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Overview and Key Rules of Thumb



There is a 99.9% chance that you will get questions about **Valuation** in any finance interview – whether you’re interviewing at an investment bank, private equity firm, hedge fund, in equity research, or even in private wealth management.

That’s because **Valuation** is core to everything you do in finance and investing: Is a company undervalued? Overvalued? Should we buy it or sell it right now? Or hold off and wait?

Bankers expect you to know 3 main points when it comes to Valuation:

1. **How** do you value a company, i.e. what are the key methodologies, metrics, and multiples to use?
2. **What** does a valuation tell you, and how can you interpret the results?
3. **Why** do valuations matter, and what do they mean in the real world?

A long time ago, questions were more focused on the very basics of valuing companies.

You could still get those questions in interviews, but expectations tend to be higher now and the trend is toward **explaining** and **analyzing** different methodologies and the trade-offs between them – plus, how valuation works with real companies.

Just as in the previous technical sections of this guide, we’re going to divide this into **5 Key Rules** first and cover the most important points in the beginning.

After that, you can test your knowledge and play around with the numbers with the **Valuation Model** we have provided, as well as the **Interactive Quiz** that covers all categories of questions.



Then, we'll go into several different question categories for both the Basic and Advanced questions and walk through dozens of questions and answers in each category.

One final note: we do **not** cover the Discounted Cash Flow (DCF) analysis in detail here, because that is addressed in a completely separate section of the guide.

There are so many possible DCF-specific questions and answers that we wanted to separate it from the rest and provide more specific rules and steps.

Key Rule #1: How Do You Value a Company?

Fundamentally, there are only 2 ways to value a company: **relative valuation** – comparing it to what similar companies are worth – and **intrinsic valuation** – estimating the net present value of its future cash flows, or estimating how much its Assets are worth, net of Liabilities.

All valuation methodologies are just variants of these two.

With **relative valuation**, you mostly look at **other public companies** (Comparable Public Companies, AKA Public Comps) and **recent M&A deals** (Precedent Transactions) to estimate what your company might be worth.

Simple Example: Three companies similar to yours in revenue growth, profit margins, and industry focus have recently sold for 3x annual profits, 5x annual profits, and 4x annual profits in the past year. From that, you might conclude that your own company is worth around 4x annual profits, since that's the **median profit multiple** of the set.

In real life you use more formal metrics than just “annual profits” – that's why you see items like EBIT, EBITDA, and Unlevered FCF that have very specific line items on the financial statements added back, subtracted, and excluded.



On the **intrinsic valuation** side, most methodologies come down to 1) Estimating future cash flows and discounting them back to their **present value** – because money today is worth more than money tomorrow – or 2) Valuing the firm's **Assets** and assuming that the firm's total value is linked to its adjusted Asset value minus its Liabilities in some way.

We go into the **Discounted Cash Flow Analysis (DCF)** in the section of this guide dedicated to that; the basic idea is that a firm's value is the sum of its discounted future cash flows and its discounted **terminal value** – whatever it's worth at the end of the 5-10 year period you analyze.

Discount Rate:				10%		
	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal Value:
Cash Flows:	\$ 100	\$ 120	\$ 140	\$ 160	\$ 180	\$ 1,000
Present Value of Cash Flows:					\$ 516	
Present Value of Terminal Value:					\$ 621	
Total Value of Firm:					\$ 1,137	

Simple Example: A firm's future free cash flows are \$100, \$120, \$140, \$160, and \$180 over a 5-year period. You assume a Discount

Rate of 10%, so the Net Present Value of those is approximately \$516. You estimate that the company can be sold for \$1,000 at the end of year 5 in your analysis. The present value of that \$1,000 is \$621 ($\$1,000 / (1 + 10\%)^5$). Therefore, the company's total value is \$1,137 (\$516 + \$621).

As an alternative to the DCF, you can also value a firm's **Assets** and **Liabilities**, subtract the modified Total Liability Value from the modified Total Asset Value, and assume that this number reflects its value.

That methodology is called a "Net Asset Value" or "Liquidation" model, and it is more common in Balance Sheet-centric industries such as insurance.

So, When Do You Use Which Methodology?



You will almost always use **Public Comps** and **Precedent Transactions** to value companies in any industry, because they are universally applicable. If you were buying a house or car, for example, you would always look at what similar houses or cars have sold for in the market.

The only difference is that you will use **different metrics and valuation multiples** depending on the industry (see the next section). For example, if you were valuing a commercial bank vs. a healthcare company, you would *always* look at comparable public companies and comparable M&A deals, but you would use different metrics and multiples in your analysis (see the next section).

In most “standard” industries (e.g. consumer/retail, technology, healthcare, industrials) you almost always use a Discounted Cash Flow analysis to value the company based on its cash flows.

In some industries, the DCF analysis is not relevant because: 1) “Free Cash Flow” is not a meaningful metric; or 2) The industry is asset-centric and so you’re better off valuing the company’s Assets and Liabilities.

Industries Where the DCF is Not Relevant: Commercial Banks, Insurance Firms, (Some) Oil & Gas Companies, Real Estate Investment Trusts (REITs).

Public Comps and Precedent Transactions work best when there’s a lot of good market data and there are truly similar companies; they don’t work as well when the data is spotty and/or when the company you’re analyzing is unique and can’t be easily compared to others.

The DCF analysis works well for stable, mature companies with predictable growth rates and profit margins; it doesn’t work as well for high-growth start-ups, companies on the brink of bankruptcy, and other situations where growth and margins are artificially high, low, or unpredictable.



One of the most common, **incorrect**, lines of reasoning is that a DCF will always produce higher values because it's dependent on future assumptions.

The DCF *can* produce higher numbers, but it won't necessarily do that: the DCF is simply **more dependent on assumptions** than the relative valuation analyses. You could make extremely conservative assumptions in a DCF that result in *lower* valuations as well.

Generally, Precedent Transactions will produce higher numbers than Public Comps because a buyer must pay a **premium** to acquire 100% of another company. If a company's share price is \$20.00, it wouldn't sell for only \$20.00 per share – a buyer might have to offer \$25.00 per share, or \$30.00 per share, to entice it to sell.

So if you calculate EV / Revenue or EV / EBITDA multiples for a set of public companies in an industry and recent transactions for that same industry, the multiples are often higher for the set of transactions.

There is no "best" methodology and there is no "correct" number that tells you what a company is worth – it's very subjective. You use all these methodologies *not* to determine a precise number (e.g. "The company is worth \$1.04 billion!") but rather to estimate a **valuation range** (e.g. "Based on these methodologies, the company might be worth between \$900 million and \$1.1 billion").

How Do You Pick Companies and Transactions?

For the assumptions to use in a DCF please refer to that section of the interview guide; we don't want to repeat it here because the proper assumptions are covered in-depth there.

To pick **comparable public companies**, you use the following criteria:

1. **Geography** (US? China? Europe? South America?).
2. **Industry** (Diversified Consumer? Food and Beverages specifically?).



3. **Financial** (Revenue or EBITDA above, below, or between certain numbers).

Here's an example from the Valuation model that accompanies this guide:

Comparable Companies - US-Based, Diversified Food and Beverage Companies with Between \$1 Billion and \$10 Billion in Revenue (\$ in Millions Except Per Share Data)									
Operating Statistics:	Capitalization				Revenue		EBITDA		
Company Name	Share Price	Equity Value	Enterprise Value	Historical Year	Forward Year 1	Forward Year 2	Historical Year	Forward Year 1	Forward Year 2
Campbell Soup Company	\$ 33.72	\$ 11,397	\$ 14,189	\$ 7,645	\$ 7,735	\$ 7,919	\$ 1,582	\$ 1,560	\$ 1,520
The J.M. Smucker Company	72.21	8,553	9,317	4,601	5,061	5,466	1,061	881	951
Seaboard Corporation	2,212.00	2,694	2,142	3,105	3,369	3,605	306	301	322
United Natural Foods, Inc.	42.97	1,938	2,126	2,944	3,112	3,236	147	154	160
TreeHouse Foods Inc.	54.82	1,994	2,867	1,712	1,986	2,115	214	293	327

You can see how we've applied those criteria here:

- **Geography:** US-Based
- **Industry:** Diversified Food and Beverage Companies
- **Financial:** Between \$1 Billion and \$10 Billion in Revenue

You may tweak these assumptions and cut or add companies as you continue with the analysis; senior bankers often have their own idea of what *should* be in there and you'll have to change your assumptions to support their ideas.

Picking **precedent transactions** is similar, but there's one additional criterion:

1. **Geography** (US? China? Europe? South America?).
2. **Industry** (Diversified Consumer? Food and Beverages specifically?).
3. **Financial** (Revenue or EBITDA above, below, or between certain numbers).
4. **Time** (Transactions Since... or Transactions Between Year X and Year Y).

Here's what that might look like for a valuation done in the same industry as shown in the Public Comps selection above:



Food & Beverage M&A Transactions with US-Based Sellers and Enterprise Values Between \$1 Billion and \$10 Billion Since January 1, 20XX (\$ in Millions Except Per Share Data)							
Ralphcorp Holdings - Comparable M&A Transactions			Target Value at Purchase Price		Operating Metrics		V
Acquirer Name	Target Name	Date	Equity Value	Enterprise Value	Trailing Revenue	Trailing EBITDA	R
Diamond Foods	Pringles (Proctor & Gamble)	4/5/20XX	\$ 1,500	\$ 2,350	\$ 1,400	\$ 240	
KKR, Centerview Partners and Vestar Capital	Del Monte Foods	11/25/20XX	3,935	5,240	3,731	510	
Carlyle Group	NBTY	7/15/20XX	3,497	3,723	2,782	462	
Ralphcorp	American Italian Pasta	6/21/20XX	1,256	1,200	628	164	
Pinnacle Foods	Birds Eyes Foods	11/19/20XX	1,410	1,300	921	145	
The J.M. Smucker Company	Folgers Coffee	6/4/20XX	2,950	3,300	1,737	384	

And yes, we are cheating by listing the timeframe as “Since January 1, 20XX” – that is because I am paranoid about this guide looking “out of date” so I’ve left out the dates here.

In real life you would list the timeframe as “Since January 1, 2001” or “Since January 1, 2011” or “Since January 1, 2051” depending what year you’re in and how far you want to go back.

Time is very important for M&A deals because markets change over time – imagine if you looked at Internet company valuations during the late 90’s and then compared them to valuations 5 years later.

Multiples are only meaningful when you limit the transactions to a **specific time period**.

What About Other Methodologies?

