purchase Price * Highest of Past 3 Months' Adjusted Long Term Rates. So, if our equity purchase price were $10 billion and the highest adjusted long-term rate were 4%, then we could use $10 billion * 4% = $400 million of NOLs each year. If the seller had $2 billion in NOLs, then the combined company could use $400 million of them each year for 5 years to offset its taxable income.

Q: Could you DTLs or DTAs in an asset purchase?

A: No because in an asset purchase the book basis of assets always matches the tax basis. They get created in a stock purchase because the book value of assets are written up or down, but the tax values are not.

Q: Explain the complete formula for how to calculate Goodwill in an M&A process.

A: Goodwill = Equity Purchase Price – Seller Book Value + Seller's Existing Goodwill – Asset Write-Ups – Seller's Existing Deferred Tax Liability + Write-Down of Seller's Existing Deferred Tax Asset + Newly Created Deferred Tax Liability.

A couple notes here:

• Seller Book Value is just the Shareholders' Equity number.

• You add the Seller's Existing Goodwill because it gets written down to $0 in an M&A deal.

• You subtract the Asset Write-Ups because these are additions to the Assets side of the Balance Sheet – Goodwill is also an asset, so effectively you need less Goodwill to "plug the hole."

• Normally you assume 100% of the Seller's existing DTL is written down.

• The seller's existing DTA may or may not be written down completely.

C. *Interview with a Full Time Recruit*

I attempted to recruit for a few full-time IB roles at well-known banks. I ended up focusing on BMO in NYC, Lazard in Charlotte, Jefferies in NYC and Charlotte, and Goldman Sachs in Singapore. The process was like an internship in the sense that networking was paramount to my success in getting interviews. The

difference was that it was less structured than the summer analyst position. Many banks do not know when they are going to hire full-time, but they venture to say it is after the summer analysts renege their offers and go elsewhere. Because of this you are stuck in a perennial holding pattern of "Keep reaching out, but we don't know if we will hire anyone let alone you".
This frustrated me to no end. You will also have the disadvantage of coming up against candidates who did a summer analyst stint in banking and either got return offers and wanted to go to a better bank/different location or didn't get return offers for various reasons (not always because they were bad summer analysts).

I personally came up against candidates who RBC and JP Morgan had over hired and were good analysts otherwise. They have more relevant experience (obviously) than you will. My advice is to be more technically sound than they are. That basically means the Evercore, Moelis, Centerview interview prep should be easy for you. You must make the bank feel like they missed out on you as a summer analyst, and in order to do that you need to have a very complex and deep knowledge of finance. You need to read Pearl and Rosenbaum and UNDERSTAND every line of it. I brushed up on my accounting knowledge through various online resources and YouTube videos as well. When you walk into the interview, the only reason they should ding you is fit.

As you will see in the technical guide, the questions are much harder than summer analyst role questions. I was asked to build an LBO on paper and have dynamic inputs and build upon the theory of a buyout. I was not prepared for that. My final piece of advice is reach out to smaller banks and secondary locations. As I said earlier, people renege on offers from these places (like Stifel, Stephens, Piper Sandler, some of the smaller banks) to go to the more well-known banks. They also try to transfer to NYC or San Francisco (like going from Jefferies Charlotte to Jefferies NYC is not unheard of). If you interview at these places, they are more likely to be hiring than Goldman Sachs in New York.

D. *Closing on Banking*

At the end of the day, the unfortunate truth is that Full-Time recruiting is incredibly difficult. For example, according to one source, in the summer of 2019 a prominent Middle Market firm had right around 100 interns in their IB division in the NY office. Of those hundred interns only 2 were not extended return offers. Retention rate of offered candidates varies slightly year to year but at this particular firm it shifts between 95-99%. Therefore, when they enter full-time recruiting, they are looking to fill at most probably 6 spots. Now, the candidates going for these spots are going to be every person who didn't receive an internship the first time, everybody who didn't accept their offers due to bank/group culture differences, and everybody who discovered IB post the internship recruiting as a sophomore/junior. So, the odds honestly just are not in your favor. It definitely can be done, but you need to understand the uphill battle

you are on and how the numbers realistically look. That said, this is not your only entrance point into IB.

The next major entrance point is coming in as an MBA associate. If you are passion really is IB, the best thing you can do is find a job that traditionally places very well with top MBA programs. From there start building your MBA profile with service, test scores, and all the other things MBA schools look for. Each one is slightly different but there is plenty of information out there. Recruiting from an MBA program is very common, and in many ways easier. If you have the background to be competitive in IB recruiting from a state school you're probably a top student and will have an academic background to set you up for a top MBA and that is going to be your best chance to re-enter the world of investment banking.

Section VII – Closing: A Note for Expansion on our Work

Readers,

We hope that you have been able to take away substantial information from this project. It is our goal to help students understand the ins-and-outs of various recruiting opportunities. This guide should by no means be your only source when preparing for these interviews, but it hopefully serves as a helpful starting place for you when deciding what careers in finance to pursue.

Our research, although thorough, could naturally be built upon and expanded. Our first major limitation is that a project of this nature is going to be heavily influenced by the individuals you conduct interviews with. In these fields, almost everything is done by word of mouth. There is much less formal information than you would anticipate, and we believe this is done intentionally to create an air of mystique surrounding these jobs. This lack of information serves as a shield that makes it difficult for people outside of the world of finance to penetrate it without building connections. If another student tries to replicate our interview process with completely different interviewees, there would likely be a large amount of overlap, but likely pieces of advice and information on specific firms would differ. It would be interesting to see this rewritten and added upon with a different interview list and see how that changes the outcomes.

Another unfortunate limitation of this guide is that the timeline sections are going to need constant revision. A major criticism of high finance is that its timelines are constantly being accelerated. There is a joke in finance that firms may as well start inviting high schoolers in to recruit (though this is no joke; some firms literally have high school programs). We would estimate that if timelines are updated every 3-5 years it would be sufficient. However, anyone using this guide should keep a close eye on timelines. Our research provides good general information, but once these processes start, they open and close fast. Do not treat our timeline as concrete, consider it as a rough estimate where you begin to look out for open applications a few months prior to our dates and monitor firm websites diligently. The best way to ensure that you do not miss a deadline is speaking and networking with a firm, then asking what the timeline is.

Lastly, one place where we would like to see our research expanded is on a firm specific level. If multiple future authors came in and built out company specific recruiting descriptions, that would be helpful for recruiting. These could include lists of contacts at the various firms that are passionate about helping alumni, any company culture specific questions, what qualities specific firms look for when hiring candidates, etc. In addition, progression tracks could be added at these various firms. It is important that you know what promotions look like before entering a firm. Some tend to promote from within, others will use you for two years and then you are expected to leave and find new work.

These profiles exist somewhat here at USC, but once again, they are not formalized. They are passed down only by word of mouth and are typically guarded relatively closely. However, if someone were able to build out these profiles, we think it would help students not only place more consistently, but also pair better with firms and roles that match their skill sets on a technical level and personalities.

We hope that this guide helped you in whichever goal you were trying to achieve in reading it. We wish you the best in your recruiting and all your future endeavors.

Alan Desai and Luke Trotter

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Appendices I-IV

Appendix I, taken from Management Consulting Case Studies

China Southern Airlines to Fly New Guangzhou-Perth Route

Case Type: new product; math problem.
Consulting Firm: Bain & Company first round summer internship job interview.
Industry Coverage: airlines.

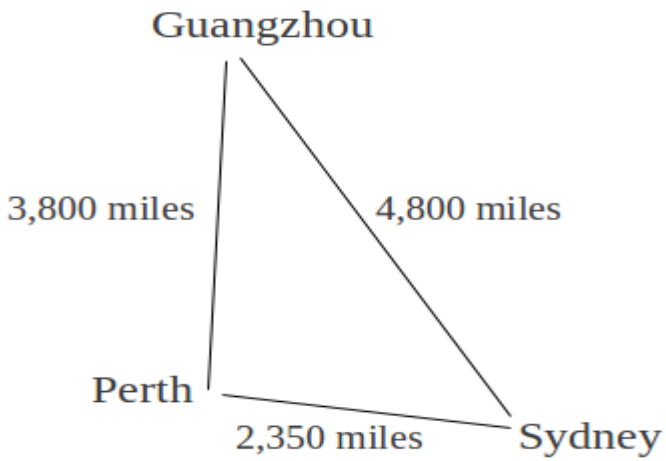
Case Interview Question #00627: Our client China Southern Airlines Company Limited is an airline headquartered in Guangzhou, Guangdong Province, People's Republic of China. It is the world's sixth largest airline measured by passengers carried, and Asia's largest airline in terms of both fleet size and passengers carried. China Southern Airlines is one of China's "Big Three" airlines, alongside Air China and China Eastern Airlines. From its main hubs at Guangzhou Baiyun International Airport and Beijing Capital International Airport, the airline flies to 121 destination

The client already operates two daily flights from Guangzhou, China to Sydney, Australia, offering connections to Perth, Sydney. The CEO of China Southern Airlines has hired your consulting firm Bain to evaluate a new direct flight between Guangzhou and Perth. Should they create this new route from Guangzhou to Perth?

Additional Information: (to be given to candidate if requested)

1. Market

- At this point there is no other airline flying from Guangzhou to Perth, and there is only one competitor Qantas Airways flying from Guangzhou to Sydney. Sydney to Perth is a domestic route with one competitor.
- The market grows with GDP.
- 15% of passengers from Guangzhou to Sydney (or return) have Perth as the original or final destination
- China Southern Airlines' current load factor in Guangzhou to Sydney flight is 80%
- Ticket price to fly from Guangzhou to Sydney or Guangzhou to Perth is $600 one way



2. Flight distance

- Guangzhou – Sydney = 4,800 miles
- Guangzhou – Perth = 3,800 miles
- Sydney – Perth = 2,350 miles

3. Aircraft type

- Airbus 319 (120 seats) has a maximum fly range of 4,000 miles
- Airbus 320 (165 seats) has a maximum fly range of 6,000 miles
- Airbus 330 (240 seats) has a maximum fly range of 7,000 miles

4. Costs

- Airbus 319 (120 seats) has a fixed cost of $41,000
- Airbus 320 (165 seats) has a fixed cost of $62,000

Possible Answer:

Interviewer: So, how would you go about analyzing this case?

