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Financial Modeling Fundamentals, Module 12: Leveraged Buyouts and LBO Models – LBO Concept and Simple Walkthrough

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Overview & Key Rules of Thumb

Questions on leveraged buyouts and leveraged buyout (LBO) models are the **most advanced** ones you'll receive in entry-level investment banking interviews.

These questions are **less important** than the ones on Accounting, Equity Value and Enterprise Value, and Valuation/DCF Analysis for several reasons:

1) **The topic is more advanced**, so most questions on it will be fairly simple.

2) **LBO models are not relevant for all finance roles** – for example, you won't receive many questions on this topic in equity research or asset management interviews.

3) **This topic is more important for private equity (PE) interviews**, where you're *guaranteed* to get questions and case studies on leveraged buyouts.

The first few sections of this guide are, by far, the most important ones.

Even if you're interviewing for a role such as equity research, you still need to be familiar with the *concept* of leveraged buyouts.

The middle sections, which cover the walk-through of a real LBO model, are more relevant if you have previous IB/PE experience or you're interviewing for PE roles.

Finally, as with the other guides, the last section on More Advanced Features **is optional** – the topics there get into obscure territory.

Key Rule #1: What is an LBO, and Why Does It Work?

You learned in the previous guide on M&A deals that one company might acquire another company if it believes it will be **better off** afterward.

For example, the Seller's "asking price" might be less than the Present Value of its Free Cash Flows, or the Buyer might expect to realize an IRR on the deal that exceeds its WACC.

Private equity firms, or "financial sponsors," acquire companies for similar reasons: They might acquire a company that's **undervalued** or one where the **potential IRR exceeds their targeted returns**.

But there's a key difference between a private equity firm's acquisition of a company and a normal company's acquisition of a company: **The private equity firm NEVER plans to hold the company forever**.

Instead, the firm's approach is like "home flipping" in real estate:

1) It searches for companies that might be **undervalued** and that could yield high returns if managed properly.

2) Then, just like a real estate investor might buy a house using a combination of a down payment and a mortgage, the PE firm uses **Cash** (Equity) and **Debt** to buy a company.

3) The private equity firm will **run the company** for several years and make "improvements," similar to the renovations that a real estate investor might make.

4) In the end, the PE firm will **sell the company**, ideally for a higher price, and use the proceeds to repay the Debt it borrowed. If all goes well, it will earn back a multiple of the Cash it invested and get a high internal rate of return (IRR).

Many sources use this home-buying analogy to explain leveraged buyouts.

The analogy is reasonable, but one point is important to clarify: **A leveraged buyout is like buying a house to RENT OUT and eventually SELL rather than buying a house to live in**.

The Math Behind an LBO

Once again, we go back to my favorite formula:

Company Value = Cash Flow / (Discount Rate – Cash Flow Growth Rate)

In an LBO scenario, the private equity firm isn't concerned with the "Company Value," *exactly* – it is concerned with the **potential IRR** and how that compares with its targeted returns, AKA the Discount Rate.

This formula still applies, but you're not using it to *solve for* "Company Value."

Instead, you **calculate the IRR** in a deal where the PE firm buys a company, runs it, and sells it, and you compare that IRR to the Discount Rate.

For example, if the deal produces an IRR in the 25-30% range, and the firm aims for at least a 20% IRR, the deal works.

But if the deal produces an IRR in the 10-15% range, it doesn't work.

In normal M&A deals, companies could use any combination of Cash, Debt, and Stock to acquire other companies.

But in leveraged buyouts, PE firms use **only** Cash and Debt to do it.

Private equity firms – even publicly traded ones – cannot use Stock to fund acquisitions because:

1) As you'll see below, they don't "own" the acquired companies directly; and

2) Unlike in normal M&A deals, they plan to *sell* the acquired companies eventually.

As you know from the IRR math, it's easier to earn a high IRR when you invest less upfront.

For example, if you bought an Asset for $100, earned $10 on it each year, and eventually sold it for $100, your IRR would be 10%.

But if you bought the Asset for $50, still earned $10 on it each year, and eventually sold it for $50, your IRR would be 20%.

As a result, private equity firms prefer to use as much Debt and as little of their own money as possible to fund deals.

Borrowing money from others – using Debt to fund deals – helps a PE firm in 2 ways:

1) It reduces the **upfront cost** of acquiring a company, which makes it easier for the PE firm to earn a high return.