There are a few other valuation methodologies to be aware of, even in entry-level interviews.

Let’s start with **Asset-Based Valuations** (alternatives to the DCF Analysis):

- **Liquidation Valuation** – You value a company’s Assets, assume they are sold to repay its Liabilities, and that whatever remains goes to Equity



Investors and is the company's Equity Value. This one also goes by a few other names, including the "Net Asset Value" model.

There are some industry-specific variations here as well – for example, there are "Net Asset Value" models in real estate, oil & gas, and insurance, and they're all slightly different. Please see the industry-specific sections of the guide for details on those.

Then there are variants on **Public Comps** and **Precedent Transactions**:

- **M&A Premiums**

Analysis – You still select Precedent Transactions but instead of calculating valuation multiples

you calculate the **premium** that the buyer paid for the seller in each case (e.g. if the buyer paid \$30.00 per share and the seller's share price was \$20.00, that was a 50% premium).

Yahoo! Inc. - Internet M&A Premiums				Share Price History		Premiums	
Acquirer Name	Target Name	Equity Value	Offer Price	1-Day	20-Day	1-Day	20-Day
Microsoft	aQuantive	\$ 6,356	\$ 66.50	\$ 35.87	\$ 31.90	85.4%	108.5%
Publicis	Digitas	1,285	13.50	10.93	10.96	23.5%	23.2%
NBC Universal	iVillage	660	8.50	8.12	7.35	4.7%	15.6%
WPP Group	24/7 Real Media	669	11.75	8.47	8.13	38.7%	44.5%
Investor Group	Vertrue	641	48.50	40.12	38.88	20.9%	24.7%
Orniture	Visual Sciences	384	18.04	17.37	14.50	3.9%	24.4%
Amazon.com	Audible	247	11.50	9.33	8.93	23.3%	28.8%
Nokia	Loudeye	127	4.50	1.79	2.20	151.4%	104.5%

- **Future Share Price Analysis** – You project a company's future share price based on the P / E (or other) multiple of comparable companies, and then discount it back to its present value.
- **Sum of the Parts** – You split a company into different segments (e.g. Chemicals, Manufacturing, and Consulting Services), pick different sets of Public Comps and Precedent Transactions for each, assign multiples, value each division separately, and then add up all the values at the end to determine the company's total value.

One final methodology is the **Leveraged Buyout (LBO) Analysis** – there, you assume that a private equity firm acquires a company and needs to achieve a certain Internal Rate of Return (IRR), such as 15% or 20%... and work backwards to calculate how much they could potentially pay to achieve that return.

It's a variation on the DCF analysis because you still value a firm via its future cash flows – only those cash flows are used to repay debt.



Key Rule #2: Which Metrics and Multiples Do You Use?

This is very dependent on the industry you're analyzing and what stage of growth the company is in.

You will *generally* use a Revenue Multiple (Enterprise Value / Revenue), which measures how valuable a firm is relative to its Net Sales, as well as a Profitability Multiple to assess how valuable it is relative to its Profits (P / E, EV / EBITDA, EV / EBIT, EV / Unlevered FCF, or Equity Value / Levered FCF, all of which measure different things).

Often, you will use two or more Profitability Multiples to gain a better perspective on what the company might be worth.

Before going into what these multiples mean, let's take a step back for a second and explain how to **calculate** each metric that you use here:

- **P / E:** Price Per Share / Earnings Per Share, or Equity Value / Net Income.
- **EBIT (Earnings Before Interest & Taxes):** This is the company's **Operating Income** from its Income Statement, or Revenue – COGS – Operating Expenses. This **includes** the impact of Depreciation, Amortization, and perhaps other non-cash charges.
- **EBITDA:** EBIT + Depreciation + Amortization. The idea here is to remove most of the non-cash charges and make it more accurately reflect cash flow potential. You may add back other non-cash charges, such as Stock-Based Compensation, as well.
- **Unlevered Free Cash Flow (Free Cash Flow to Firm):** There are a few ways to calculate this (see the DCF section); one method is $EBIT * (1 - \text{Tax Rate}) + \text{Non-Cash Charges} - \text{Change in Operating Assets and Liabilities} - \text{CapEx}$.
- **Levered Free Cash Flow (Free Cash Flow to Equity):** Again, there are a few methods to calculate this (see the DCF section); one method is $\text{Net Income} + \text{Non-Cash Charges} - \text{Change in Operating Assets and Liabilities} - \text{CapEx} - \text{Mandatory Debt Repayments}$.



These Profitability Multiples all measure different things:

Multiple Name:	Used For:	What Does It Mean?
Enterprise Value / EBIT	Used for many types of companies; most useful for those where CapEx is more important to factor in (Since D&A follows CapEx closely)	Rough approximation of how valuable a company is relative to its income from business operations
Enterprise Value / EBITDA	Used for many types of companies; most useful for those where CapEx and D&A are not as important since it excludes both	Rough approximation of how valuable a company is relative to its operational cash flow
P / E	Used for many types of companies; most relevant for banks and financial institutions; distorted by non-cash charges, capital structure, and tax rates	Rough measure of how valuable a company is in proportion to its after-tax earnings
Equity Value / Levered FCF	Not very common because it requires more work to calculate and may produce wildly different numbers depending on capital structure	Most accurate measure of a company's true "cash flow" and how valuable it is relative to that
Enterprise Value / Unlevered FCF	Used when CapEx or changes in Operational Assets and Liabilities such as Deferred Revenue have a big impact; also critical in DCFs	Similar to Levered FCF, but it's capital structure-neutral – so better for comparing different companies

Of these multiples, EV / EBITDA and EV / EBIT are by far the most common in finance.



P / E is probably the “worst” (or at least, “least accurate”) multiple for the reasons stated above – it includes non-cash charges and is impacted by tax rates and capital structures – and is more common among the general public than finance professionals.

The Free Cash Flow multiples are “more accurate” than the EBIT and EBITDA multiples, but there are two problems with using them:

1. They take **more time** to calculate and you have to go through the company’s financial statements in detail.
2. They **may not be standardized** because companies include very different items in the Cash Flow from Operations section of their Cash Flow Statements.

So that is why EBIT and EBITDA multiples tend to be more common: **convenience** and **comparability**.



Book Value Multiples (Equity Value / Book Value, or Price per Share / Book Value per Share) are also common; they tell you how valuable a company is relative to its Balance Sheet. Book Value is just another word for “Shareholders’ Equity” (with slight adjustments sometimes).

But the problem is that P / BV multiples have become **less relevant** over time for *most* industries because most companies’ Equity Values are vastly different from the Shareholders’ Equity on their Balance Sheets.

That happened because companies have become more and more **service-oriented** and **intellectual property-oriented** over time – whereas when Benjamin Graham wrote *The Intelligent Investor*, Balance Sheet Assets were much more important for most companies.

Depending on the industry you’re in, there may be specific multiples you need to use as well (see the industry-specific sections for more detail). A few examples:



- **Retail, Restaurant, and Airlines:** EV / EBITDAR (R stands for “Rent” – you add back the rental expense) is often used for **comparability purposes** because some companies own buildings and others rent them.
- **Oil & Gas Companies:** EV / EBITDAX (X stands for “Exploration” – you add back the exploration expense) is often used for **comparability purposes** because some companies capitalize (portions of) this expense whereas others expense it on their Income Statements. EV / Proved Reserves and EV / Daily Production multiples are also common because those are very important in energy.
- **Real Estate:** P / FFO (Funds from Operations) per Share and P / AFFO (Adjusted Funds from Operations) per Share multiples are widely used because they are more accurate than P / E for REITs since they add back Depreciation (massive non-cash charge) and Gains / (Losses).
- **Internet Companies:** Here, it’s common to see multiples like EV / Unique Visitors or EV / Registered Users if the company has not yet reached profitability or isn’t even generating revenue.

And the list goes on. You can make a valuation multiple out of almost any metric you want, and you’ll see variants like EV / # of Beds in Healthcare, EV / Subscribers in Telecom, and EV / Passenger Miles for Aerospace & Defense.

You don’t need to memorize all these metrics and multiples: just be aware that they exist and that they depend on the industry you’re working in.

Once you’ve calculated all the relevant multiples, you normally find the minimum, maximum, median, 25th percentile, and 75th percentile each year and then apply them to the company’s own financial figures.

If the company’s EBITDA is \$100 million and the median EV / EBITDA multiple of the set is 10x, then the company’s implied valuation based on the median multiple of the set is \$1 billion.



You don't necessarily **just** use the medians; you normally create a graph based on the full range of values (see below), and you may weight certain multiples more heavily or less heavily than others.

You can see this concept in action in the diagram below:

Valuation Summary - Ralcorp Holdings (\$ in Millions Except Per Share Data)												
Valuation Statistics - Ralcorp Holdings												
Ralcorp Holdings - Range of Valuation Multiples / Premiums						Ralcorp Holdings - Implied Per Share Value Range						
Methodology Name	Minimum Multiple	25th Percentile Multiple	Median Multiple	75th Percentile Multiple	Maximum Multiple	Applicable Ralcorp Holdings Figure	Minimum Multiple	25th Percentile Multiple	Median Multiple	75th Percentile Multiple	Maximum Multiple	
Public Company Comparables:												
Year 1 EV / Revenue:	0.7 x	0.7 x	1.7 x	1.9 x	2.0 x	\$ 4,049	\$ 4.13	\$ 6.48	\$ 74.58	\$ 87.08	\$ 98.70	
Forward Year 1 EV / Revenue:	0.6 x	0.7 x	1.4 x	1.8 x	1.8 x	\$ 4,721	7.90	11.93	11.93	106.57	107.07	
Forward Year 2 EV / Revenue:	0.6 x	0.7 x	1.4 x	1.7 x	1.8 x	\$ 4,907	6.35	11.89	72.44	101.51	108.80	
Year 1 EV / EBITDA:	7.0 x	8.8 x	9.0 x	13.4 x	14.5 x	\$ 672	38.40	59.65	61.77	112.20	124.95	
Forward Year 1 EV / EBITDA:	7.1 x	9.1 x	9.8 x	10.6 x	13.8 x	\$ 862	63.62	92.58	102.68	114.33	162.18	
Forward Year 2 EV / EBITDA:	6.7 x	8.8 x	9.3 x	9.8 x	13.3 x	\$ 913	62.62	95.46	104.32	111.43	166.03	

This is a bit different from what's described above because we're calculating the **Implied Share Price** for Ralcorp (the company we're valuing) rather than just multiplying 9.0x by their EBITDA of \$672 million, for example.