Candidate: (Summarize the case and work on a framework) This case requires us to estimate the potential market size of route Guangzhou-Perth, the growth opportunity, the competition as well as our client's resources. Also, any legal or governmental issue should be discussed.

Interviewer: OK. How would you estimate the market size (demand) for the Guangzhou-Perth route? What do you need to know? I have been working with this client for a long time and might have the needed information.

Candidate: Although we could estimate the size of the market, it might be more reasonable to look at the current information the client company has about the indirect route. I would believe many passengers already fly from Perth to Guangzhou by connecting flights in Sydney, right?

Interviewer: Correct.

Candidate: So, I would like to find out the number of flights per day, the number of passengers per flight and the percent of these passengers that actually have Perth as the origin or destination.

Interviewer: Very well thought. It is a smart decision to start more conservative. Our client China Southern Airlines currently flies twice a day from Guangzhou to Sydney and back. It currently operates Airbus 320 in this route, with 80% load factor. 15% of the passengers have Perth as the origin or destination. I can also tell you some aircraft limitations:

- Airbus 319 (120 seats) has a maximum fly range of 4,000 miles
- Airbus 320 (165 seats) has a maximum fly range of 6,000 miles
- Airbus 330 (240 seats) has a maximum fly range of 7,000 miles

Candidate: This gives us 165 * 80% = 132 passengers per flight or 132 * 2 = 264 passengers per day (one way), of which 15% or 40 have Perth as the origin (and final destination). We should have in mind that if the client offers the new Guangzhou-Perth direct flight, it will reduce the load factor of the Guangzhou-Sydney route from 80% to 68%.

Aside from our own cannibalization, I would expect that by offering this new route our client China Southern Airlines will be able to take customers from its competitors, right? Actually, does the client have any competition on its current routes?

Interviewer: There is only one competitor flying from Guangzhou to Sydney, but this competitor has a code-share agreement with a domestic airline that flies from Sydney to Perth. From Guangzhou to Sydney the competitor flies an A330 (240 seats) daily with the same 80% load factor. Also, 15% of its passengers have Perth as the origin or final destination.

Candidate: This gives us an additional 240 * 80% * 15% = 30 passengers/day. Before we conclude that our client will be able to steal these customers from the competition, let us analyze the pricing points. Do you have any information of prices?

Interviewer: Both our client and the competitor charge $600 per one way from Guangzhou to Sydney or Guangzhou to Perth.

Candidate: It is interesting to see that the passenger pays the same fare to fly from Guangzhou to Sydney (4,800 miles) and from Guangzhou to Perth (4,800 + 2,350 = 7,150 miles). So basically, we have the same price and potentially a faster trip. Unless we find any competitive advantage other than travel time, we could assume our client is able to steal all the Guangzhou-Perth customers from the competitor.

I would also imagine that by entering into this route our client would have first-mover advantage and the competitor would not enter this route if they did not think that it could steal share from our client.

Interviewer: This makes sense. Basically, you have estimated a conservative demand. What else would you analyze?

Candidate: We know the potential demand; although there is an expected growth in the industry let us see whether this route would be currently profitable. What do we know about the cost structure?

Interviewer: The total fixed cost of operating A319 and A320 are $41,000 per flight and $62,000 per flight, respectively. There are some variable costs, but they are marginal.

Candidate: Basically, for route Guangzhou-Sydney the client must use an A320, but A319 is an option for route Guangzhou-Perth. Let us analyze the daily revenue, cost, and profit for each route:

Revenues from Guangzhou to Sydney: (165 * 80% * 85%) * $600 = $67,320
Cost for Guangzhou to Sydney: $62,000 (A320)
Profit: $67,320 – $62,000 = $5,320
Profit margin: $5,320 / $67,320 ~= 8%

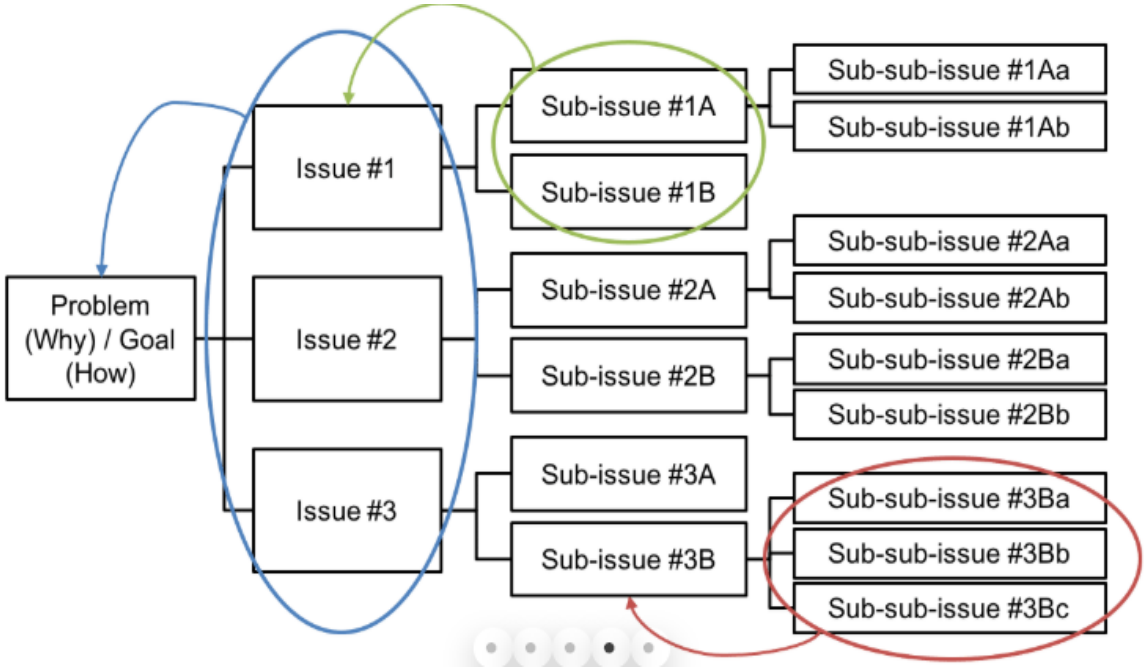
Revenues from Guangzhou to Perth: (40 + 30) * $600 = $42,000
Cost for Guangzhou to Perth: $41,000 (A319)
Profit: $42,000 – $41,000 = $1,000
Profit margin" $1,000 / $42,000 ~= 2.4%

I am assuming the client could use the A320 for the main Guangzhou to Sydney route and A319 for the new Guangzhou to Perth route. As we can see, the former route will remain profitable (8%) and the new route will give a 2.4% margin.

Interviewer: So, what is your conclusion?

Candidate: Taking into consideration that a 2.4% margin is not a very bad number for the airline industry and that our assumption does not take into consideration an additional demand generated by the new faster route from Guangzhou to Perth, the client should at least launch a trial of this new route. The former route, from Guangzhou to Sydney, will remain profitable.

Interviewer: Very good. Thank you.


Problem (Why) / Goal (How)
Issue #1
Issue #2
Issue #3
Sub-issue #1A
Sub-issue #1B
Sub-issue #2A
Sub-issue #2B
Sub-issue #3A
Sub-issue #3B
Sub-sub-issue #1Aa
Sub-sub-issue #1Ab
Sub-sub-issue #2Aa
Sub-sub-issue #2Ab
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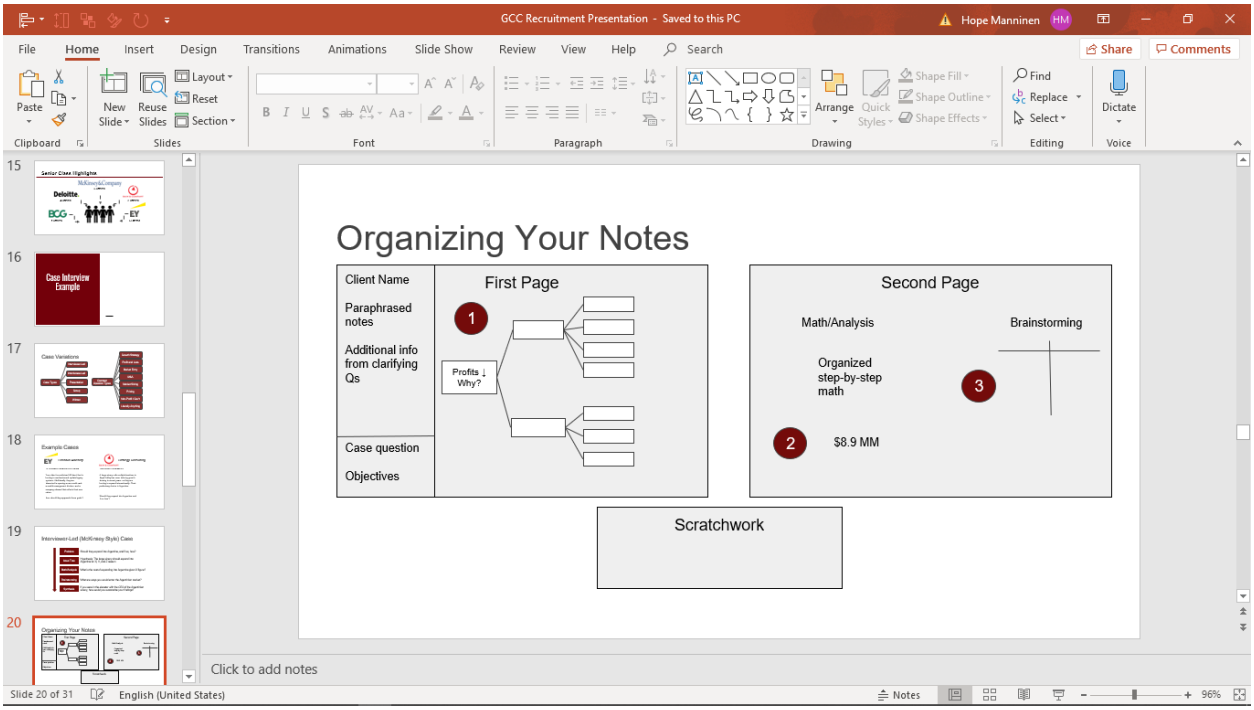
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Profits ↓ Why?
Second Page
Math/Analysis
Organized step-by-step math
Brainstorming
$8.9 MM
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English (United States)