2) It lets the PE firm use the company's cash flows to **repay the Debt** and make interest payments.

The PE firm still must repay the Debt when it sells the company, but the **benefits** of Debt far outweigh this drawback.

That's because **money today is worth more than money tomorrow**: The IRR increases by a greater amount if you can *reduce* the purchase price by $100 *today* than if you can *increase* the exit price by $100 *in 5 years*.

Consider this scenario where an investor buys a house for $500K, rents it out to earn $35K in rental income per year, and then sells it for $550K after 5 years have passed:

Scenario 1 - 100% Cash Purchase:

Cash Used:	100.0%	$ 500
Debt Used:	0.0%	-

Revenue and Expenses:	Purchase	Year 1	Year 2	Year 3	Year 4	Year 5
Rental Income:	$ -	$ 35	$ 35	$ 35	$ 35	$ 35
Interest Payments:	-	-	-	-	-	-
Debt Principal Payments:	-	-	-	-	-	-
Repay Remaining Debt Upon Exit:	-	-	-	-	-	-
Purchase or Sale of Property:	(500)	-	-	-	-	550
Net Cash Flow:	**$ (500)**	**$ 35**	**$ 35**	**$ 35**	**$ 35**	**$ 585**

Money-on-Money (MoM) Multiple:	**1.5 x**
Internal Rate of Return (IRR):	**8.7%**

This outcome is "OK."

It's normal when you buy a property with 100% Cash, run it without changing anything, and then sell it after home prices have increased over several years.

But let's say you use **30% Cash and 70% Debt** instead, with these assumptions:

House Value:	$ 500	Debt Interest Rate:	5.0%
Sale Value:	550	Debt Principal Repayment:	2.5%
		Annual Rental Income:	35

Scenario 2 - 30% Cash Purchase:

Cash Used:	30.0%	$ 150
Debt Used:	70.0%	350

Revenue and Expenses:	Purchase	Year 1	Year 2	Year 3	Year 4	Year 5
Rental Income:	$ -	$ 35	$ 35	$ 35	$ 35	$ 35
Interest Payments:	-	(18)	(17)	(17)	(16)	(16)
Debt Principal Payments:	-	(9)	(9)	(9)	(9)	(9)
Repay Remaining Debt Upon Exit:	-	-	-	-	-	(306)
Purchase or Sale of Property:	(150)	-	-	-	-	550
Net Cash Flow:	**$ (150)**	**$ 9**	**$ 9**	**$ 10**	**$ 10**	**$ 254**

Money-on-Money (MoM) Multiple:	**1.9 x**
Internal Rate of Return (IRR):	**15.5%**

The IRR jumps from 9% to 16%, and the MoM multiple also increases from **1.5x to 1.9x**.

We get less cash flow in Years 1 – 5 and we receive less in net proceeds from selling the property, but **the lower purchase price more than makes up for those**.

Many guides and textbooks show these results and conclude by stating: "Leverage boosts returns in a leveraged buyout."

But that is incorrect. Leverage does NOT "boost returns" – it AMPLIFIES returns!

If a deal **performs well**, it will do **even better** when you pay less upfront. But if a deal does **poorly**, it will do **even worse** when you pay less upfront.

Here's what happens if the real estate market crashes, home prices fall by 20%, and we sell the house for $400K at the end:

Scenario 1 - 100% Cash Purchase:

Cash Used:	100.0%	$ 500
Debt Used:	0.0%	-

Revenue and Expenses:	Purchase	Year 1	Year 2	Year 3	Year 4	Year 5
Rental Income:	$ -	$ 35	$ 35	$ 35	$ 35	$ 35
Interest Payments:	-	-	-	-	-	-
Debt Principal Payments:	-	-	-	-	-	-
Repay Remaining Debt Upon Exit:	-	-	-	-	-	-
Purchase or Sale of Property:	(500)	-	-	-	-	400
Net Cash Flow:	**$ (500)**	**$ 35**	**$ 35**	**$ 35**	**$ 35**	**$ 435**

Money-on-Money (MoM) Multiple:	**1.2 x**
Internal Rate of Return (IRR):	**3.3%**

Scenario 2 - 30% Cash Purchase:

Cash Used:	30.0%	$ 150
Debt Used:	70.0%	350

Revenue and Expenses:	Purchase	Year 1	Year 2	Year 3	Year 4	Year 5
Rental Income:	$ -	$ 35	$ 35	$ 35	$ 35	$ 35
Interest Payments:	-	(18)	(17)	(17)	(16)	(16)
Debt Principal Payments:	-	(9)	(9)	(9)	(9)	(9)
Repay Remaining Debt Upon Exit:	-	-	-	-	-	(306)
Purchase or Sale of Property:	(150)	-	-	-	-	400
Net Cash Flow:	**$ (150)**	**$ 9**	**$ 9**	**$ 10**	**$ 10**	**$ 104**

Money-on-Money (MoM) Multiple:	**0.9 x**
Internal Rate of Return (IRR):	**(1.3%)**

In this "Downside" scenario, leverage makes our returns even worse.

Private equity firms try to avoid these outcomes, but this is a major risk of using leverage to fund acquisitions: **Mediocre deals turn into disasters with enough leverage**.

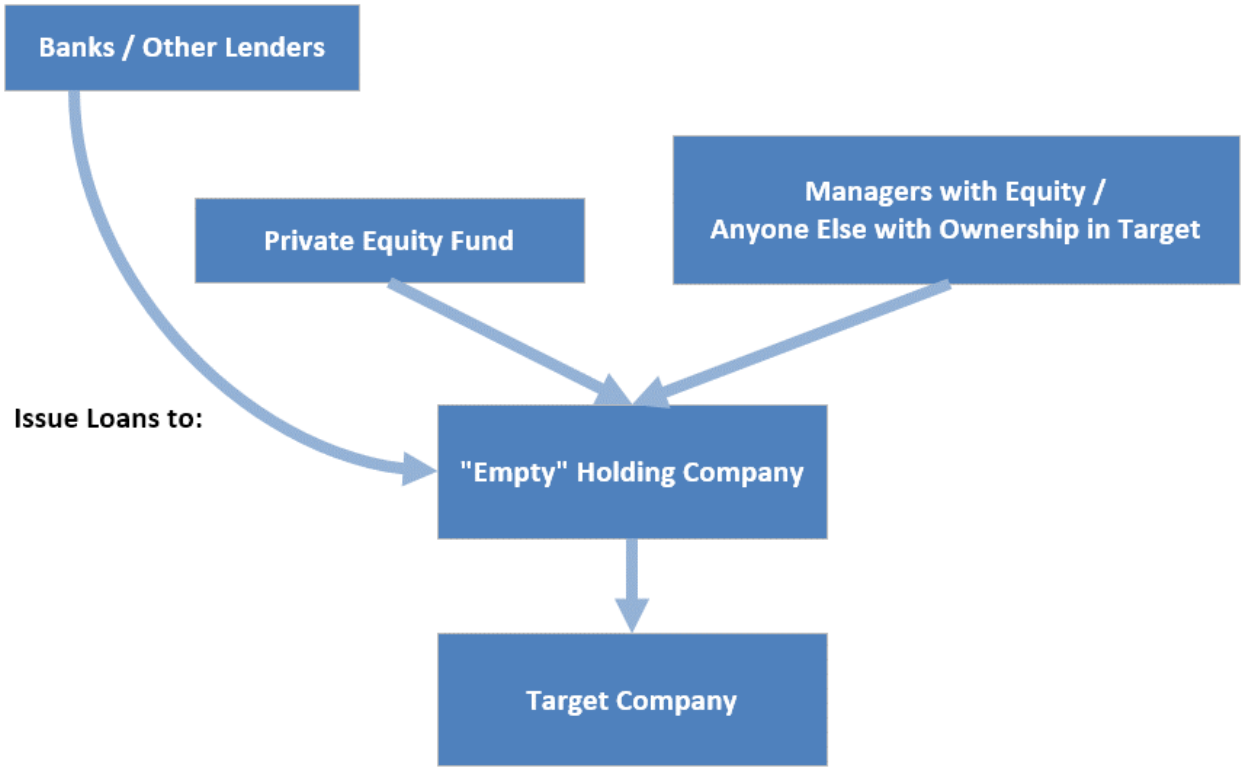
The Legal Structure That Makes LBOs Possible

Earlier, we mentioned that the PE firm doesn't truly "own" the acquired company in a leveraged buyout.