But the strategy is the same: we've calculated EV / Revenue and EV / EBITDA multiples for a set of comparable public companies, and now we're applying all of them to Ralcorp's own figures.

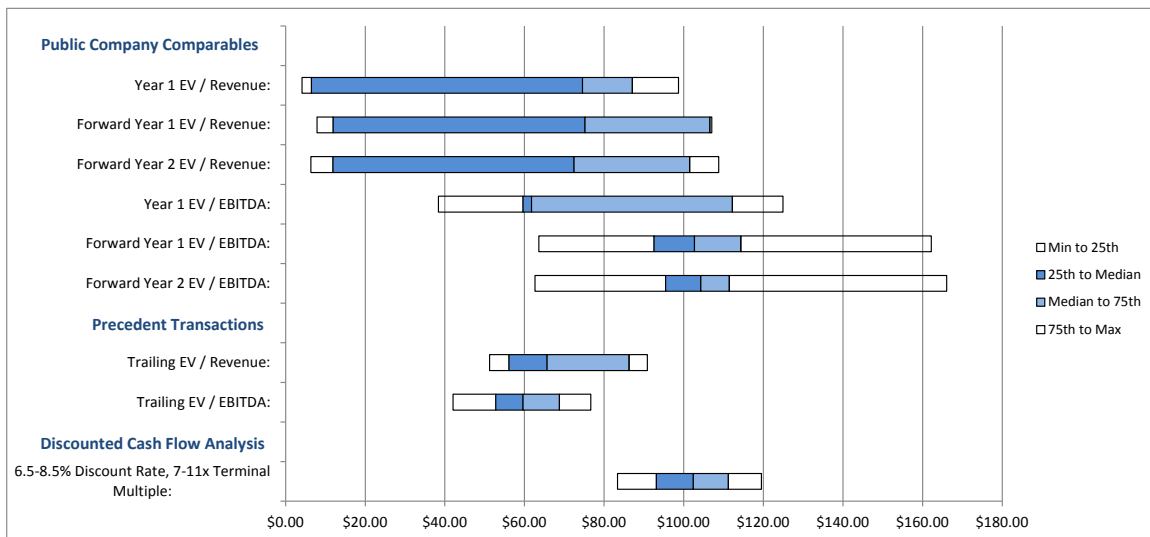
Key Rule #3: What Does a Valuation Mean?

The most common **incorrect** interpretation of a valuation is that it tells you how much a company is worth. It **does not** – it only gives you a **range** of possible values for a company.

When you value a company, the **worst way** to interpret the results would be to say, "Aha! Based on all 8 methodologies here, this company is worth exactly \$1,423,987,176.00, or \$23.41 per share."

Valuation is all about the **potential range** for a company's value. A much better interpretation would be, "Based on all the methodologies here, the company is worth between \$1.3 billion and \$1.5 billion, or \$21.37 to \$24.66 per share."

Take a look at the "Football Field" graph below to understand how you would present the results:



You can see the enormous range implied by this particular valuation – it goes from close to \$0.00 per share all the way up to over \$160.00 per share.

However, it is also incorrect to say, "Aha! The company might be worth anywhere from \$0.00 per share to \$160.00 per share based on this!"

Normally, you would interpret this data using the following reasoning: "The 25th percentile to 75th percentile is between \$60.00 and \$80.00 for the transactions, and between \$100.00 and \$120.00 for the rest; so the company might be worth anywhere from \$80.00 per share to \$120.00 per share."

The graph above is **extremely unusual** because Precedent Transactions result in lower multiples than everything else... which means that we may not have picked the right set, or that this market is quite strange.



And some companies have revenue multiples so low that the implied per share value is close to \$0.00 based on those. We could make a good argument for excluding the EV / Revenue multiples altogether and just focusing on EV / EBITDA, and perhaps adding in P / E as well.

Nevertheless, the graph above is also how you normally present the data to investors, potential buyers, and the company itself: you show a wide range of values to make sure no one takes it personally when they see a number they don't like.

A valuation like this might be used to give the company an **idea** of what it's worth, or to see whether or not an acquisition offer is reasonable.

Key Rule #4: Trade-Offs and Correlations

Advantages and Disadvantages of Different Methodologies:

Methodology Name:	Public Comps	Precedent Transactions	Discounted Cash Flow Analysis
Advantages:	Based on real data as opposed to future assumptions	Based on what real companies have actually paid for other companies	- Not as subject to market fluctuations - Theoretically sound since it's based on ability to generate cash flow
Disadvantages:	- There may not be true comparables - Less accurate for thinly traded stocks or volatile companies	- Data can be spotty (especially for private co. acquisitions) - There may not be truly comparable transactions	- Subject to far-in-the-future assumptions - Less useful for fast-growing, unpredictable companies



And then for the more “exotic” methodologies:

- **Liquidation Valuation:** Good because it ignores “noise” in the market and determines value based on Assets and Liabilities; but it’s not useful for most healthy companies because it tends to produce extremely low values.
- **M&A Premiums Analysis:** Same issues as with Precedent Transactions. Also, you can’t use acquisitions of private companies for this because premiums only apply to public companies with stock prices.
- **Future Share Price Analysis:** Good because it tells you how much a company might be worth, theoretically, 1-2 years into the future; but bad because of its dependence on assumptions.
- **Sum of the Parts:** Good because it more accurately values diversified, conglomerate-type companies; but bad because often you lack the appropriate data for each division.
- **Leveraged Buyout (LBO) Analysis:** Good because it sets a “floor” on valuation by determining the *maximum* amount a PE firm could pay to achieve its returns (which is almost always lower than all these other methodologies); bad because it gives a relatively low / “floor” number rather than a wide range of values.

Remember that interviews have shifted more and more to **understanding the concepts** as opposed to reciting facts and formulas – so these trade-offs are likely to come up in interview questions.

Comparing Expected Values from Different Methodologies

There are few rules here because so much depends on assumptions and it’s very difficult to directly compare methodologies.

Here’s what we can say:

- **Precedent Transactions vs. Public Comps:** Transactions *tend* to be higher due to the control premium, i.e. the premium the buyer pays to acquire



- the seller. But **not** always, as you saw from the valuation graph above for a real company.
- **Discounted Cash Flow:** It's hard to draw conclusions about its value, but tends to be the most *variable* of the methodologies because of its dependence on future assumptions.
 - **Liquidation Valuation:** 99% of the time, this will produce the **lowest** numbers because most companies are worth significantly more than what their Balance Sheets suggest.
 - **Sum of the Parts:** A bit obvious, but if a company truly *is* worth more in "parts" then this one will tend to produce higher values than relative valuation methodologies.
 - **LBO Analysis:** Tends to produce lower values, usually lower than a DCF or relative valuation, but once again it's dependent on assumptions.

There are very few hard-and-fast rules, and almost all of these guidelines have exceptions or do not hold up in many cases.

So don't get caught in a **trap** in interviews when they start asking you about how these different methodologies stack up in terms of numbers... in this world, only death and taxes are certain.

The Link Between Metrics and Multiples

Generally, there's a correlation between **growth rates** and **relevant multiples**, and sometimes also between **margins** and **multiples**:

- All else being equal, a company with **higher revenue growth** will also have higher revenue multiples than companies *not* growing as quickly.
- Similarly, a company with **higher EBITDA growth** tends to have higher EBITDA multiples than companies *not* growing as quickly.

And you see the same behavior with the other profitability multiples as well. To account for this, you will sometimes calculate **PEG** (P / E Divided by EPS Growth) multiples to get a better view of a company's real value.



But keep in mind two other very important points as well:

1. These are just *general*, “all else being equal”-type rules. Plenty of other factors besides revenue/EBITDA/EPS growth rates impact the multiples... and there are many exceptions.
2. **Basic math** can also impact the multiples, especially when companies have very different margins.

On point #1, valuations are impacted by everything from lawsuit rulings to recent earnings announcements to (perceived) market leadership to competitive advantages *not* reflected in the financials (intellectual property, talented employees, etc.).

On point #2, here’s a quick example of what we mean:

Comparable Companies - Hypothetical Example (\$ in Millions Except Per Share Data)													
Operating Statistics:		Revenue				EBITDA		Revenue Growth		EBITDA Margin			
		Enterprise Value	Historical Year	Forward Year 1	Forward Year 2	Historical Year	Forward Year 1	Forward Year 2	Forward Year 1	Forward Year 2	Historical Year	Forward Year 1	Forward Year 2
Company Name													
Company A		\$ 150	\$ 90	\$ 100	\$ 110	\$ 9	\$ 10	\$ 11	11.1%	10.0%	10.0%	10.0%	10.0%
Company B		200	90	100	110	18	20	22	11.1%	10.0%	20.0%	20.0%	20.0%
Valuation Statistics:		Enterprise Value / Revenue				Enterprise Value / EBITDA							
		Enterprise Value	Historical Year	Forward Year 1	Forward Year 2	Historical Year	Forward Year 1	Forward Year 2					
Company Name													
Company A		\$ 150	1.7 x	1.5 x	1.4 x	16.7 x	15.0 x	13.6 x					
Company B		200	2.2 x	2.0 x	1.8 x	11.1 x	10.0 x	9.1 x					

Very different margins

Very different margins

On paper, Company A’s Forward Year 1 EBITDA multiple is 15x and Company B’s Forward Year 1 EBITDA multiple is 10x... but is Company A really “more valuable?”

It’s hard to say because both companies’ margins are very different. Multiples are *most* meaningful when growth rates and margins are in similar ranges.

Advantages and Disadvantages of Multiples

To recap briefly, **EV / Revenue** and **P / E** multiples, while easy to calculate, are taken the *least* seriously because 1) A company should be valued based on its



profits, not its sales... earning revenue is easy, *keeping* it is hard; and 2) P / E is subject to non-cash and non-recurring charges, significantly different tax rates, the company's capital structure, and a host of other problems.

The other common multiples – EV / EBIT, EV / EBITDA, EV / Unlevered FCF, and Equity Value / Levered FCF – all have their strengths and weaknesses and you can review them above.

P / BV multiples used to be common in 1930 or so, but nowadays they are mostly relevant for banks and insurance firms and not much else – companies' Balance Sheets are far different from their true market values.

Key Rule #5: Valuation in the Real World

We've touched on many of these points in the other sections above, but to recap:

The entire **purpose** of a valuation is to give a client an idea of what it's worth, to justify (or argue against) an acquisition offer or a price at which you invest, and also to approximate a company's value for internal purposes.