Appendix II. taken from Mergers and Inquisitions, Stock Pitch Guide: How to Pitch a Stock in Hedge Fund Interviews and Win Offers

REIT Valuation Case Study: AvalonBay [AVB] – Full Stock Pitch [LONG]

Recommendation: We recommend **longing** AvalonBay [AVB], a leading multifamily REIT that currently trades at $165.09 per share, because it is undervalued by 20-30%, and its stock price could increase significantly in the next 6-12 months.

The company's stock price has declined by 10-15% over the past 9 months because the market has incorrectly penalized the company for earnings misses in FY 17, along with expectations of rising interest rates and a multifamily slowdown in the company's key coastal markets; consensus forecasts also underestimate the company's Development pipeline.

The company's intrinsic value is likely close to $190 – $210 per share, and even if we are wrong about everything above, the company is only overvalued by 10%.

Catalysts to increase the company's share price in the next 6-12 months include the stabilization of a record $1.9 billion in FY 17 Development deliveries, same-store rental increases above guidance, and expansion into new markets to maintain Development yields.

Key investment risks include a coastal multifamily market downturn in the next 1-2 years, underperformance of the Development pipeline, and lower NOI margins due to rising concessions. We can mitigate these risks by purchasing put options, longing multifamily REITs in different geographies, or shorting a broader multifamily/real estate index fund or ETF.

Company Background: AvalonBay [AVB] is a development-focused REIT with a major presence on the East and West Coasts of the U.S.; the company owns primarily Class A properties, and its average monthly rent per unit is over $2,300.

In its most recent fiscal year, AVB generated $2.2 billion of revenue, $1.3 billion of EBITDA, and Funds from Operations (FFO) of $1.2 billion. Its current Market Cap is $22.8 billion, and its Enterprise Value is $29.8 billion (LTM EV / EBITDA of 22.1x and P / FFO of 19.6x).

We project a revenue CAGR of 6% over the next five years in the Base Case, with EBITDA and FFO growing at 7-8% annualized rates (vs. consensus forecasts of 3-4% annualized growth).

Investment Thesis: Currently, the market views AvalonBay as a company with limited upside and significant downside because of rising interest rates, a substantial risk of real estate price declines in coastal markets, and an inability to raise rents above market growth rates – but each part of this view is incorrect.

First, rising interest rates help the company because they make mortgages more expensive, discouraging home ownership, and approximately 83% of AVB's Debt is fixed rate with an average maturity of ~10 years. Even with a Cost of Debt of 5%, far above its current 3% level, the company would still be **undervalued by ~10%** in the Base Case of our DCF.

There is a legitimate risk of a recession, but it is more likely to affect the single-family owned home market because home prices have risen far more quickly than wages (e.g., Northern Virginia, where inflation-adjusted wages have *declined* since 2010 but where home prices have risen by over 20%). In many of AVB's markets, even highly paid engineers at companies such as Google and Facebook would struggle to pay for a home with less than 30% of their income.

Historically, AVB's rental revenue has never declined by more than 2% per year, even in 2009 – 2010 (when it *increased* by ~2% each year) and 2001 – 2002. With fairly conservative Cap Rates assigned to each segment, AVB's NAV per Share is in the $180 – $190 range; even if Cap Rates everywhere increased by 0.5%, the company will simply trade in-line with its NAV per Share.

Finally, consensus estimates for 3-4% growth significantly underestimate AvalonBay's projected revenue and NOI by assuming minimal contributions from Development. But the company's Development pipeline is significant (~14% of Gross RE Assets) and accounts for 4% extra revenue CAGR over 5 years. In the Base Case, our Year 5 revenue is 10-15% above consensus.

The company's Development potential increases its implied share price by approximately **10%**, its ability to raise rents at the top end of its guidance increase its implied share price by another **10%**, and the limited impact of rising interest rates boosts its implied share price by another **5-10%**; together, these factors imply that the company is **20-30% undervalued**.

Catalysts: The company reported record Development deliveries of $1.9 billion in FY 17; assuming a one-year stabilization at a 6.0% – 6.5% average yield in FY 18, these initial deliveries plus ongoing Development in the future will boost the company's implied share price by ~10%.

We also believe the company can increase rents in Established Communities above its guidance, resulting in total same-store rental growth of 3% in FY 18 (home price growth will outpace wage growth, and interest rates will increase, making renting more attractive).

Finally, the company recently announced plans to expand into new markets, such as Denver, South Florida, and Baltimore; specific projects will be announced within the next year. Construction costs in these markets are likely to be lower than those in established markets, further supporting the company's targeted Development Yields.

Valuation: We valued AVB with a Net Asset Value Model based on a segment and geographic split for its 12-month forward NOI, with Cap Rates ranging from 4% to 5% in established coastal markets and 5% to 7% for development/redevelopment properties.

At 0.5% differentials to these Cap Rate estimates, the NAV per Share was between $160 and $210, with the most likely outcomes between $180 and $190.

The DCF, based on 10-year Unlevered FCF projections, stock issuances for 25% of total capital costs, Terminal FCF Growth Rates of 0.6% – 1.6%, and Discount Rates of 4.2% – 5.0%, produced implied share prices in the $140 – $240 range. The company appears undervalued by 40% in the Upside Case, 20-25% in the Base Case, and overvalued by 10% in the Downside Case.

The Public Comps (U.S.-based residential REITs with over $5 billion in Gross RE Assets) also point to AVB being undervalued; despite EBITDA and FFO growth 2-3x above the set median, the company trades in-line with the median EV / EBITDA and P / FFO multiples of the set. The Precedent Transactions produce a mixed view, with AVB's multiples above the set medians in some cases and below them in others.

Risk Factors: If there is a recession, and same-store rents fall by 1-2% per year over the next two years before recovering, the company's implied share price could decline by ~10%.

Development underperformance, which we simulate with a 5-year average Development completion time vs. the normal 3-year period and stabilized yields closer to 5.0% rather than 6.0% – 6.5%, would also reduce the company's implied share price by ~10%.

Some of the company's markets, such as Downtown LA, have experienced rising concessions due to unit oversupply, so lower NOI margins also represent a risk factor; if NOI margins were consistently 2% below our forecast over 5 years (68% vs. 70%), the company's implied share price would be ~10% lower.

In the worst-case scenario, if all the events above come true, then the company's stock price could potentially fall to $130 within the next year (a ~20% loss). But that is extremely unlikely, and we could hedge against these risks by purchasing put options with $145 – $150 exercise prices, limiting our losses to 10-12%, or by setting a stop-loss or stop-limit order in that range.

We could also hedge against these risks by longing multifamily REITs in different geographies, such as the Sunbelt or Midwest, or ones that focus on acquisitions rather than development; we could short a broader multifamily/real estate index fund or ETF.

Recommendation

AvalonBay COMMUNITIES, INC.

- We recommend **longing** AvalonBay [AVB] because it is undervalued by 20-30%, and its stock price could increase significantly in the next 6-12 months

- **Investment Thesis:** The market has incorrectly penalized the company for earnings misses in FY 17 and expectations of rising interest rates and a slowdown in the coastal multifamily markets; consensus forecasts also underestimate the company's Development pipeline potential

- **Valuation:** The company's intrinsic value is closer to $190 – $210 / share in the Base Case (15-30% upside), and even if we're wrong about all these factors, the company is only overvalued by ~10% at its current share price