Instead, the PE firm typically forms a "holding company," which it owns, and this "holding company" acquires the real company.

The banks and other lenders that provide the Debt in the deal then lend to this Holding Company so that the Debt is at the "HoldCo" level.

Managers and executives at the acquired company that retain ownership after the deal takes place also own shares in this Holding Company:



This structure is important because it means that **the private equity firm is NOT "on the hook" for the Debt it uses in the deal!** It's up to the Target Company to repay it.

If you sit back and think about what happens in an LBO, **it's a bit crazy**:

1. The company itself raises Debt to purchase a certain number of its own shares.

2. Then, the PE firm uses its own Cash (called "Investor Equity" in models) to purchase the *remaining* shares.

3. But the PE firm will own 100% of the company afterward! (This percentage is often lower than 100% because existing investors may "roll over" their shares.)

The PE firm not only *borrows other peoples' money* to do the deal, but it doesn't even borrow the money directly – the company borrows money so the PE firm can do the deal!

And then if something goes horrifically wrong, it's the company's fault.

One implication is that *most* leveraged buyouts are **friendly deals** where both sides agree on a price and deal terms: Otherwise, why would the company agree to raise Debt to purchase its own shares?

There are some famous exceptions, like KKR's ill-fated buyout of RJR Nabisco in 1988, but even in that deal, there was still *cooperation* between the company and the potential PE buyers.

Finally, note that private equity firms do have a **reputational risk** from this arrangement. A firm can't just go around buying companies, loading them up with Debt, and then abandoning them.

Not only would the PE firm's returns plummet, but companies would stop agreeing to do deals with the firm.

This legal structure makes deals more attractive and reduces the risk for PE firms, but it doesn't let them do whatever they want.

Ideal Leveraged Buyout Candidates

While there are hundreds of millions of companies in the world, only a few are **ideal leveraged buyout candidates**.

First off, 99% of companies are too small for leveraged buyouts – a family business with $500K in annual revenue and 10 employees is nice for that family, but it's too small for a PE firm.

Some boutique and middle-market PE firms do execute smaller leveraged buyouts, but even those "smaller" deals are worth at least $5-10 million in most cases.

Assuming the size is right, **the price must also be right**.

Almost any deal could work *at the right price*, but even the best company would be a terrible LBO candidate at a price that's too high.

High prices create significant risk for the PE firm because the higher the price, the greater the probability of the price falling over time; few companies trade at high multiples forever.

After size and price, an ideal LBO candidate must be able to service its Debt, so **stable cash flows** are extremely important.

A pre-revenue biotech or tech startup would be the **worst** possible leveraged buyout candidate because it's extremely risky and could not possibly afford to carry interest-bearing Debt.

It's harder to say what the **best** candidates look like, but here are some financial characteristics that PE firms seek:

Aspect of Company:	Ideal LBO Candidate:	Non-Ideal LBO Candidate:
Income Statement:	Low fixed costs, high recurring revenue, relatively high EBITDA margins; revenue *growth* not necessarily essential.	The opposite; a pre-revenue tech or biotech startup would be the single worst possible LBO candidate due to lack of revenue, extremely high risk, etc.
Balance Sheet:	Significant fixed assets such as PP&E for use as debt collateral.	Fewer fixed assets that can be used as debt collateral.
Cash Flow Statement:	**Stable cash flows** above all else! Need them for interest and debt principal repayment. Minimal CapEx is ideal (e.g., mature company with lots of assets, but not spending much on new assets). Minimal Working Capital requirements also help, but tend to matter less.	Unstable cash flows and a high amount of CapEx (20-30% of revenue is quite high for most industries), especially if it's Maintenance CapEx rather than Growth CapEx; companies that require a lot of cash outlays for Working Capital (e.g., retailers with inventory) are also not ideal.
Valuation:	Lower to mid-range EBITDA multiple (varies wildly based on the industry - need to look at comps to determine this).	Moderate to high EBITDA multiple - creates a lot of risk for the PE firm if that multiple declines.

Stability is the major theme. The *last* thing a PE firm wants is for a portfolio company's cash flow to drop by 80% in one quarter, causing the company to default on its Debt.

Revenue and cash flow growth help, but are not essential next to stability.