You **always** present a valuation via the "Football Field" graph shown above and you focus on **ranges** rather than specific numbers.

A company may be valued at a **premium** or **discount** for many reasons, including its market position, competitive advantages that are not reflected in the financial statements (employees, IP, legal rulings, product benefits), and recent news and announcements.

You can pick certain multiples and ranges or focus on them for many reasons – for example, if a company is truly outperforming its peers, maybe you'll focus on the 75th percentile in a set of comps when displaying the multiples and the "Football Field" graph.

Accounting choices and oddities can also greatly affect valuation – for example, **owning** vs. **leasing** buildings makes a big impact on EBITDA.



If you own a building, there's Depreciation and Interest Expense (from the mortgage), neither of which are reflected in EBITDA. If you lease it, the rental expense *does* show up in EBITDA and reduces it.

And then there are non-recurring charges related to Restructuring, Lawsuits, Asset Impairments, and all sorts of other things (see the Accounting section of the guide) – all of those can potentially affect valuation multiples, so you need to adjust for them and be aware of what the numbers truly tell you.

One final point: what should you do if a company has no profit and/or no revenue?

If it's unprofitable (negative Net Income), you can still use revenue multiples or possibly cash flow-based multiples... but a DCF is relatively useless unless you project it far into the future.

If it doesn't even have revenue yet (e.g. Internet start-ups), then you can take one of two approaches:

- 1) In industries like Consumer Internet you can **alternate metrics and multiples**, such as Enterprise Value / Unique Visitors or Enterprise Value / Registered Users, or even more creative ones.
- 2) Sometimes for Biotech and Pharmaceutical companies, you *will* actually create a far-in-the-future, multi-stage DCF – it's more acceptable there since potential profits from a drug with a known market size are easier to estimate than what a pie-in-the-sky Internet startup might be worth.

For Further Learning

The rules above are a great start, but sometimes you need more: if you're in this position, [click here to check out our Financial Modeling Fundamentals course](#).

You receive a \$50 discount as a *Breaking Into Wall Street* member, and you get 20 hours of video tutorials along with several **bonus case studies** on real M&A



Investment Banking Interview Guide

[Access the Rest of the Interview Guide](#)

deals and leveraged buyouts – plus valuation case studies based on those same deals.

It has been one of our most popular courses year after year, and it's a great way to extend your knowledge of valuation, learn how it works in the context of real deals, and prepare more intensely for interviews.



Valuation Model

This is *combined* with the DCF model from the next section, because it makes more sense to include all the spreadsheets together when valuing a company.

This one consists of a full valuation of **Ralcorp**, a US-based company in the consumer sector (food and beverages specifically). You'll see how to apply Public Comps, Precedent Transactions, and a DCF analysis in real life to value a publicly traded company.

And you'll get a full video tutorial that explains the entire model. You should play around with this model, tweak the numbers, and see how the valuation output changes as a result.

Get the full model and video tutorial right here:

- [Ralcorp Holdings – Valuation Excel Model and Video Tutorial](#)



Valuation Interactive Quiz

We've also included an interactive quiz on Valuation in this edition of the guide. This covers both the Basic and Advanced question categories below, and thoroughly tests your knowledge of all things Valuation-related.

Ideally, you will go through this **after** you've studied the description above and the questions below so that you can test yourself one last time before your interviews.

This quiz isn't quite as long as the one on Accounting because there are fewer question categories – but it's just as important since Valuation is one of the fundamental topics in interviews.

- [Basic Valuation Quiz](#)
- [Advanced Valuation Quiz](#)



Valuation Questions & Answers – Basic



While these questions are “Basic,” some of them are trickier than they appear. They cover concepts similar to what we addressed in the Overview and Key Rules of Thumb above, but these questions and answers are intended for **interview practice** as opposed to learning the concepts in the first place.

This part is divided into 4 sections: an overview of the different methodologies and how to use them, the key valuation metrics and multiples, how different methodologies compare to one another, and “real world” valuation questions.

Once again, the DCF-related questions are all in a separate section of the interview guide that’s dedicated to that topic.

Valuation Methodologies and Selecting Comps

1. What are the 3 major valuation methodologies?

Public Company Comparables (Public Comps), Precedent Transactions and the Discounted Cash Flow Analysis.

Public Comps and Precedent Transactions are examples of **relative valuation** (based on market values), while the DCF is **intrinsic valuation** (based on cash flows).

2. Can you walk me through how you use Public Comps and Precedent Transactions?

First, you select the companies and transactions based on criteria such as industry, financial metrics, and geography (see the next question).

Then, you determine the appropriate metrics and multiples for each set – for example, revenue, revenue growth, EBITDA, EBITDA margins, and revenue and



EBITDA multiples – and you calculate them for all the companies and transactions.

Next, you calculate the minimum, 25th percentile, median, 75th percentile, and maximum for each valuation multiple in the set.

Finally, you apply those numbers to the financial metrics for the company you're analyzing to estimate the potential range for its valuation.

For example, if the company you're valuing has \$100 million in EBITDA and the median EBITDA multiple of the set is 7x, its implied Enterprise Value is \$700 million based on that. You would then calculate its value at other multiples in this range.

3. How do you select Comparable Companies or Precedent Transactions?

The 3 main criteria for selecting companies and transactions:

1. Industry classification
2. Financial criteria (Revenue, EBITDA, etc.)
3. Geography

For Precedent Transactions, you also limit the set based on **date** and often focus on transactions within the past 1-2 years.

The most important factor is industry – that is *always* used to screen for companies/transactions, and the rest may or may not be used depending on how specific you want to be.

Here are a few examples:

- **Comparable Company Screen:** Oil & gas producers with market caps over \$5 billion.
- **Comparable Company Screen:** Digital media companies with over \$100 million in revenue.



- **Precedent Transaction Screen:** Airline M&A transactions over the past 2 years involving sellers with over \$1 billion in revenue.
- **Precedent Transaction Screen:** Retail M&A transactions over the past year.

4. For Public Comps, you calculate Equity Value and Enterprise Value for use in multiples based on companies' share prices and share counts... but what about for Precedent Transactions? How do you calculate multiples there?

They should be based on the **purchase price of the company at the time of the deal announcement**.

For example, a seller's current share price is \$40.00 and it has 10 million shares outstanding. The buyer announces that it will pay \$50.00 per share for the seller.

The seller's **Equity Value** in this case, in the context of the transaction, would be $\$50.00 \times 10$ million shares, or \$500 million. And then you would calculate its Enterprise Value the normal way: subtract cash, add debt, and so on.

You **only** care about what the offer price was at the initial deal announcement. You never look at the company's value *prior* to the deal being announced.

5. How would you value an apple tree?

The same way you would value a company: by looking at what comparable apple trees are worth (relative valuation) and the present value of the apple tree's cash flows (intrinsic valuation). Yes, you could build a DCF for anything – even an apple tree.

6. When is a DCF useful? When is it not so useful?

A DCF is best when the company is large, mature, and has stable and predictable cash flows (think: Fortune 500 companies in “boring” industries). Your far-in-the-future assumptions will generally be more accurate there.



A DCF is not as useful if the company has unstable or unpredictable cash flows (tech start-up) or when Debt and Operating Assets and Liabilities serve fundamentally different roles (ex: Banks and Insurance Firms – see the industry-specific guides for more).

7. What other Valuation methodologies are there?

- **Liquidation Valuation** – Valuing a company's Assets, assuming they are sold off and then subtracting Liabilities to determine how much capital, if any, equity investors receive.
- **LBO Analysis** – Determining how much a PE firm could pay for a company to hit a "target" IRR, usually in the 20-25% range.
- **Sum of the Parts** – Valuing each division of a company separately and adding them together at the end.
- **M&A Premiums Analysis** – Analyzing M&A deals and figuring out the premium that each buyer paid, and using this to establish what your company is worth.
- **Future Share Price Analysis** – Projecting a company's share price based on the P / E multiples of the public company comparables and then discounting it back to its present value.

8. When is a Liquidation Valuation useful?

It's most common in bankruptcy scenarios and is used to see whether or not shareholders will receive anything after the company's Liabilities have been paid off with the proceeds from selling all its Assets.

It is often used to advise struggling businesses on whether it's better to sell off Assets separately or to sell 100% of the company.

9. When would you use a Sum of the Parts valuation?

This is used when a company has completely different, unrelated divisions – a conglomerate like General Electric, for example.



If you have a plastics division, a TV and entertainment division, an energy division, a consumer financing division, and a technology division, you should *not* use the same set of Comparable Companies and Precedent Transactions for the entire company.

Instead, you should use different sets for each division, value each one separately, and then add them together to calculate the Total Value.

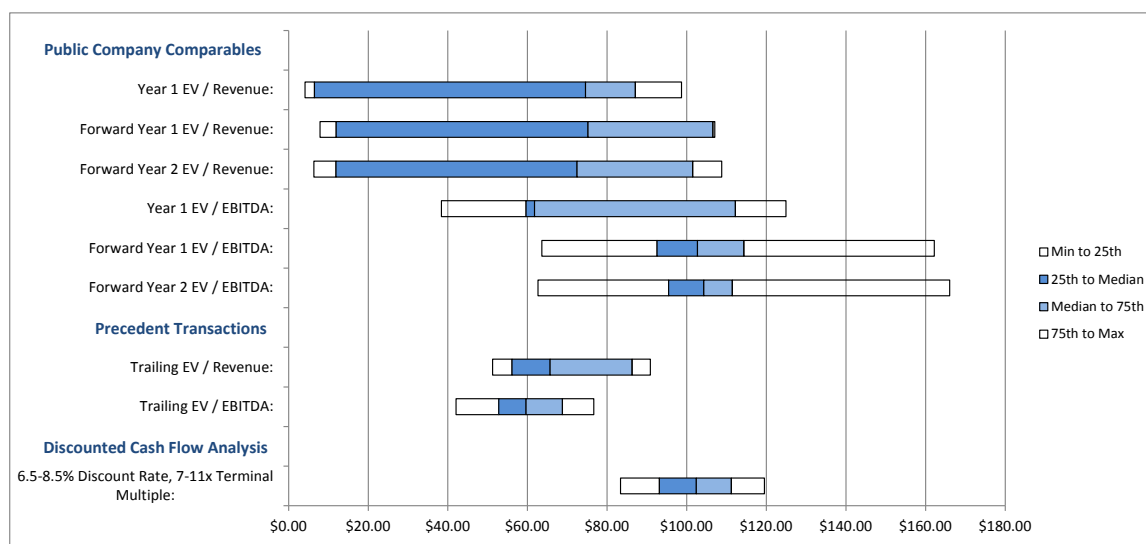
10. When do you use an LBO Analysis as part of your Valuation?