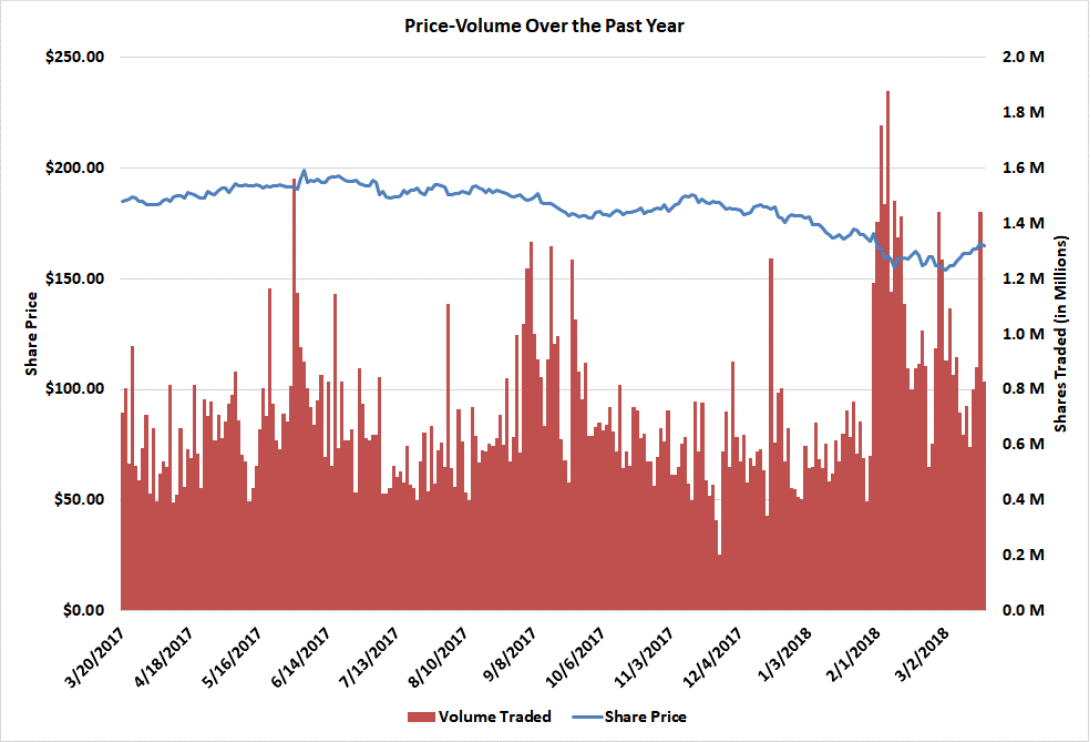
- **Catalysts** in the next 6-12 months include the stabilization of a record $1.9 billion in FY 17 Development deliveries, same-store rental increases above guidance, and the company's expansion into new markets to maintain its Development yields

- **Risks** include a coastal multifamily market downturn in the next 1-2 years, the Development pipeline performing below expectations, and lower NOI margins due to rising concessions

- We can mitigate these risks by purchasing put options at $145 – $150 exercise prices (to limit losses to 10-12%), longing multifamily REITs in different geographies/strategies, or shorting a broader real estate index fund or ETF

Company Background

- **Industry:** Multifamily REITs (U.S.-based, Class A properties, Development focus, East/West Coasts of the U.S.)
- **LTM Financials:** $2.2 billion revenue; $1.3 billion EBITDA; $1.2 billion FFO
- **Market Cap:** $22.8 billion; **Enterprise Value:** $29.8 billion
- **LTM Multiples:** 22.1x EV / EBITDA; 19.6x P / FFO
- **Established Communities:**
  - California (~43% of revenue)
  - Metro NY/NJ (~23%)
  - New England (~15%)
  - Mid-Atlantic and PNW (~19%)
- **Base Case Projections:**
  - 6% 5-year Revenue CAGR; 70% NOI margins
  - $900 – $950 million in annual Development spending
  - 6.0% – 6.5% stabilized Yields on Development



Investment Thesis

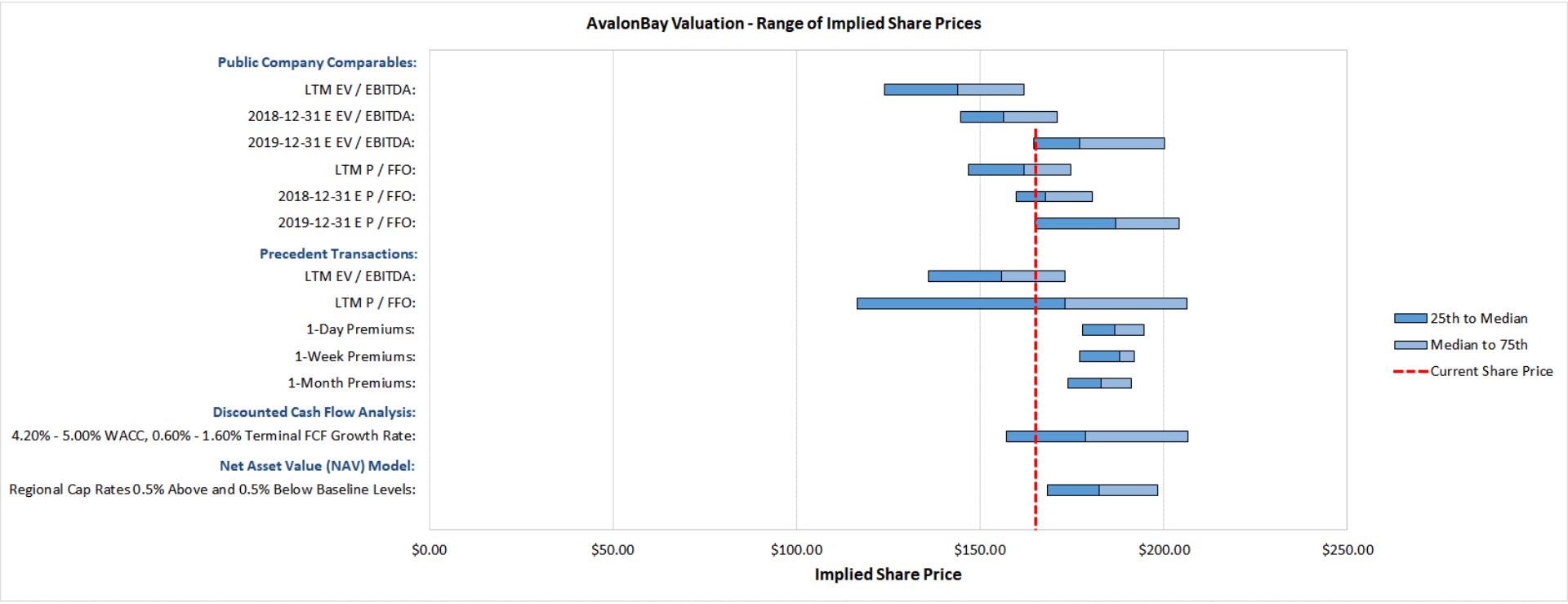
	Our View	Valuation Implications
Rising Interest Rates	▪ Will actually help AVB by discouraging home ownership and making renting more attractive ▪ 83% of AVB's Debt is fixed-rate with an average maturity of ~10 years	▪ Even if the Cost of Debt rises from 3% to 5%, the company would still be undervalued by ~**10%** (Base Case)
Risk of Recession and Decline in Coastal Multifamily Rents	▪ More likely to affect single-family owned homes than multifamily properties ▪ AVB's rental revenue has never declined by more than 2% historically; NAV uses conservative Cap Rates	▪ NAVPS is in the **$180 – $190** range; with 0.5% higher Cap Rates, NAVPS is in-line with current share price
Same-Store Rental Growth and Revenue/NOI Forecasts	▪ Development pipeline should boost 5-year revenue CAGR by ~4% ▪ Consensus forecasts assume only 3-4% annualized growth, implying almost no Development contribution	▪ Cumulative NOI from Development activity boosts share price by **~10%**

Catalysts

#1	Stabilization of $1.9 Billion in FY 17 Develop. Deliveries	Assuming a one-year stabilization period and 6.0% – 6.5% average yields, this Development activity will boost AVB's share price by ~5%; 10% boost when factoring in the cumulative activity over 5 years
#2	Increase in Established Communities Rents Above Expected Range	Total same-store rental growth is likely to be ~3% for FY 18, since renting will continue to be more attractive than buying in markets where home prices have risen far more quickly than wages or rent
#3	Planned Expansion into New Markets within the Next Year	The company has announced plans to acquire and develop in Denver, South Florida, and Baltimore; these lower-cost markets should support its targeted Development Yields going forward

Valuation Summary

- Most methodologies point to AVB being undervalued in the Base Case:



- AVB's FFO and EBITDA growth exceed those of the Public Comps by 2-3x, but its P / FFO and EV / EBITDA multiples are in-line with the medians of the set
- The **DCF** and **NAV**, arguably the most important methodologies, point to a company that's 20-25% undervalued
- In the Downside Case, the company appears overvalued by ~10%

Summary of NAV Assumptions and Output

- We used the following baseline Cap Rates for each segment of AVB's business (and re-valued its JV Assets and Liabilities, including the Pro-Rata portion of JV Debt):

Established Properties by Region:		Nominal Forward NOI:	Repl. Reserve Deduction:	Economic Forward NOI:	Economic Cap Rate:	Sensitized Cap Rate:	Implied Value:
New England:	$ M	$ 154.8	$ (7.7)	$ 147.1	5.0%	5.0%	$ 2,941.6
Metro NY/NJ:	$ M	253.7	(12.7)	241.1	4.0%	4.0%	6,026.4
Mid-Atlantic:	$ M	156.7	(7.8)	148.9	5.3%	5.3%	2,809.0
Pacific Northwest:	$ M	64.2	(3.2)	61.0	4.3%	4.3%	1,417.9
Northern California:	$ M	264.0	(13.2)	250.8	4.5%	4.5%	5,572.9
Southern California:	$ M	253.2	(12.7)	240.5	4.2%	4.2%	5,726.2
Other Business Segments:							
Other Stabilized Properties:	$ M	317.6	(15.9)	301.7	6.1%	6.1%	4,946.0
Development Properties:	$ M	52.0	(2.6)	49.4	7.0%	7.0%	705.7
Redevelopment Properties:	$ M	88.8	(4.4)	84.3	5.0%	5.0%	1,686.6
Acquired Properties:	$ M	23.1	(1.2)	22.0	5.0%	5.0%	439.2
Disposed Properties:	$ M	(25.2)	1.3	(23.9)	5.3%	5.3%	(451.7)
Equity Investments (Unconsolidated Real Estate):	$ M	65.0	(3.3)	61.8	5.0%	5.0%	1,235.3
(x) Pro-Rata Allocation Percentage:	%						25.1%
Market Value of Pro-Rata Portion of Unconsol. RE:	$ M						**310.4**

- These assumptions, as well as the mark-to-market adjustments for the Debt, produced the following results:

Sensitivity Analysis - NAV per Share:

	Cap Rate Differentials to Baseline Estimates:										
	(0.5%)	(0.4%)	(0.3%)	(0.2%)	(0.1%)	-	0.1%	0.2%	0.3%	0.4%	0.5%
	$ 210.22	$ 204.12	$ 198.30	$ 192.74	$ 187.44	**$ 182.36**	$ 177.50	$ 172.85	$ 168.39	$ 164.10	$ 159.98

		Cap Rate Differentials to Baseline Estimates:										
		(0.5%)	(0.4%)	(0.3%)	(0.2%)	(0.1%)	-	0.1%	0.2%	0.3%	0.4%	0.5%
Operating Scenario:	Upside	$ 219.03	$ 212.74	$ 206.74	$ 201.02	$ 195.55	**$ 190.32**	$ 185.31	$ 180.51	$ 175.91	$ 171.49	$ 167.24
	Base	210.22	204.12	198.30	192.74	187.44	**182.36**	177.50	172.85	168.39	164.10	159.98
	Downside	189.65	184.02	178.66	173.54	168.65	**163.97**	159.49	155.21	151.09	147.14	143.35

Summary of DCF Assumptions and Output

AvalonBay COMMUNITIES, INC.