A PE firm could easily make money with a slow-growing company as long as the purchase price and exit price are favorable and the company repays significant Debt over time.

But it would be much harder to make money if the company's cash flows are spotty and it cannot service its Debt.

For the most part, a company's current capital structure does NOT affect its appeal as a leveraged buyout candidate.

However, it may still make *a bit* of a difference for a few reasons.

For example, Excess Cash may make a company look more appealing because the company can use some of its Cash balance to fund the deal (e.g., the Silver Lake / Dell LBO).

Of course, Excess Cash doesn't matter if you're looking at the company based on its Enterprise Value and basing the purchase price on it since EV already reflects Cash, Debt, and so on.

Existing Debt may make a small difference because there may be **penalty fees** associated with repaying it early.

For example, there are often "Call Premiums" that state the company must repay 105%, or 104%, or 103% of the principal if it repays the entire balance fairly soon after raising the Debt (e.g., in Year 3 or 4 of a 10-year term).

And sometimes it must pay more than that depending on how much interest the lenders lose.

Moving on, here are qualitative and financing-related factors that PE firms seek:

Aspect of Company:	Ideal LBO Candidate:	Non-Ideal LBO Candidate:
Management Team:	"Strong" CEO and CFO (What does that really mean?) - experienced and have worked together for a long time, ideally *participating* in the LBO by rolling over equity to get "skin in the game."	Constant management turnover / shuffling is a red flag; inexperienced C-level executives can also be trouble; if no one on the team is participating in the deal, that could also be a negative sign.
Industry / Market Factors:	High barriers to entry or "stickiness" (e.g., Facebook); strong competitive advantage; stable, growing industry; little risk of technological change (Warren Buffett and Coca-Cola); ideally a market leader in a relatively fragmented industry.	Lower barriers to entry and/or high rate of tech/industry change; already a highly consolidated market with only 2-3 players; declining industry or exceptionally speculative industry (e.g., asteroid mining) are both non-ideal.
Financing Method and Debt Capacity:	Can support many tranches of debt (e.g., 2-3x Term Loans, 1x Senior Notes, 1x Subordinated Notes…) as well as alternative debt structures depending on the company's needs. Relatively low % equity, perhaps around 20-30% depending on market conditions.	Can only support 1-2x more turns of debt, or can *only* use Term Loans or *only* Subordinated Notes due to the covenants (we'll get to this later on). Might need more like 40-50% or more equity.
Credit Stats and Ratios:	EBITDA / Net Interest Expense > 2.0x; (EBITDA - CapEx) > Net Interest Expense > 1.5x; Total Debt / EBITDA highly dependent on industry and market, but unusually to go above 5-6x and often far lower than that.	The opposite - coverage ratios below those levels and/or a Debt / EBITDA ratio at the end of the range for the industry and/or for companies overall.
Credit Rating:	Post-deal credit ratings don't take that much of a "hit" - that will cause interest rates to go up. Credit rating will *always* go down, but ideally more like an A to BB drop rather than AA to CCC.	Post-deal credit ratings take a massive hit, and the company's interest rates jump up by a massive amount (say, 8-10%) - deal could still work, but it's tougher.

It's tough to assess the "strength" of a management team, but you *can* measure their commitment to the deal by looking at how many shares they're rolling over.

The industry appeal is a bit easier to evaluate because you can find market data that indicate how fragmented it is.

An industry where the #1 company has 5% market share, with companies #2 – 99 all having market shares between 1% and 5%, is more appealing than one where the top 3 companies own 80% of the market.

That's because many PE firms pursue **add-on acquisitions** to make the companies they acquire bigger and more valuable, and such acquisitions are easier to execute in a fragmented market.

Finally, private equity firms must consider their **exit strategies** and **sources of returns** in deals.

They almost always:

- Prefer deals and markets where **M&A exits** are feasible (either selling the company to another normal company or another private equity firm).
- **Target IRRs of 20-25%**, though this varies based on region and investing style.
- Prefer to **avoid deals that are overly dependent on "Multiple Expansion"** (e.g., EV / EBITDA must increase from 10x to 15x for the IRR to be above 20%):

Aspect of Company:	Ideal LBO Candidate:	Non-Ideal LBO Candidate:
Exit Strategies:	Ideally, a sale to a "strategic" (normal company); sale to another private equity firm or an IPO could also work; dividend recap or leveraged recap less than ideal.	Unlikely to sell the company or take it public (e.g., a smaller private company in a niche market), so dividend recaps or leveraged recaps become more necessary.
Key Drivers of Returns:	Mostly from EBITDA growth and/or debt paydown.	Minimal EBITDA growth and debt paydown, so returns are highly dependent on multiple expansion.
Targeted IRR:	20-25% even in more pessimistic cases; growth equity funds may focus more on MoM multiple.	Tough to achieve 20-25% IRR unless assumptions are more optimistic; 10-15% often seen for less ideal candidates.