Clearly, you use this whenever you're analyzing a Leveraged Buyout – but it is also used to “set a floor” on the company's value and determine the *maximum* amount that a PE firm could pay to achieve its targeted returns.

You often see it used when both **strategics** (normal companies) and **financial sponsors** (PE firms) are competing to buy the same company, and you want to determine the potential price if a PE firm were to acquire the company.

11. How do you apply the valuation methodologies to value a company?

You would present everything in a “Football Field” graph such as the one shown below:





To do this, you need to calculate the minimum, 25th percentile, median, 75th percentile, and maximum for each set (2-3 years of comps and the transactions, for each different multiple used) and then multiply by the relevant metrics for the company you're analyzing.

Example: If the median EBITDA multiple from your set of Precedent Transactions is 8x and your company's EBITDA is \$500 million, the implied Enterprise Value would be \$4 billion.

For public companies, you will also work backwards to calculate the Equity Value and the implied Per Share Price based on this.

Valuation Metrics and Multiples

1. Can you walk me through how to calculate EBIT and EBITDA? How are they different?

Revenues	\$5,257,668	\$6,425,679	\$6,969,274
Cost of revenues	<u>2,096,201</u>	<u>2,675,723</u>	<u>2,838,758</u>
Gross profit	<u>3,161,467</u>	<u>3,749,956</u>	<u>4,130,516</u>
Operating expenses:			
Sales and marketing	1,033,947	1,322,259	1,610,357
Product development	569,527	833,147	1,084,238
General and administrative	341,073	528,798	633,431
Amortization of intangibles	109,195	124,786	107,077
Total operating expenses	<u>2,053,742</u>	<u>2,808,990</u>	<u>3,435,103</u>
Income from operations	<u>1,107,725</u>	<u>940,966</u>	<u>695,413</u>

EBIT is just a company's **Operating Income** on its Income Statement; it includes not only COGS and Operating Expenses, but also non-cash charges such as Depreciation & Amortization

and therefore reflects, at least indirectly, the company's Capital Expenditures.

EBITDA is defined as EBIT plus Depreciation plus Amortization. You may sometimes add back other expenses as well (see the Advanced section).

The idea of EBITDA is to move closer to a company's "cash flow," since D&A are both non-cash expenses... but there's a problem with that since you're also excluding CapEx altogether.



2. What about how you calculate Unlevered FCF (Free Cash Flow to Firm) and Levered FCF (Free Cash Flow to Equity)?

There are several methods (see the DCF section), but the simplest ways:

Unlevered FCF = EBIT * (1 – Tax Rate) + Non-Cash Charges – Change in Operating Assets and Liabilities – CapEx

With Unlevered FCF, you're **excluding** interest income and expenses, as well as mandatory debt repayments.

Levered FCF = Net Income + Non-Cash Charges – Change in Operating Assets and Liabilities – CapEx – Mandatory Repayments

With Levered FCF, you're **including** interest income, interest expense, and required principal repayments on the debt.

3. What are the most common Valuation multiples? And what do they mean?

- **Enterprise Value / Revenue:** How valuable is a company in relation to its overall sales.
- **Enterprise Value / EBITDA:** How valuable is a company in relation to its *approximate* cash flow.
- **Enterprise Value / EBIT:** How valuable is a company in relation to the pre-tax profit it earns from its core business operations.
- **Price Per Share / Earnings Per Share (P / E):** How valuable is a company in relation to its after-tax profits, inclusive of interest income and expense and other non-core business activities.

Other multiples include Price Per Share / Book Value Per Share (P / BV), Enterprise Value / Unlevered FCF, and Equity Value / Levered FCF.

P / BV is not terribly meaningful for most companies; EV / Unlevered FCF is closer to true cash flow than EV / EBITDA but takes more work to calculate; and



Equity Value / Levered FCF is even closer, but it's influenced by the company's capital structure and takes even more time to calculate.

4. How are the key operating metrics and valuation multiples correlated? In other words, what might explain a higher or lower EV / EBITDA multiple?

Usually, there is a correlation between **growth** and **valuation multiples**. So if one company is growing revenue or EBITDA more quickly, its multiples for both of those may be higher as well.

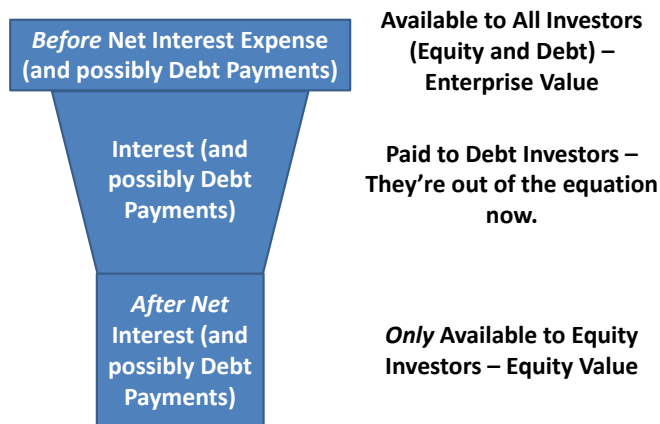
However, **math** also plays a role and sometimes companies with extremely high EBITDA margins (for example) may have lower EBITDA multiples because EBITDA itself is much higher to begin with... and it's in the denominator.

Finally, keep in mind that plenty of other non-financial factors explain higher or lower multiples (see the "Real-World" section).

5. Why can't you use Equity Value / EBITDA as a multiple rather than Enterprise Value / EBITDA?

Remember our funnel chart from the previous section on Equity Value and Enterprise Value (see: right image).

If the metric **includes interest income and expense**, you use Equity Value; if it *excludes* them (or is "before" them), you use Enterprise Value.



EBITDA is available to **all** investors in the company – not just common shareholders. Similarly, Enterprise Value is also available to all investors since it includes Equity *and* Debt, so you pair them together.



Calculating Equity Value / EBITDA, however, is comparing apples to oranges because Equity Value does **not** reflect the company's entire capital structure – only what's available to common shareholders.

6. What would you use with Free Cash Flow multiples – Equity Value or Enterprise Value?

Trick question. For *Unlevered* Free Cash Flow (Free Cash Flow to Firm), you would use Enterprise Value, but for *Levered* Free Cash Flow (Free Cash Flow to Equity) you would use Equity Value (see the diagram above).

Remember, Unlevered Free Cash Flow excludes Interest (and mandatory debt repayments) and thus represents money available to *all* investors, whereas Levered FCF already includes the effects of Interest expense (and mandatory debt repayments) and the money is therefore only available to *equity* investors.

Debt investors have already “been paid” with the interest payments and principal repayments they received.

7. Why does Warren Buffett prefer EBIT multiples to EBITDA multiples?

Warren Buffett once famously asked, "Does management think the tooth fairy pays for capital expenditures?"

He dislikes EBITDA because it hides the **Capital Expenditures** companies make and disguises how much cash they require to finance their operations.

In some industries there is also a large gap between EBIT and EBITDA – anything that is capital-intensive and asset-heavy, for example, will show a big disparity.

Note that EBIT itself does **not** include Capital Expenditures, but it does include Depreciation and **that is directly linked to CapEx** – that's the connection. If a company has a high Depreciation expense, chances are it has high CapEx spending as well.



8. What are some problems with EBITDA and EBITDA multiple? And if there are so many problems, why do we still use it?

First, it hides the amount of debt principal and interest that a company is paying each year, which can be very large and may make the company cash flow-negative; as mentioned above, it also hides CapEx spending, which can also be huge.

EBITDA also ignores **working capital requirements** (e.g. Accounts Receivable, Inventory, Accounts Payable), which can be very large for some companies.

Finally, companies like to “add back” many charges and expenses to EBITDA, so you never really know what it represents unless you dig into it in-depth.

So in many cases, EBITDA is not even close to true “cash flow” – it is widely used mostly because of **convenience** (it’s easy to calculate) and because it has become a standard over time.

Another argument for EBITDA is that although it’s not close to cash flow, it’s better for **comparing** the cash generated by a company’s core business operations than other metrics – so you could say that EBITDA is more about **comparability** than cash flow approximation.

9. The EV / EBIT, EV / EBITDA, and P / E multiples all measure a company’s profitability. What’s the difference between them, and when do you use each one?

P / E depends on the company’s **capital structure**, whereas EV / EBIT and EV / EBITDA are **capital structure-neutral**. Therefore, you use P / E for banks, insurance firms, and other companies where interest is critical and where capital structures tend to be similar.

EV / EBIT includes Depreciation & Amortization, whereas EV / EBITDA excludes it – you’re more likely to use EV / EBIT in industries where D&A is large and



where Capital Expenditures and fixed assets are important (e.g. manufacturing), and EV / EBITDA in industries where fixed assets are less important and where D&A is comparatively smaller (e.g. Internet companies).

NOTE: Many bankers get this logic reversed and think that EV / EBITDA is better when CapEx and Depreciation are both large... which is not correct, if you take a second to think about it. If they start arguing about it an interview, just give in and agree with what they say.

10. Could EV / EBITDA ever be higher than EV / EBIT for the same company?

No. By definition, EBITDA must be **greater than or equal to** EBIT because to calculate it, you take EBIT and then add Depreciation & Amortization, neither of which can be negative (they could, however, be \$0, at least theoretically).

Since EBITDA is always greater than or equal to EBIT, EV / EBITDA **must** always be less than or equal to EV / EBIT for a single company.

11. What are some examples of industry-specific multiples?

- **Technology (Internet):** EV / Unique Visitors, EV / Pageviews
- **Retail / Airlines:** EV / EBITDAR (Earnings Before Interest, Taxes, Depreciation, Amortization & Rental Expense)
- **Oil & Gas:** EV / EBITDAX (Earnings Before Interest, Taxes, Depreciation, Amortization & Exploration Expense), EV / Production, EV / Proved Reserves
- **Real Estate Investment Trusts (REITs):** Price / FFO per Share, Price / AFFO per Share (Funds from Operations, Adjusted Funds from Operations)

Technology and Oil & Gas should be straightforward – you’re looking at website traffic and energy reserves as value drivers rather than revenue or profit.

For Retail / Airlines, you add back Rent because some companies own their own buildings and capitalize the expense whereas others rent and therefore have a



rental expense. This one is about **comparability** rather than cash flow approximation.