	Downside	Base	Upside
Year 10 Revenue (CAGR)	▪ $3.2 billion (3.9%)	▪ $3.5 billion (5.1%)	▪ $3.9 billion (6.2%)
Year 10 EBITDA (CAGR)	▪ $2.2 billion (4.8%)	▪ $2.4 billion (6.0%)	▪ $2.7 billion (7.1%)
5-Year Same-Store NOI CAGR	▪ 1.2%	▪ 2.8%	▪ 3.9%
Annual Development Spending	▪ $500 – $850 million	▪ $950 – $900 million	▪ $1.3 – $1.1 billion
Stabilized Development Yields	▪ 5.0% rising to 6.3%	▪ 6.2% rising to 6.5%	▪ 7.5% falling to 6.7%
WACC	▪ 4.2% – 5.0%	▪ 4.2% – 5.0%	▪ 4.2% – 5.0%
Terminal Value	▪ 0.6% Terminal Growth	▪ 1.6% Terminal Growth	▪ 2.1% Terminal Growth
Implied Share Price	▪ ~$150	▪ ~$203	▪ ~$232

Key Risk Factors

- **Risk #1: Recession in the Next 1-2 Years:** If same-store rents fall by 1-2% per year and margins fall over the next two years, the company's implied share price could decline by ~10%

- **Risk #2: Development Pipeline Underperformance:** Delays and cost overruns (e.g., 5-year average completion time rather than 3 years, along with ~5% yields) could reduce AVB's implied share price by ~10%

- **Risk #3: Declining NOI Margins Due to Rising Concessions:** If NOI Margins are consistently 2% below our long-term forecast (68% vs. 70%), the implied share price would be ~10% lower

- **Worst-Case Scenario:** If everything above came true and the company performed even worse than in our projected Downside Case, the stock price could fall by ~20% to $130 within the next year

- **Recommended Hedges:** Put options at $145 – $150 exercise prices, or stop-loss or stop-limit orders at a similar range to limit potential losses to 10-12%

- **Other Options:** Could also long REITs focused on Sunbelt/Midwest geographies or acquisitions rather than development; or short a broader multifamily/real estate index fund or ETF if we're most concerned about a cyclical downturn in real estate

Summary and Recommendations

#1	We Recommend LONGING AvalonBay	At its current share price of ~$165, it is undervalued by 20-30% because the market misunderstands the risks of rising interest rates and a decline in coastal multifamily properties, and the company's Development pipeline
#2	NAV, DCF, and Public Comps Point to Undervalued Company	NAV and DCF demonstrate that the company is undervalued by 20-25%, even in the Base Case, and by 40% in the Upside Case; AVB trades in-line with peer companies despite FFO and EBITDA growth that are 2-3x higher
#3	Substantial Catalysts to Drive Up Price Within 6-12 Months	Potential catalysts include stabilization of FY 17 Development deliveries, same-store rental increases above guidance due to continued home-price pressure, and expansion into new geographies
#4	We Can Hedge Against the Key Risks Fairly Easily	We could purchase put options at $145 – $150 exercise prices to limit losses to 10-12%, long multifamily REITs with different strategies, or short a broader multifamily/real estate index fund or ETF

Appendix III, taken from Mergers and Inquisitions, Stock Pitch Guide: How to Pitch a Stock in Hedge Fund Interviews and Win Offers

DCF / Valuation Case Study: Jazz DCF / Valuation Case Study: Jazz Pharmaceuticals [JAZZ] – Full Stock Pitch [SHORT]

Recommendation: We recommend **shorting** Jazz Pharmaceuticals [JAZZ], a specialty pharmaceutical company that currently trades at $147.40 per share, because it is overvalued by 50-70%, and its stock price could decline significantly in the next 6-12 months.

The market has incorrectly assumed a late entrance year for generics of Xyrem (the company's key revenue driver), more pricing power than the company has, and higher-than-warranted peak sales from late-clinical-stage drugs Vyxeos and JZP-110.

The company's intrinsic value is likely close to $60-70 / share, and even if we are wrong about everything above, the company is still only valued appropriately at $147.40 with optimistic assumptions that exceed market expectations.

Catalysts to reduce the company's share price in the next 6-12 months include more Xyrem generics winning FDA approval, a further slowdown in price increases following the Brent Saunders "price hike limit," and early sales results from Vyxeos.

Key investment risks include a later-than-expected entrance for Xyrem generics, Vyxeos and JZP-110 performing above expectations, and earlier-stage drugs such as JZP-258 and JZP-507 posting promising clinical data, implying higher potential sales. We can mitigate these risks by purchasing call options at exercise prices of $170 – $180, shorting competitors seeking to produce Xyrem generics, or longing a broader biotech/pharma index fund or ETF.

Company Background: Jazz Pharmaceuticals is a specialty pharmaceutical company with approximately $1.5 billion in LTM revenue and $759 million in LTM EBITDA, with a market cap of $9.1 billion and LTM revenue and EBITDA multiples of 6.8x and 13.8x, respectively.

Its key product is Xyrem, for cataplexy and excessive daytime sleepiness ('EDS') in narcolepsy patients (~75% of revenue); it also sells Erwinaze for patients with a variant of leukemia and Defitelio for patients with complications from stem-cell transplants.

We project revenue growth of 15-20% with EBITDA margins of 40-50% over the next several years, followed by single-digit revenue growth and 30-40% EBITDA margins after generics enter.

Investment Thesis: Currently, the market views Jazz as a company with limited near-term generics competition for its key revenue driver Xyrem and one with significant upside potential from drug-price hikes and its late-stage pipeline drugs Vyxeos and JZP-110.

That view is incorrect because it reflects market dynamics from years ago, when Xyrem generics were less of a threat and when the company had fewer pricing constraints.

If Xyrem generics arrive **earlier** than expected – FY 20-21 rather than FY 23 – that reduces Jazz's implied share price by **~10%.** That is likely due to the Hikma deal for licensed generics starting in FY 23, combined with many other companies seeking generics approval from the FDA.

If the company can only raise prices at annual rates under 10%, that reduces its implied share price by **20-25%** (based on the application of our Upside Case pricing assumptions to the Base Case figures). That outcome is likely because of industry pressure (the "Brent Saunders rule") and pushback from the government following high-profile scandals such as EpiPen.

Finally, market expectations for peak sales of both Vyxeos and JZP-110 do not match up with reality. More realistic estimates of market uptake of 35% for Vyxeos at the end of 10 years and 4-5% price increases and 20% uptake for JZP-110 with similar price increases imply a **20% lower share price**. Both outcomes seem likely because of new pricing constraints and significant uncertainty around the market size and effectiveness of JZP-110 over Xyrem.

Taken together, these factors imply a company that is overvalued by **at least 50%**; even if we are incorrect about everything, the company is valued appropriately at its current share price.

Catalysts: More Xyrem generics could win FDA approval within the next year; each year earlier that generics enter the market reduces the company's implied share price by ~5%. Half a dozen lawsuits related to Xyrem patents began litigation on May 1 and may be resolved within a year.

Also, the company will come under pressure to avoid double-digit-percentage price hikes following Allergan CEO Brent Saunders' pledge to keep annual price increases under 10%, which other companies have adopted.

Finally, early sales results from Vyxeos (and possibly JZP-110) will be reported within the next year, and poor results could cause the market to rethink its peak sales expectations.

Valuation: We picked a set of U.S. and Canada-based specialty pharmaceutical companies with LTM revenue between $500 million and $5 billion; based on the trailing and forward EV / Revenue, EV / EBITDA, and P / E multiples, Jazz is appropriately valued. A similar set of Precedent Transactions over the past five years gives a similar result and may even point to the company being undervalued.

However, the DCF produces significantly different results. In our Base Case, with Xyrem peak sales of $2.1 billion in FY 20, Erwinaze and Defitelio peak sales of $250 – $350 million each in FY 26, and Vyxeos and JZP-110 risk-adjusted peak sales of $300 – $400 million each in FY 26, along with operating margins falling from 40% to 25-30% once Xyrem generics enter, and a WACC of 10.0% declining to 7.5% by Year 10, the DCF indicates that the company is ~50% overvalued. In the Downside Case, the company appears overvalued by ~70%.

Even with much more optimistic assumptions, such as a WACC that starts at 7.5% and declines to 5.0% (highly unlikely based on the Public Comps) and a Terminal FCF Growth Rate of 2.5%, the company is only 5-10% undervalued. And in the Upside Case, the company is still overvalued at any Terminal FCF Growth Rate below 2.0%.

Risk Factors: If Xyrem generics enter the market in FY 23 rather than FY 20-21 (per the Hikma/Roxane deal), the company's implied share price would be ~10% higher.