While all these criteria make a difference, one factor is most important: **Price**.

If a company is too expensive, nothing else matters because it will be almost impossible to realize an acceptable return.

And if a company is cheap, you can overlook many other flaws, such as a non-ideal industry or inability to support as much leverage as you would like.

To put these concepts together, let's say we wanted to buy a company in the **consumer/retail** industry.

We consider **Foot Locker**, **Finish Line**, **Burberry**, and **Michael Kors** in this analysis:

Foot Locker

- **EBITDA:** ~$950M; 13% margin
- **Cash Flows:** Grown steadily from ~$350M FCF to ~$500M FCF over 3 years
- **Valuation:** 18.0x P / E multiple, 9.5x EV / EBITDA

Foot Locker seems "decent": It has good FCF generation, margins, and growth, though its valuation multiples are a bit high.

Finish Line

- **EBITDA:** ~$160M; 9% margin
- **Cash Flows:** *Fallen* from ~$65M FCF to ~$14M FCF over 3 years
- **Valuation:** 11.0x P / E multiple, 5.0x EV / EBITDA

Finish Line is worse than Foot Locker because its EBITDA margins are lower and its FCF has **declined** in recent years. It's also much cheaper, but that's what you would expect for a company in decline.

Burberry

- **EBITDA:** ~$870M; 23% margin
- **Cash Flows:** Increased from $371M FCF to $491M over 3 years
- **Valuation:** 19.0x P / E multiple, 10.0x EV / EBITDA

Burberry is better than the companies above because it has even higher margins, it has also increased its cash flow significantly, and its valuation multiples are almost the same as Foot Locker's.

Michael Kors

- **EBITDA:** ~$1400M; 32% margin
- **Cash Flows:** Increased from $27M FCF to $473M over 3 years
- **Valuation:** 10.0x P / E multiple, 5.0x EV / EBITDA

Michael Kors is the clear winner because it has the **highest** margins, the **lowest** valuation multiples, and the **strongest FCF growth.**

Our ranking would be: Michael Kors > Burberry > Foot Locker > Finish Line.

Leveraged Buyouts vs. M&A Deals

While there are similarities between leveraged buyouts and "normal" M&A deals, there are also plenty of differences.

The main one is that in an LBO, you assume the PE firm **sells** the acquired company after 3-5 years (and sometimes a bit longer than that); as a result, you focus heavily on the internal rate of return (IRR) in the deal.

Others include:

- **The "Buyer":** In an LBO, the PE firm always forms a "shell corporation" to complete the acquisition; this might also happen in a normal M&A deal, but the company could become a direct subsidiary of the Buyer as well.

- **Purchase Price:** It's based on a per-share premium and the valuation methodologies in both, but in an LBO, you may also consider the purchase price required to achieve a certain IRR or MoM multiple.

- **Funding Sources:** In M&A deals, Buyers use Cash, Debt, and Stock, but in LBOs, PE firms can use only Cash (Investor Equity) and Debt. And they *have* to use a combination of both, or it's not a real LBO.

- **Financial Statement Projections:** In an M&A deal, you need projections for both the Buyer and the Seller; in an LBO, you project only the Seller's financials.

- **Synergies:** These can be very important in M&A deals, but they don't matter much in LBOs unless the PE firm is combining portfolio companies.

- **Relevant Analyses:** EPS accretion/dilution matters a lot in M&A deals but is irrelevant in LBOs; the same goes for Contribution Analysis. You'll look at Returns Attribution and LBO Valuation Analysis in LBOs, but not in M&A deals.

- **Value to Society:** Most M&A *and* LBO deals tend to destroy value, but *some* M&A deals do lead to positive outcomes (e.g., Google / YouTube). Many leveraged buyouts, by contrast, are based on "financial engineering" and don't improve the company or add much value to the world at large.