The EBITDAX metric for Oil & Gas exists because some companies capitalize (a portion of) their exploration expenses and some expense them. You add back the exploration expense to normalize the numbers – once again, **comparability**, not cash flow.

For REITs, Funds from Operations is a common metric that adds back Depreciation and subtracts Gains (and adds Losses) on the sale of property. Depreciation is a non-cash yet extremely large expense in real estate, and Gains and Losses on property sales are assumed to be non-recurring, so FFO is a more “normalized” picture of earnings than Net Income.

12. When you’re looking at an industry-specific multiple like EV / Proved Reserves or EV / Subscribers (for telecom companies, for example), why do you use Enterprise Value rather than Equity Value?

You use Enterprise Value because those Proved Reserves or Subscribers are “available” to all the investors (both debt and equity) in a company. This is almost always the case unless the metric already includes interest income and expense (FFO and AFFO above).

Comparison of Methodologies and Trade-Offs

1. Rank the 3 main valuation methodologies from highest to lowest expected value.

Trick question – there is no ranking that always holds up.

In general, Precedent Transactions will be higher than Comparable Public Companies due to the Control Premium built into acquisitions (i.e. the buyer must pay a **premium** over a company’s current share price to acquire it).



Beyond that, a DCF could go either way and it's best to say that it's more *variable* than other methodologies. Often it produces the highest value, but it can produce the lowest value as well depending on your assumptions.

2. Would an LBO or DCF produce a higher valuation?

Technically it could go either way, but in *most* cases the LBO will give you a lower valuation.

Here's the easiest way to think about it: with an LBO, you **do not get any value from the cash flows of a company in between Year 1 and the final year** – you only get “value” out of its final year.

With a DCF, by contrast, you're taking into account *both* the company's cash flows in the period itself and its terminal value, so values tend to be higher.

Note: Unlike a DCF, an LBO model by itself does not give a specific valuation. Instead, you set a desired IRR and back-solve for how much you could pay for the company (the valuation) based on that. See the LBO section of the guide for more.

3. When would a Liquidation Valuation produce the highest value?

This is highly unusual, but it could happen if a company had substantial hard assets but the market was severely undervaluing it for a specific reason (such as an earnings miss or cyclicalit).

As a result, the Comparable Companies and Precedent Transactions would likely produce lower values as well – and if its assets were valued highly enough, Liquidation Valuation might give a higher value than other methodologies.

4. Why are Public Comps and Precedent Transactions sometimes viewed as being “more reliable” than a DCF?



It's because they're based on actual market data, as opposed to assumptions far into the future.

Note, however, that you still *do* make future assumptions even with these (for example, the "Forward Year 1" and "Forward Year 2" multiples in the graphs above are based on projections for each company in the set).

Also note that sometimes you don't have good or truly comparable data for these, in which case a DCF may produce better results.

5. What are the flaws with Public Company Comparables?

- No company is 100% comparable to another company.
- The stock market is "emotional" – your multiples might be dramatically higher or lower on certain dates depending on the market's movements.
- Share prices for small companies with thinly-traded stocks may not reflect their full value.

6. You mentioned that Precedent Transactions usually produce a higher value than Comparable Companies – can you think of a situation where this is *not* the case?

Sometimes this happens when there is a substantial mismatch between the M&A market and the public markets. For example, no public companies have been acquired recently but lots of small private companies have been acquired at low valuations.

For the *most part* this generalization is true but there are exceptions to almost every "rule" in finance.

And if you want proof, just take a look at the valuation graph we've been using throughout this part of the guide.

7. What are some flaws with Precedent Transactions?



- Past transactions are rarely 100% comparable – the transaction structure, size of the company, and market sentiment all make a huge impact.
- Data on precedent transactions is generally more difficult to find than it is for public company comparables, especially for acquisitions of small, private companies.

Real-World Valuation Scenarios

1. How would you present these Valuation methodologies to a company or its investors? And what do you use it for?

Usually you use a “Football Field” chart where you show the valuation range implied by each methodology. You *always* show a range rather than one specific number.

Once again, see the graph we’ve been using throughout this section of the guide for an example.

You could use a Valuation for:

- **Pitch Books and Client Presentations** – When you provide updates and tell them what you think they’re worth.
- **Parts of Other Models** – Defense analyses, merger models, LBO models, DCFs, and almost everything else in finance will incorporate a Valuation in some way.
- **Fairness Opinions** – Right before a deal with a public seller closes, its financial advisor creates a “Fairness Opinion” that justifies the acquisition price and directly estimates the company’s valuation.

2. Why would a company with similar growth and profitability to its Comparable Companies be valued at a premium?

This could happen for a number of reasons:



- The company has just reported earnings well-above expectations and its stock price has risen in response.
- It has some type of competitive advantage not reflected in its financials, such as a key patent or other intellectual property.
- It has just won a favorable ruling in a major lawsuit.
- It is the market leader in an industry and has greater market share than its competitors.

3. How do you take into account a company's competitive advantage in a valuation?

1. Highlight the 75th percentile or higher for the multiples rather than median.
2. Add in a premium to some of the multiples.
3. Use more aggressive projections for the company.

In practice you rarely do all of the above – these are just possibilities.

4. Do you ALWAYS use the median multiple of a set of public company comparables or precedent transactions?

Nope. In fact, you almost always show a **range**. And you may make the median the center of that range, but you don't have to – you could focus on the 75th percentile, 25th percentile, or anything else if the company is outperforming or underperforming for some reason.

5. Two companies have the exact same financial profiles (revenue, growth, and profits) and are purchased by the same acquirer, but the EBITDA multiple for one transaction is twice the multiple of the other transaction – how could this happen?

- One process was more competitive and had a lot more companies bidding on the target.
- One company had recent bad news or a depressed stock price so it was acquired at a discount.



- They were in industries with different median multiples.
- The two companies have different accounting standards and have added back different items when calculating EBITDA, so the multiples are not truly comparable.

6. If you were buying a vending machine business, would you pay a higher EBITDA *multiple* for a business that owned the machines and where they depreciated normally, or one in which the machines were leased? The Depreciation expense and the lease expense are the same dollar amounts and everything else is held constant.

You would pay a higher **multiple** for the one with leased machines if all else is equal.

The Purchase Enterprise Value would be the same for both acquisitions, but Depreciation is excluded from EBITDA – so EBITDA is **higher**, and the EV / EBITDA multiple is **lower** for the one that owns its own machines.

For the company with leased machines, the lease expense would show up in Operating Expenses, making EBITDA **lower** and the EV / EBITDA multiple **higher**.

This goes back to one of the points we've made throughout this guide: in isolation, specific valuation multiples don't mean much. You need to see what goes into the numbers and what standards are used.

In this case, it would be more meaningful to use an EBIT or EBITDAR multiple to *compare* the two potential acquisitions.

7. How would you value a company that has no profit and no revenue?

There are two options:

1. You could use Comparable Companies and Precedent Transactions and look at more "creative" multiples such as EV / Unique Visitors and EV /



- Pageviews (for Internet start-ups, for example) rather than EV / Revenue or EV / EBITDA.
2. You could use a “far-in-the-future DCF” and project a company’s financials out until it actually earns revenue and profit.

Method #1 is better for Internet start-ups and anything else that is truly unpredictable; method #2 is more common for biotech and pharmaceutical companies, where you can more predictably estimate the potential market size and prices for new drugs.

8. The S&P 500 Index (or equivalent index in other country) has a median P / E multiple of 20x. A manufacturing company you’re analyzing has earnings of \$1 million. How much is the company worth?

It depends on how it’s performing relative to the index, and relative to companies in its own industry. If it has higher growth and/or higher margins, you may assign a higher multiple to it – maybe 25x or even 30x, and therefore assume that its Equity Value equals \$25 million or \$30 million.

If it’s on par with everyone else, then maybe its valuation is just \$20 million.

And if it’s underperforming, perhaps it’s lower than that.

Qualitative factors, such as management team and market position, also come into play and may determine the appropriate multiple to use.

9. A company’s current stock price is \$20.00 per share, and its P / E multiple is 20x, so its EPS is \$1.00. It has 10 million shares outstanding.

Now it does a 2-for-1 stock split – how do its P / E multiple and valuation change?

They don’t. Think about what happens: the company now has 20 million shares outstanding... but its Equity Value has stayed the same, so its share price falls to \$10.00.



Its EPS falls to \$0.50, but its share price has also fallen to \$10.00, so the P / E multiple remains 20x.

Splitting stock into fewer units or additional units doesn't, by itself, make a company worth more or less.

However, in practice, often a stock split is viewed as a positive sign by the market... so in many cases a company's value will go up and its share price won't necessarily be cut in half, so P / E could increase.

10. Let's say that you're comparing a company with a strong brand name, such as Coca-Cola, to a generic manufacturing or transportation company.

Both companies have similar growth profiles and margins. Which one will have the higher EV / EBITDA multiple?

In all likelihood, Coca-Cola will have the higher multiple due to its strong brand name.

Remember that valuation is **not** a science – it's an art, and the market often behaves in irrational ways. Values are not based strictly on financial criteria, and other factors such as brand name, perceived "trendiness," and so on all make a huge impact.



Valuation Questions & Answers – Advanced

These questions cover 3 different topics:

1. More **advanced** valuation methodologies.
2. Valuation **nuances** such as calendarization, non-recurring charges, and where to find information on deals and companies.
3. Industry-specific valuation and **special cases**, such as private companies, IPOs, and more.



There are not that many truly “Advanced” interview questions on Valuation because most of the difficulty lies in the **mechanics** and searching through companies’ filings to find and adjust information.

And questions on those points are difficult and time-consuming to test in the time-constrained setting of an interview; even if you get a case study, they’re more likely to ask you to construct a basic valuation model based on information they give you.

More Advanced Valuation Methodologies

1. Walk me through an M&A premiums analysis.

The purpose of this analysis is to look at similar transactions and calculate the **premiums** that buyers have paid over **public** sellers’ share prices when acquiring them. For example, if a company is trading at \$10.00/share and the buyer acquires it for \$15.00/share, that’s a 50% premium.

1. First, **select** the precedent transactions based on industry, date (the past 2-3 years, for example), and size (ex: over \$1 billion market cap).
2. For each transaction, get the **seller’s share price** 1 day, 20 days, and 60 days before the transaction was announced (you can also look at 90-day intervals, or 30 days, 45 days, etc.).



3. Then, **calculate** the 1-day premium, 20-day premium, etc. by dividing the per-share purchase price by the appropriate share price on each day.
4. Get the **medians** for each set, and then apply them to your company's current share price, share price 20 days ago, and so on to estimate how much of a premium a buyer might pay for it.