If Vyxeos and JZP-110 perform above expectations (i.e., with the Upside Case assumptions of 55% market uptake and $175,000 per patient for Vyxeos and 30% market uptake and $175,000 per patient for JZP-110 by Year 10), the company's implied share price would be 15-20% higher.

Finally, we did not consider pipeline drugs such as JZP-258 or JZP-507 due to limited information and the early stages of those drugs. However, if they pass clinical trials, they might perform as well as JZP-110 and Vyxeos in the Base Case, which would add another ~$700 million revenue to the company's Year 10 sales and boost its implied share price by 10-15%.

In the worst-case scenario, if all of the events above come true, then the company's stock price could potentially increase to ~$200 per share within the next year (a ~35% loss). However, the company's stock price has never reached $200.00 historically, and we believe that all of these events are unlikely to transpire.

We could hedge against these risks by purchasing call options with a $170 – $180 exercise price, limiting our losses to 15-20%, or by setting a stop-loss or stop-limit order in that range.

We could also hedge against these risks by shorting companies such as Hikma or Par Pharmaceuticals that are attempting to produce Xyrem generics. Finally, we could long a broader pharmaceutical/biotech index fund or ETF to hedge against the risks of earlier-stage drugs performing well or companies increasing prices by double-digit percentages.

Recommendation

- We recommend **shorting** Jazz Pharmaceuticals [JAZZ] because it is overvalued by 50-70%, and its price could decline significantly in the next 6-12 months

- **Investment Thesis:** The market has incorrectly assumed an FY 23 entrance year for Xyrem generics vs. more reasonable estimates of FY 20-21, and it has assumed unreasonable pricing power and peak sales figures for Vyxeos and JZP-110

- **Valuation:** The company's intrinsic value is closer to $60-70 / share, and even if we're wrong about all these factors, the company is appropriately valued right now at $147 / share

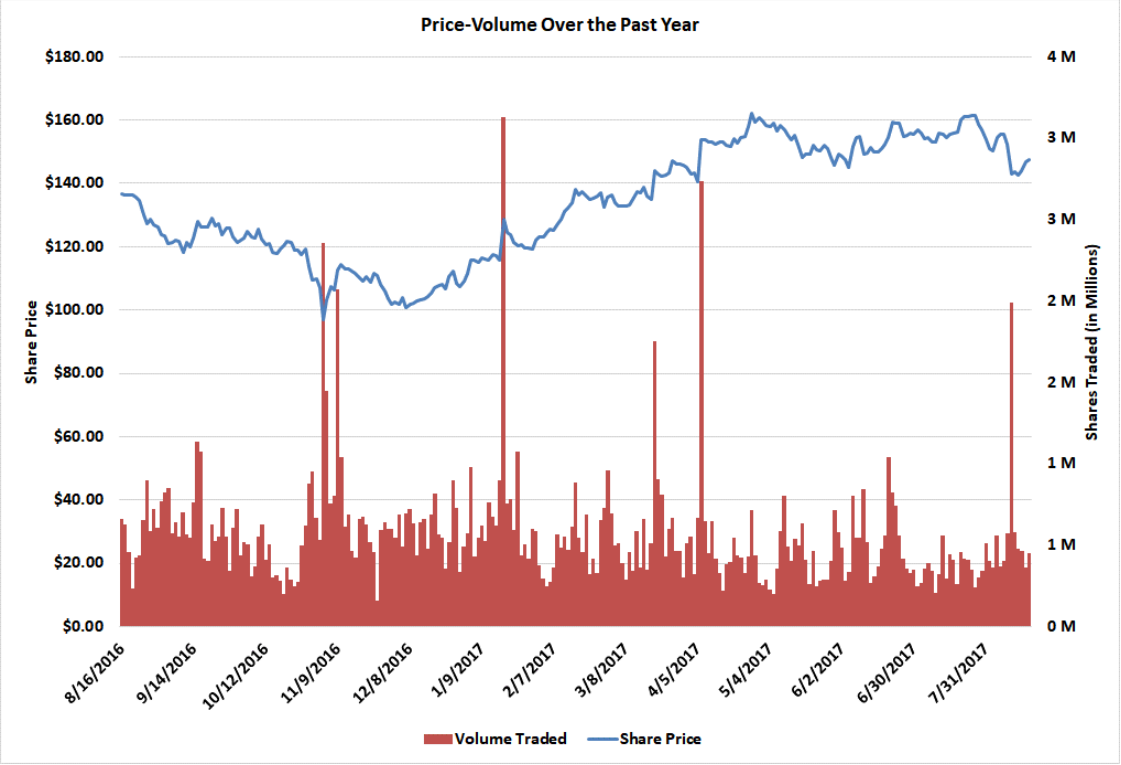
- **Catalysts** in the next 6-12 months include more Xyrem generics winning FDA approval, a slowdown in price increases, and early sales results from Vyxeos

- **Risks** include a later-than-expected entrance for Xyrem generics, outperformance from Vyxeos and JZP-110, and promising clinical data and eventual sales from early-stage drugs like JZP-258 and JZP-507

- We can mitigate these risks by purchasing call options at $170 – $180 exercise prices (to limit losses to 15-20%) , shorting Xyrem generics companies, or by longing a broader biotech/pharma index fund or ETF

Company Background

- **Industry:** Specialty pharmaceuticals (Orphan drugs for narcolepsy, leukemia, and stem-cell complications)
- **LTM Financials:** $1.5 billion revenue; $759 million EBITDA
- **Market Cap:** $9.1 billion; **Enterprise Value:** $10.5 billion
- **LTM Multiples:** 6.8x EV / Revenue; 13.8x EV / EBITDA
- **Products:**
  - Xyrem (75% of revenue)
  - Erwinaze (~14%)
  - Defitelio (~7%)
- **Base Case Projections:**
  - 15-20% revenue growth falling to single digits post-generics
  - 40-50% EBITDA margins
  - Margins decline to 30-40% once Xyrem generics enter



Investment Thesis

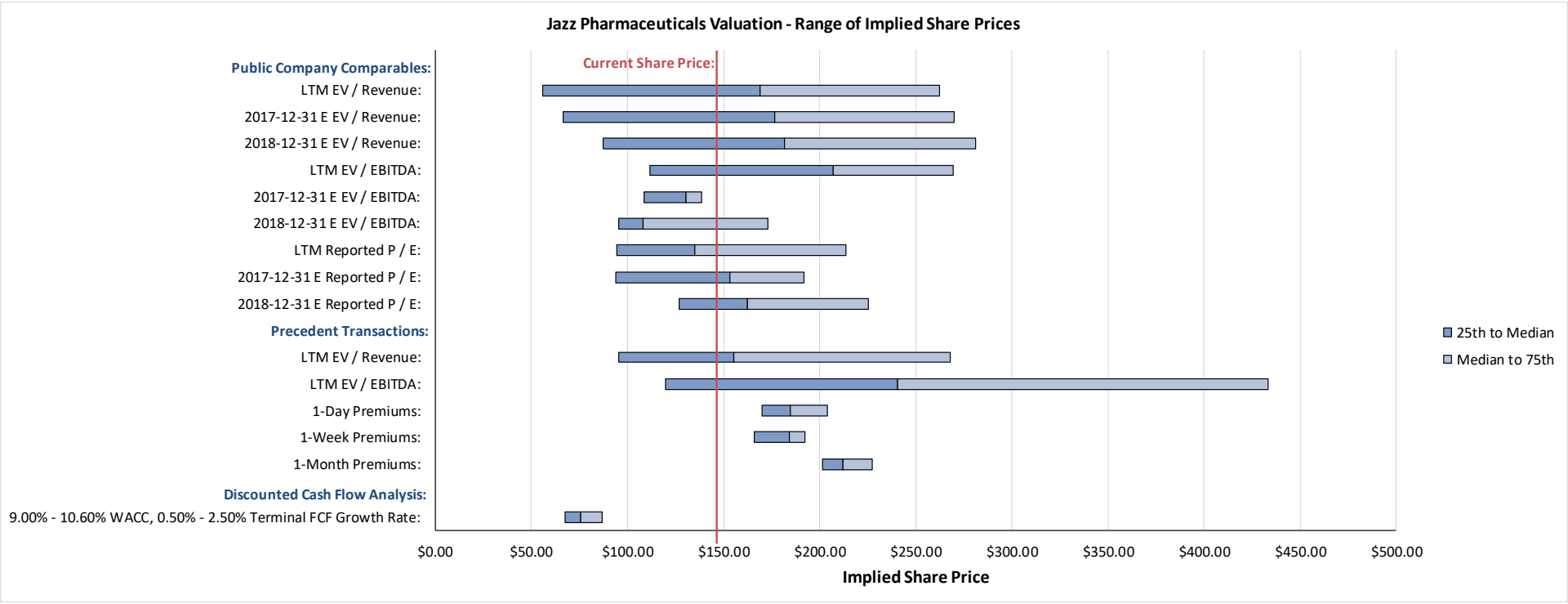
	Our View	Valuation Implications
Threat of Xyrem Generics	▪ More likely to arrive in FY 20 or FY 21 than FY 23 ▪ Due to ongoing lawsuits and generics companies seeking FDA approval	▪ Earlier entrance year would reduce company's implied share price by **~10%**
Limited Price Increases	▪ Annual price increases well under 10% vs. double-digit percentage increases in past years ▪ Due to Brent Saunders pledge and government/regulatory scrutiny	▪ Reduced rate of price increases across all drugs reduces implied share price by **20-25%**
Reduced Potential of Vyxeos and JZP-110	▪ Risk-adjusted peak sales of $300-400M for each vs. expectations of twice those figures ▪ Due to uncertainty around market size and JZP-110 improvements over Xyrem	▪ Implied share price declines by **~20%** with more modest assumptions for these pipeline drugs

Catalysts

#1	FDA Approval of Additional Xyrem Generics	Multiple companies are currently targeting FDA approval, with possible litigation resolution in the coming year; for each earlier entrance year, the implied share price falls by ~5%
#2	Reduced Ability to Increase Prices on Key Drugs	Allergan CEO Brent Saunders pledged to limit annual price increases to 10% last year, which other companies adopted; significant pressure/scrutiny on the industry following cases like EpiPen, so 20-30% increases are unlikely
#3	Early Sales Results from Vyxeos (and JZP-110)	If Vyxeos sales results come in below the $10-20M forecast for FY 17, the market may start expecting lower peak sales – and with single-digit price increases, it will take much longer to grow sales by 20x

Valuation Summary

- At first glance, JAZZ seems appropriately valued in the Base Case:



- It trades in-line with the multiples of the Public Comps, and is slightly below those of the Precedent Transactions
- But the **DCF**, with our own long-term views, tells a different story – it produces implied share prices close to those from the other methodologies only in the Upside Case
- The implied share price in the Base and Downside Cases is a **50-70% discount** to the current share price

Summary of DCF Assumptions

	Downside	Base	Upside
Xyrem Peak Sales	▪ $1.5B in FY 19	▪ $2.1B in FY 20	▪ $3.8B in FY 22
Erwinaze Peak Sales	▪ $0.2B in FY 26	▪ $0.3B in FY 26	▪ $0.3B in FY 26
Defitelio Peak Sales	▪ $0.3B in FY 26	▪ $0.4B in FY 26	▪ $0.6B in FY 26
Vyxeos and JZP-110 Sales	▪ $0.4B total in FY 26	▪ $0.8B total in FY 26	▪ $1.6B total in FY 26
Operating Margins	▪ 40% falling to 25-30%	▪ 40% falling to 25-30%	▪ 40% falling to 25-30%
WACC	▪ 10.0% falling to 7.5%	▪ 10.0% falling to 7.5%	▪ 10.0% falling to 7.5%
Terminal Value	▪ 1.5% Terminal Growth	▪ 2.0% Terminal Growth	▪ 2.5% Terminal Growth
Implied Share Price	▪ ~$48	▪ ~$77	▪ ~$157

DCF Output – Sensitivities

- Even in the Upside Case, it seems unlikely that the company is undervalued:

Sensitivity - Terminal FCF Growth Rate vs. Discount Rate and Implied Share Price from DCF Analysis:

The only share prices that exceed the company's current share price.

Initial Discount Rate (WACC) (Steps down by 0.25% per year over 10 years):	Terminal FCF Growth Rate:								
	0.50%	0.75%	1.00%	1.25%	1.50%	1.75%	2.00%	2.25%	2.50%
10.00%	$ 131.76	$ 134.14	$ 136.69	$ 139.45	$ 142.44	$ 145.70	$ 149.24	$ 153.13	$ 157.40
10.20%	128.38	130.58	132.95	135.50	138.26	141.26	144.51	148.06	151.96
10.40%	125.16	127.22	129.42	131.78	134.33	137.09	140.09	143.34	146.90
10.60%	122.11	124.03	126.07	128.27	130.63	133.18	135.94	138.93	142.20
10.80%	119.21	121.00	122.91	124.95	127.14	129.50	132.05	134.81	137.80
11.00%	116.45	118.12	119.90	121.80	123.84	126.03	128.38	130.93	133.69
11.20%	113.82	115.38	117.04	118.81	120.71	122.75	124.93	127.29	129.83
11.40%	111.30	112.76	114.32	115.98	117.74	119.64	121.67	123.85	126.20
11.60%	108.90	110.27	111.73	113.27	114.93	116.69	118.58	120.61	122.79

- And in the Base Case, we need a substantially lower Discount Rate and higher Terminal Growth Rate for the company to be undervalued:

Sensitivity - Terminal FCF Growth Rate vs. Discount Rate and Implied Share Price from DCF Analysis:

Initial Discount Rate (WACC) (Steps down by 0.25% per year over 10 years):	Terminal FCF Growth Rate:								
	1.50%	1.75%	2.00%	2.25%	2.50%	2.75%	3.00%	3.25%	3.50%
7.50%	$ 125.29	$ 132.23	$ 140.33	$ 149.90	$ 161.38	$ 175.41	$ 192.95	$ 215.66	$ 244.43
7.70%	118.67	124.75	131.78	140.01	149.75	161.49	175.89	193.98	217.48
7.90%	112.72	118.08	124.23	131.36	139.72	149.65	161.66	176.45	195.14
8.10%	107.34	112.10	117.52	123.74	130.97	139.47	149.61	161.90	177.11
8.30%	102.46	106.70	111.50	116.98	123.28	130.62	139.27	149.61	162.20
8.50%	98.01	101.81	106.08	110.92	116.46	122.84	130.29	139.10	149.67
8.70%	93.93	97.35	101.17	105.48	110.37	115.96	122.44	130.00	138.98
8.90%	90.18	93.27	96.70	100.55	104.89	109.83	115.49	122.06	129.75
9.10%	86.58	89.49	92.62	96.07	99.95	104.33	109.31	115.05	121.70

Initial Discount Rates of 7.5% - 8.0% and Terminal Growth Rates of 2.5 - 3.5% required for JAZZ to be undervalued currently.

Key Risk Factors

- **Risk #1: Late Entrance Year for Xyrem Generics:** FY 23 rather than FY 20-21 boosts Jazz's implied share price by ~10%
- **Risk #2: Vyxeos and JZP-110 Perform Above Expectations:** Upside Case assumptions ($700-$800M in peak sales) applied to Base Case results in implied share price that's 15-20% higher
- **Risk #3: Early-Stage Drugs Gain Positive Clinical Trial Data:** If JZP-258 and JZP-507 perform at the potential of Vyxeos and JZP-110, that could add another $700M in revenue and boost the implied share price by 10-15%
- **Worst-Case Scenario:** If everything above came true and the company performed above our Upside Case, its share price might increase to ~$200
- **Recommended Hedges:** Call options at $170 – $180 exercise prices, or stop-loss or stop-limit orders at a similar range to limit potential losses to 15-20%
- **Other Options:** Could also short Hikma, Par, or other companies attempting to produce Xyrem generics, or long a broad biotech/pharma index fund or ETF to hedge against pricing and early-stage drug risk

Summary and Recommendations

#1	We Recommend SHORTING Jazz Pharmaceuticals	At its current share price of ~$147, it is overvalued by 50-70% because the market misunderstands the threat from generics, the company's pricing power, and the potential of its pipeline drugs
#2	Wide Divergence Between Valuation Methodologies	Public Comps and Precedent Transactions indicate that JAZZ is appropriately valued; however, our 10-year DCF, even with optimistic long-term assumptions, shows it is almost certainly overvalued
#3	Substantial Catalysts to Drive Down Price Within 6-12 Months	Possible catalysts include more Xyrem generics winning FDA approval, a slowdown in the company's ability to raise prices, and disappointing early sales results from Vyxeos
#4	We Can Hedge Against the Key Risks Fairly Easily	We could purchase call options at $170 – $180 exercise prices to limit losses to 15-20%, short generics competitors, or long broader biotech/pharma index funds or ETFs

Appendix IV, taken from Street of Walls, Paper LBO Training Model

An illustrative example of a paper LBO is broken into 5 simple steps. In a paper LBO exercise, you will be expected to complete the important components of a working LBO model with the use of paper and pencil and without the use of a computer.

Given LBO Parameters and Assumptions

- XYZ Private Equity Partners purchases ABC Target Company for 5.0x Forward 12 months (FTM) EBITDA at the end of Year 0.
- The debt-to-equity ratio for the LBO acquisition will be 60:40.
- Assume the weighted average interest rate on debt to be 10%.
- ABC expects to reach $100 million in sales revenue with an EBITDA margin of 40% in Year 1.
- Revenue is expected to increase by 10% year-over-year (y-o-y).
- EBITDA margins are expected to remain flat during the term of the investment.
- Capital expenditures are expected to equal 15% of sales each year.
- Operating working capital is expected to increase by $5 million each year.
- Depreciation is expected to equal $20 million each year.
- Assume a constant tax rate of 40%.
- XYZ exits the target investment after Year 5 at the same EBITDA multiple used at entry (5.0x FTM EBITDA).
- Assume all debt pay-down occurs at the moment of sale at the end of Year 5 (this eliminates the iterative/circular dependency between debt pay-down/cash balances and interest expense in a computer-based LBO model).

1. CALCULATE THE PURCHASE PRICE OF ABC.

Using a 5.0x entry multiple, calculate the price paid by multiplying by Year 1 EBITDA. $40 million in EBITDA (which represents a 40% EBITDA margin on $100 million in revenue) multiplied by 5. The purchase price is $200 million.

2. CALCULATE THE DEBT AND EQUITY FUNDING AMOUNTS USED FOR THE PURCHASE PRICE.

The given information assumes debt to equity ratio of 60:40 for the purchase price.

Debt portion = 60% × $200 million, or $120 million.

Equity portion = 40% × $200 million, or $80 million.

Entry Assumptions		
Entry multiple		5.0x
EBITDA *(Year 1)*		$40
Price paid		$200
Debt	60%	$120
Equity	40%	80
Total	**100%**	**$200**

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3. BUILD THE INCOME STATEMENT.