You **only** use this analysis when valuing a public company because private companies don't have share prices. Sometimes the set of companies here is exactly the same as your set of precedent transactions, but typically it is **broader**.

2. Both M&A premiums and precedent transactions involve analyzing previous M&A transactions. What's the difference in how we select them?

- All the sellers in the M&A premiums analysis must be **public**.
- Usually we use a **broader** set of transactions for M&A premiums – we might use fewer than 10 precedent transactions but we might have dozens of M&A premiums. The industry and financial screens are usually less stringent.
- Aside from those, the screening criteria are similar – financial metrics, industry, geography, and date.

3. Walk me through a future share price analysis.

The purpose of this analysis is to **project** what a company's share price might be 1 or 2 years from now and then **discount it back to its present value**.

1. Get the **median historical** (usually Trailing Twelve Months, or TTM) P / E multiple of the public company comparables.
2. **Apply** this P / E multiple to your company's 1-year forward or 2-year forward projected EPS to get its implied future share price.
3. Then, **discount** this share price back to its present value by using a discount rate in-line with the company's Cost of Equity.

You normally look at a range of P / E multiples as well as a range of discount rates for this type of analysis, and then create sensitivity tables with these as



inputs. Technically, you could also use other multiples but P / E is the most common one here.

4. Walk me through a Sum-of-the-Parts analysis.

In a Sum-of-the-Parts analysis, you value each division of a company using separate comparables and transactions, get to separate multiples, and then add up each division's value to get the total for the company (example from our modeling courses shown below):

	Projected Revenue	Low Multiple	High Multiple	Low EV	High EV
Revenue by Segment:					
Search Advertising:	\$ 1,384	6.0 x	7.0 x	\$ 8,302	\$ 9,685
Display Advertising:	2,415	4.0 x	5.0 x	9,660	12,075
Affiliate Site Revenue:	656	2.0 x	3.0 x	1,313	1,969
Premium Fees:	934	2.0 x	3.0 x	1,868	2,802
Other Revenue:	412	1.0 x	2.0 x	412	823
Total:	\$ 5,801	15.0 x	20.0 x	\$ 21,554	\$ 27,355
Implied Share Value:				\$ 21.33	\$ 25.53

Once again, picking a **range** of multiples and values is crucial and you would never just say, "The exact multiple to use for Search Advertising is 6.5x!"

5. How do you value Net Operating Losses (NOLs) and take them into account in a valuation?

You determine how much the NOLs will save the company in taxes in future years, and then calculate the **net present value** of the total future tax savings. There are two ways to estimate the tax savings in future years:

1. Assume that a company can use its NOLs to **completely offset** its taxable income until the NOLs run out.
2. In an acquisition scenario, use **Section 382** and multiply the highest adjusted long-term rate (<http://pmstax.com/afr/exemptAFR.shtml>) of the past 3 months by the Equity Purchase Price of the seller to determine the



maximum allowed NOL usage in each year – and then use that to determine how much the company can save in taxes.

You might *look* at NOLs in a valuation but you rarely factor them in – if you did, they would be treated similarly to Cash and you would subtract NOLs to go from Equity Value to Enterprise Value, and vice versa (see the Equity Value and Enterprise Value section of the guide).

Advanced Valuation Nuances

1. What's the purpose of "calendarization"? How do you use it in a valuation?

You "calendarize" because different companies have different fiscal years. For example, some companies' fiscal years may run from January 1 to December 31 – but others may have fiscal year that run from April 1 to March 31, or from July 1 to June 30.

This creates a problem because you can't directly compare all these periods – you always need to look at the **same calendar period** when you create a set of Public Comps.

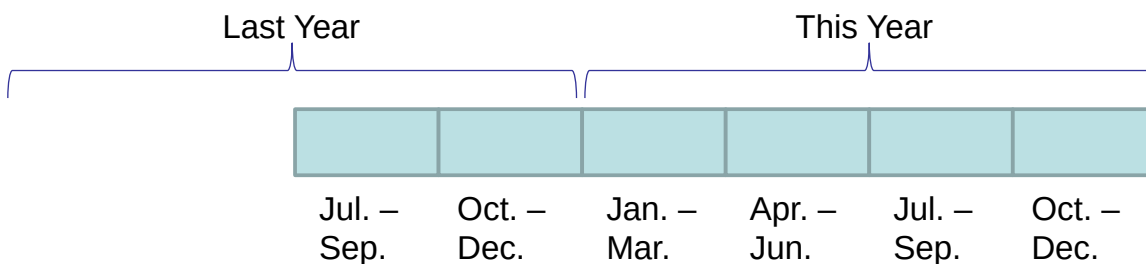
So you adjust all the fiscal years by adding and subtracting "partial" periods.

You almost always adjust other companies' fiscal years to match **the company you're valuing**.

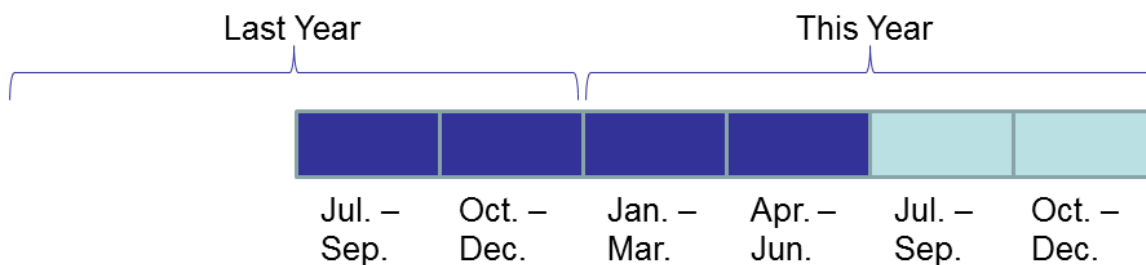
Let's say that you need to adjust a July 1 – June 30 fiscal year to make it end on December 31 instead.

In this scenario, you'd take the July 1 – June 30 period, **add** the financials from the June 30 – December 31 period this year, and then **subtract** the financials from the June 30 – December 31 period the *previous* year.

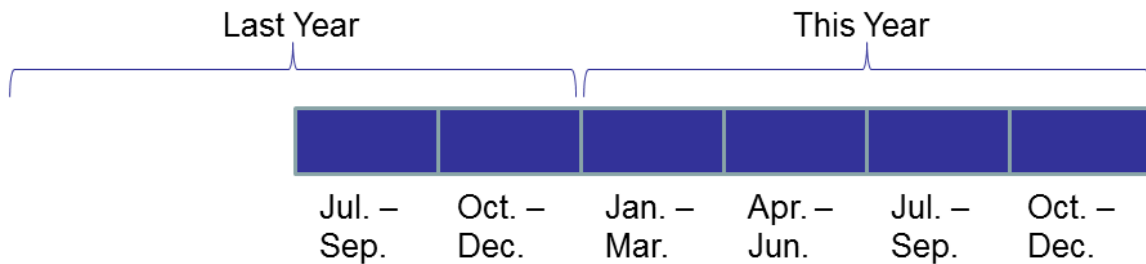
Here's a set of diagrams to illustrate the process:



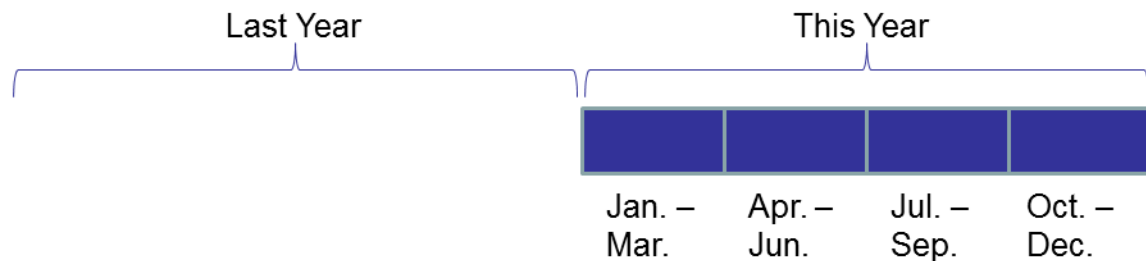
Step 1: Take the most recent fiscal year (July 1 – June 30).



Step 2: Add the 2 most recent quarters (July 1 – December 31).



Step 3: Subtract the same 2 quarters from last year (July 1 – December 31).



Now you can see that we're left with the January 1 – December 31 period, rather than July 1 – June 30.



2. Does calendarization apply to both Public Comps and Precedent Transactions?

It applies mostly to Public Comps because there's a high chance that fiscal years will end on different dates with a big enough set of companies.

However, in effect you *do* calendarize for Precedent Transactions as well because you normally look at the Trailing Twelve Months (TTM) period for each deal.

So if an acquisition was announced on April 30 and the company's fiscal year ends on December 31, you will calendarize the revenue, EBITDA, and so on by adding the January 1 – March 31 period of the current year and subtracting the January 1 – March 31 period of the previous year.

3. I'm looking at financial data for a public company comparable, and it's April (Q2) right now. Walk me through how you would "calendarize" this company's financial statements to show the Trailing Twelve Months as opposed to just the last Fiscal Year.

The formula to calendarize financial statements is as follows:

$$\text{TTM} = \text{Most Recent Fiscal Year} + \text{New Partial Period} - \text{Old Partial Period}$$

So in the example above, we would take the company's Q1 (January 1 – March 31 of this year) numbers, add the most recent fiscal year's (January 1 – December 31 of last year) numbers, and then *subtract* the previous year's Q1 numbers (January 1 – March 31 of last year).

For US-based companies you can find these quarterly numbers in the 10-Q; for international companies they're in the interim reports.

4. Let's say that you're looking at a set of Public Comps with fiscal years ending on March 31, June 30, and December 31. The company you're analyzing has a fiscal year that ends on June 30. How would you calendarize the financials for these companies?



You generally calendarize based on the fiscal year of the company you're valuing. So in this case you would adjust and make the other companies' fiscal years end on June 30.

For the one with the March 31 year, you would take that year and then add the March 31 – June 30 period, and subtract the March 31 – June 30 period from the previous year.

For the one with the December 31 year, you would take that year and add the January 1 – June 30 period, and subtract the January 1 – June 30 period from the previous year.

5. You're analyzing the financial statements of a Public Comp, and you see Income Statement line items for Restructuring Expenses and an Asset Disposal. Should you add these back when calculating EBITDA?