($ in millions)	Year					
	1	**2**	**3**	**4**	**5**	**6**
Sales revenue	$100	$110	$121	$133	$146	$161
EBITDA	40	44	48	53	59	64
Less: D&A	(20)	(20)	(20)	(20)	(20)	(20)
EBIT	20	24	28	33	39	44
Less: Interest expense	(12)	(12)	(12)	(12)	(12)	(12)
EBT	8	12	16	21	27	32
Less: Taxes	(3)	(5)	(7)	(8)	(11)	(13)
EBT (Tax-effected)	**$5**	**$7**	**$10**	**$13**	**$16**	**$19**

(Notice that, because the exit value at the end of Year 5 will be based on a forward EBITDA multiple, we must calculate six years' worth of income statement, not 5. Also note that the numbers might not agree perfectly because of rounding. It is reasonable to round your intermediate calculations to the nearest integer in carrying over calculations to the next step.)

1. Project revenue: Revenue is expected to grow 10% annually.
   $100 million Year 1 sales × (1 + 10% growth rate) = $110 million sales in Year 2.
   $110 million Year 2 sales × (1 + 10% growth rate) = $121 million sales in Year 3.
   $121 million Year 3 sales × (1 + 10% growth rate) = $133.1 million sales in Year 4.
   $133 million Year 4 sales × (1 + 10% growth rate) = $146.3 million sales in Year 5.
   $146 million Year 5 sales × (1 + 10% growth rate) = $160.6 million sales in Year 6.

2. Use EBITDA margin to calculate EBITDA.
   $100 million Year 1 sales × 40% EBITDA margin = $40 million Year 1 EBITDA.
   $110 million Year 2 sales × 40% EBITDA margin = $44 million Year 2 EBITDA.
   $121 million Year 3 sales × 40% EBITDA margin = $48 million Year 3 EBITDA.

$133 million Year 4 sales × 40% EBITDA margin = $53 million Year 4 EBITDA.
$146 million Year 5 sales × 40% EBITDA margin = $59 million Year 5 EBITDA.
$161 million Year 6 sales × 40% EBITDA margin = $64 million Year 6 EBITDA.

3. Subtract Depreciation & Amortization (D&A) to get EBIT.
$40 million Year 1 EBITDA – $20 million D&A = $20 million Year 1 EBIT. (etc. for Years 2-6)

4. Calculate interest expense using the debt amount used for purchase multiplied by the interest rate to calculate the yearly interest expense line item.
$120 million of debt × 10% interest rate = $12 million interest expense per year.

5. Calculate Earnings Before Tax (EBT).
$20 million Year 1 EBIT – $12 million int. exp. = $8 million Year 1 EBT. (etc. for Years 2-6)

6. Subtract taxes using the tax rate to get to tax-effected EBT (a proxy for Net Income).
$8 million Year 1 EBT × 40% tax rate = $3 million taxes, so $5 million Year 1 t/e EBT.
$12 million Year 2 EBT × 40% tax rate = $5 million taxes, so $7 million Year 2 t/e EBT.
$16 million Year 3 EBT × 40% tax rate = $6 million taxes, so $10 million Year 3 t/e EBT.
$21 million Year 4 EBT × 40% tax rate = $8 million taxes, so $13 million Year 4 t/e EBT.
$27 million Year 5 EBT × 40% tax rate = $11 million taxes, so $16 million Year 5 t/e EBT.
$32 million Year 6 EBT × 40% tax rate = $13 million taxes, so $19 million Year 6 t/e EBT.

4. CALCULATE CUMULATIVE LEVERED FREE CASH FLOW (FCF).

($ in millions)	Year					
	1	2	3	4	5	6
EBT (Tax-effected)	$5	$7	$10	$13	$16	
Plus: D&A (non-cash expense)	20	20	20	20	20	
Less: capital expenditures	(15)	(17)	(18)	(20)	(22)	
Less: Increase in net working capital	(5)	(5)	(5)	(5)	(5)	
Free cash flow (FCF)	**$5**	**$6**	**$7**	**$8**	**$9**	

1. Start with EBT (Tax-effected) and then add back non-cash expenses (D&A).
$5 million Year 1 tax-effected EBT + $20 million D&A.

2. Subtract capital expenditures (Capex).
(NOTE: We do not need Year 6 capital expenditures, or Free Cash Flow for that matter, because EBITDA does not incorporate capex and because only FCF in Years 1-5 can be used to pay down debt.)
$100 million Year 1 sales × 15% capex/sales = $15 million Year 1 capital expenditures.
$110 million Year 2 sales × 15% capex/sales = $17 million Year 2 capital expenditures.
$121 million Year 3 sales × 15% capex/sales = $18 million Year 3 capital expenditures.
$133 million Year 4 sales × 15% capex/sales = $20 million Year 4 capital expenditures.
$146 million Year 5 sales × 15% capex/sales = $22 million Year 5 capital expenditures.

3. Subtract the annual increase in operating working capital to get to Free Cash Flow (FCF).
$5mm Y1 t/a EBT + $20mm D&A – $15mm Y1 capex – $5mm NWC = $5mm Year 1 FCF.
$7mm Y1 t/a EBT + $20mm D&A – $17mm Y2 capex – $5mm NWC = $6mm Year 2 FCF.

$10mm Y1 t/a EBT + $20mm D&A – $18mm Y3 capex – $5mm NWC = $7mm Year 3 FCF.
$13mm Y1 t/a EBT + $20mm D&A – $20mm Y4 capex – $5mm NWC = $8mm Year 4 FCF.
$16mm Y1 t/a EBT + $20mm D&A – $22mm Y5 capex – $5mm NWC = $9mm Year 5 FCF.

4. Calculate Cumulative Free Cash Flow during the life of the LBO.
Cumulative FCF until exit equals total debt pay-down if it is assumed that 100% of FCF is used to pay down debt. (This is a standard assumption for a basic LBO model.)
$5 mm Year 1 FCF + $5 mm Year 2 FCF + $7 mm Year 3 FCF + $8 mm Year 4 FCF + $9 mm Year 5 FCF = $34 mm Cumulative FCF.

5. CALCULATE ENDING PURCHASE PRICE (EXIT VALUE) AND RETURNS

1. Calculate Total Enterprise Value (TEV) at Exit.
Take Forward EBITDA at exit (Year 6 EBITDA) along with a 5.0x exit multiple to calculate Exit TEV. $64 million Year 6 EBITDA × 5.0x multiple = $320 million Enterprise Value at Exit.

2. Calculate Net Debt at Exit (also known as Ending Debt).
Beginning Debt – Debt Pay-down = Ending Debt.
$120 million in Beginning Debt – $34 million in Cumulative FCF = $86 million in Ending Debt.

3. Calculate ending Equity Value (EV) by subtracting Ending Debt from Exit TEV.
$320 Exit TEV – $86 million Ending Debt = $234 million Ending EV.

4. Calculate the Multiple-of-Money (MoM) EV return (Ending EV ÷ Beginning EV).
$234 million Ending EV ÷ $80 Beginning EV = 2.93x MoM.

5. Estimate IRR based on the MoM multiple.
The following table is useful for estimating IRR based upon 5-year MoM multiples:
2.0x MoM over 5 years ~15% IRR
2.5x MoM over 5 years ~20% IRR
3.0x MoM over 5 years ~25% IRR
3.7x MoM over 5 years ~30% IRR
Therefore, we can assume that the implied IRR for the paper LBO case study is approximately 25%, or slightly below. (It is actually very close to 24%.)

The following is the full paper LBO case study exhibit, calculated using Excel rather than pen and paper. As a result, some of the numbers might be slightly different, as rounding has been eliminated:

($ in millions)	Year					
	1	**2**	**3**	**4**	**5**	**6**
Sales revenue	$100	$110	$121	$133	$146	$161
EBITDA	40	44	48	53	59	64
Less: D&A	(20)	(20)	(20)	(20)	(20)	(20)
EBIT	20	24	28	33	39	44
Less: Interest expense	(12)	(12)	(12)	(12)	(12)	(12)
EBT	8	12	16	21	27	32
Less: Taxes	(3)	(5)	(7)	(8)	(11)	(13)
EBT (Tax-effected)	**$5**	**$7**	**$10**	**$13**	**$16**	**$19**
EBT (Tax-effected)	$5	$7	$10	$13	$16	
Plus: D&A (non-cash expense)	20	20	20	20	20	
Less: capital expenditures	(15)	(17)	(18)	(20)	(22)	
Less: Increase in net working capital	(5)	(5)	(5)	(5)	(5)	
Free cash flow (FCF)	**$5**	**$6**	**$7**	**$8**	**$9**	

Revenue Growth		*10%*	*10%*	*10%*	*10%*	*10%*
EBITDA Margin	*40%*	*40%*	*40%*	*40%*	*40%*	*40%*
Tax rate	*40%*	*40%*	*40%*	*40%*	*40%*	*40%*
Capex	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*

Entry Assumptions		
Entry multiple		5.0x
EBITDA *(Year 1)*		$40
Price paid		$200
Interest rate		10%
Debt	60%	$120
Equity	40%	80
Total	**100%**	**$200**

FTM EBITDA *(Year 6)*	64		
Exit Multiple	5.0x		
Ending TEV	322		
Beginning debt	120		
Cash generated *(total FCF)*	34		
Ending debt	86		
		Approximation	
Ending equity value	236	*MoM*	*IRR*
Beginning equity value	80	*2.0x*	*15%*
Approximate EV Multiple	**3.0x**	*2.5x*	*20%*
IRR	**> 25%**	*3.0x*	*25%*

FINAL STEPS

Make sure to take your time and calculate every formula correctly since this is not a race, and any error that you make will flow through the model you are building. If you catch a mistake part-way through, you will have to go back and correct it—sometimes causing you to have to recalculate nearly everything, and possibly leading to compounding mistakes on top of the original one.

In addition, the interviewer will ask you to walk through your thought process and calculations. Thus, it is important to be able to build the proper paper LBO in simple, accurate steps, and make sure you can walk through the reasoning regarding the process and each calculation. This takes practice, so be sure to practice at least one more paper LBO before your next private equity interview.