This is a trick question on multiple levels:

1. First, you should **always** take these charges from the Cash Flow Statement if possible – sometimes the charges are partially embedded within other line items on the Income Statement. If they don't appear on the Cash Flow Statement, look up them in the Notes to the Financial Statements.
2. Second, you **only** add them back if they're truly non-recurring charges. If a company claims it has been "restructuring" for the past 5 years, well, that's not exactly a non-recurring expense.

There's a lot of subtlety when adjusting for these types of charges and there is not necessarily a "correct" way to do it in all cases.

6. How do non-recurring charges typically affect valuation multiples?

Most of the time, these charges effectively **increase** valuation multiples because they reduce metrics such as EBIT, EBITDA, and EPS. You could have non-



recurring *income* as well (e.g. a one-time asset sale) which would have the opposite effect.

So be aware that it works both ways, and be ready to adjust for both non-recurring expenses and non-recurring income sources.

7. We're valuing a company's 30% interest in another company – in other words, an Investment in Equity Interest or Associate Company.

We could just multiply 30% by that company's value, but what other adjustments might we make?

Normally, you'll apply some type of "Liquidity Discount" or "Lack of Control Discount" and assume that the stake is worth 20-30% (or more) less than the book value because the company you're valuing doesn't truly control this other company.

Additionally, you may value these types of investments by assuming that they get sold off – so you would apply the company's tax rate as well and calculate the after-tax proceeds, *after* any discounts have been applied.

8. I have a set of public company comparables and need to get the projections from equity research. How do I select which report to use?

This varies by bank and group, but here are two common methods:

1. You pick the report with the most detailed information.
2. You pick the report with numbers in the middle of the range.

Note that you **do not** pick reports based on which bank they're coming from. So if you're at Goldman Sachs, you would not pick all Goldman Sachs equity research – that would actually be bad because then the valuation would be less objective.



9. I have a set of precedent transactions but I'm missing information like EBITDA for a lot of the companies, since they were private. How can I find it if it's not available via public sources?

1. Search online and see if you can find press releases or articles in the financial press with these numbers.
2. Failing that, look in equity research for the **buyer** around the time of the transaction and see if any of the analysts estimate the seller's numbers.
3. Also look at online sources like Capital IQ and Factset and see if any of them disclose numbers or give estimates for the deals.

10. You're analyzing a set of transactions where the buyers have acquired everything from 20% to 80% to 100% of other companies.

Should you use all of them as part of your valuation?

Ideally, no. It is best to limit the set to *just* 100% acquisitions, or at least > 50% acquisitions, because the dynamics are very different when you acquire an entire company or a majority of a company compared to when you acquire only a 20% or 30% stake.

You may not always be able to do this due to lack of data or lack of transactions, but generally transactions get less and less comparable as the percentage acquired varies by more and more.

11. You're analyzing a transaction where the buyer acquired 80% of the seller for \$500 million. The seller's revenue was \$300 million and its EBITDA was \$100 million. It also had \$50 million in cash and \$100 million in debt.

What were the revenue and EBITDA multiples for this deal?

First, calculate the Equity Value: $\$500 \text{ million} / 80\% = \625 million . That represents the value of **100%** of the seller.



Then, calculate Enterprise Value: \$625 million – \$50 million + \$100 million = \$675 million.

The revenue multiple is \$675 million / \$300 million, or 2.3x, and the EBITDA multiple is \$675 million / \$100 million, or 6.8x.

12. How far back and forward do we usually go for public company comparable and precedent transaction multiples?

Usually you look at the TTM (Trailing Twelve Months) period for both sets, and then you look forward either 1 or 2 years.

You're more likely to look backward more than 1 year and go forward more than 2 years for public company comparables; for precedent transactions it's odd to go forward more than 1 year because the information is more limited.

13. 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's the problem with comparing these two valuations directly?

There's no "rule" that says this is 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. See the diagram below:

Comparable Companies - Hypothetical Example (\$ in Millions Except Per Share Data)												
Operating Statistics:		Revenue			EBITDA			Revenue Growth		EBITDA Margin		
Company Name	Enterprise Value	Historical Year	Forward Year 1	Forward Year 2	Historical Year	Forward Year 1	Forward Year 2	Forward Year 1	Forward Year 2	Historical Year	Forward Year 1	Forward Year 2
Company A	\$ 150	\$ 90	\$ 100	\$ 110	\$ 9	\$ 10	\$ 11	11.1%	10.0%	10.0%	10.0%	10.0%
Company B	200	90	100	110	18	20	22	11.1%	10.0%	20.0%	20.0%	20.0%
Valuation Statistics:		Enterprise Value / Revenue			Enterprise Value / EBITDA							
Company Name	Enterprise Value	Historical Year	Forward Year 1	Forward Year 2	Historical Year	Forward Year 1	Forward Year 2					
Company A	\$ 150	1.7 x	1.5 x	1.4 x	16.7 x	15.0 x	13.6 x					
Company B	200	2.2 x	2.0 x	1.8 x	11.1 x	10.0 x	9.1 x					

Very different margins



In this situation, we might consider screening based on margins and remove the outliers – you would not try to “normalize” the EBITDA multiples based on margins.

Valuation Special Cases

1. How do you value a private company?

You use the same methodologies as with public companies: public company comparables, precedent transactions, and DCF. But there are some differences:

- You might apply a 10-15% (or more) **discount** to the public company comparable multiples because the private company you’re valuing is not “liquid” like the public comps are.
- You can’t use a **premiums analysis** or **future share price analysis** because a private company doesn’t have a share price.
- Your valuation shows the **Enterprise Value** for the company as opposed to the **implied per-share price** as with public companies. You *can* still calculate Equity Value, but a “per-share price” is meaningless for a private company.
- A DCF gets tricky because a private company doesn’t have a market capitalization or Beta – you would probably **estimate WACC** based on the public comps’ WACC rather than trying to calculate it yourself.

2. Let’s say we’re valuing a private company. Why might we discount the public company comparable multiples but not the precedent transaction multiples?

There’s no discount because with precedent transactions, you’re acquiring the entire company – and once it’s acquired, the shares immediately become illiquid.

But **shares** – the ability to buy individual “pieces” of a company rather than the whole thing – can be either liquid (if it’s public) or illiquid (if it’s private).



Since shares of public companies are always more liquid, you would discount public company comparable multiples to account for this.

3. Can you use private companies as part of your valuation?

Only in the context of precedent transactions – it would make no sense to include them for public company comparables or as part of the Cost of Equity or WACC calculation in a DCF because they are not public and therefore have no values for market cap or Beta.

4. Walk me through an IPO valuation for a company that's about to go public.

1. Unlike normal valuations, in an IPO valuation we **only care about public company comparables** – we select them as we normally would.
2. After picking the public company comparables, we decide on the most relevant multiple(s) to use and then estimate our company's Enterprise Value based on that (or Equity Value depending on the multiple).
3. Once we have the Enterprise Value, we work backwards to calculate Equity Value. We also have to account for the IPO proceeds in here, i.e. by **adding** them since we're working backwards (these proceeds are what the company receives in cash from the IPO).
4. Then we divide by the total number of shares (old and newly created) to get its per-share price. When people say "An IPO *priced* at..." this is what they're referring to.

If you were using P / E or any other "Equity Value-based multiple" in step #2 here, then you could skip step #3 and just take into account the cash proceeds.

5. How do you value banks and financial institutions differently from other companies?

For **relative valuation**, the methodologies (public comps and precedent transactions) are the same but the metrics and multiples are different:



- The **financial criteria** consist of Assets, Loans, or Deposits rather than revenue or EBITDA.
- You look at **metrics** like ROE (Return on Equity = Net Income / Shareholders' Equity), ROA (Return on Assets = Net Income / Total Assets), and Book Value and Tangible Book Value rather than Revenue, EBITDA, and so on.
- You use multiples such as P / E, P / BV, and P / TBV rather than EV / EBITDA.

Rather than a traditional DCF, you use 2 different methodologies for **intrinsic valuation**:

- In a **Dividend Discount Model (DDM)** you sum up the present value of a bank's dividends in future years and then add it to the present value of the bank's terminal value, usually basing that on a P / BV or P / TBV multiple.
- In a **Residual Income Model** (also known as an Excess Returns Model), you take the bank's current Book Value and simply add the present value of the excess returns to that Book Value to value it. The "excess return" each year is $(ROE * Book Value) - (Cost of Equity * Book Value)$ – basically by how much the returns exceed your expectations.

You need to use these methodologies and multiples because **Interest** is a critical component of a bank's revenue and because Debt is a "raw material" rather than just a financing source; also, banks' Book Values are usually very close to their Market Caps.

See the industry-specific guides for more detail here.

6. Walk me through how we might value an oil & gas company and how it's different from a "standard" company.

Public comps and precedent transactions are similar, but:



- You might **screen** based on metrics like Proved Reserves or Daily Production.
- You would look at the above metrics as well as R/P (Proved Reserves / Last Year's Production), EBITDAX, and other industry-specific ones, and use matching multiples.

You could use a standard Unlevered DCF to value an oil & gas company as well, but it's more common to see a **NAV (Net Asset Value) Model** where you take the company's Proved Reserves, assume they produce revenue until depletion, assign a cost to the production in each year, and take the present value of those cash flows to value the company.

There are also a host of other complications: oil & gas companies are cyclical and have no control over the prices they receive, companies use either "full-cost accounting" or "successful efforts accounting" and treat the exploration expense differently according to that, and so on.

See the industry-specific guides for more detail here.

7. Walk me through how you would value a REIT (Real Estate Investment Trust) and how it differs from a "normal" company.

Similar to energy, real estate is asset-intensive and a company's value depends on how much cash flow specific properties generate.

- You look at Price / FFO per Share (Funds from Operations) and Price / AFFO per Share (Adjusted Funds from Operations), which add back Depreciation and subtract Gains (and add Losses) on property sales.
- A **Net Asset Value (NAV)** model is the most common intrinsic valuation methodology; you assign a **Cap Rate** to the company's projected NOI and multiply to get the value of its real estate, adjust and add its other assets, subtract liabilities and divide by its share count to get NAV per Share, and then compare that to its current share price.



- You **value properties** by dividing **Net Operating Income (NOI)** (Property's Gross Income – Property-Level Operating Expenses and Property Taxes) by the **capitalization rate** (based on market data).
- **Replacement Valuation** is more common because you can actually estimate the cost of buying new land and building new properties.
- A DCF is still a DCF, but it flows from specific properties instead and it tends to be far less common than the NAV model.

See the industry-specific guides for more detail here.