The *types of questions* you receive in interviews also differ: Many M&A interview questions focus on accretion/dilution math and how Equity Value and Enterprise Value change in deals, while LBO-related questions focus on the rationale, key drivers, model setup, and IRR math.

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Key Rule #2: How to Set Up a Simple LBO Model (Paper LBO)

As with merger models, you can make LBO models extremely complex – but complexity won't necessarily produce more useful information.

For **screening** and **case study/interview purposes**, simpler models tend to be the most useful.

You can create and analyze a simple LBO model in 4 steps:

Step 1: Make Basic Transaction Assumptions

At the bare minimum, you need to know:

1) The **Purchase Price**.
2) The **% Debt and Equity Used**.

The Purchase Price might be either the Purchase Equity Value or Purchase Enterprise Value, but in simplified models, you can assume it's the **Purchase Enterprise Value**:

Assumptions:	
EBITDA Purchase Multiple:	10.0 x
Purchase Price:	$ 1,000
% Debt:	50.0%
Debt Used:	500
Equity Contribution:	500

This corresponds to the Purchase Enterprise Value here.

In real life, these would be based on the Debt and Equity levels for similar companies.

A public company's Purchase Price would be based on a premium to its current share price, so you would calculate its Purchase Equity Value and then adjust for Cash and Debt to get its Purchase Enterprise Value.

You would still calculate the EBITDA Purchase Multiple to check this valuation, but you wouldn't *start with* this multiple.

Step 2: Project Cash Flow and Debt Repayment

To project cash flows, you need information on the company's Revenue, EBITDA, Taxes, and other key items such as Working Capital and Capital Expenditures.

You also need to know the Interest Rate on the Debt used in the leveraged buyout and its repayment terms (e.g., Must the company pay back 10% of the principal per year?).

Here are the assumptions we used in this simple model:

Assumptions:			
EBITDA Purchase Multiple:	10.0 x	EBITDA Exit Multiple:	11.0 x
Purchase Price:	$ 1,000	Year 0 Revenue:	$ 250
% Debt:	50.0%	Annual Revenue Growth Rate:	10.0%
Debt Used:	500	Annual EBITDA Margin:	40.0%
Equity Contribution:	500		
		D&A % Revenue:	3.0%
Initial Cash Balance:	$ 20	CapEx % Revenue:	4.5%
Interest Rate:	10.0%	Change in WC % Change in Revenue:	(15.0%)
Tax Rate:	40.0%		

And here are our Cash Flow Projections for the company, starting with its Income Statement:

Assumptions:			
EBITDA Purchase Multiple:	10.0 x	EBITDA Exit Multiple:	11.0 x
Purchase Price:	$ 1,000	Year 0 Revenue:	$ 250
% Debt:	50.0%	Annual Revenue Growth Rate:	10.0%
Debt Used:	500	Annual EBITDA Margin:	40.0%
Equity Contribution:	500		
		D&A % Revenue:	3.0%
Initial Cash Balance:	$ 20	CapEx % Revenue:	4.5%
Interest Rate:	10.0%	Change in WC % Change in Revenue:	(15.0%)
Tax Rate:	40.0%		

Income Statement:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue:	$ 250	$ 275	$ 303	$ 333	$ 366	$ 403
EBITDA:	100	110	121	133	146	161
(-) Depreciation & Amortization:		(8)	(9)	(10)	(11)	(12)
(-) Interest:						
Pre-Tax Income:		102	112	123	135	149
(-) Taxes:		(41)	(45)	(49)	(54)	(60)
Net Income:		**$ 61**	**$ 67**	**$ 74**	**$ 81**	**$ 89**

We leave the Interest Expense blank for now, since we have to project the Debt and Cash balances first.

Revenue starts at $250 and increases by 10% per year; EBITDA stays at 40% of Revenue.

We subtract D&A, which is 3% of Revenue, to get the company's Pre-Tax Income, and then we subtract Taxes, which are 40% of Pre-Tax Income, to calculate the Net Income.

We calculate **Free Cash Flow** by starting with Net Income, making non-cash adjustments, factoring in the Change in Working Capital, and subtracting CapEx:

Income Statement:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue:	$ 250	$ 275	$ 303	$ 333	$ 366	$ 403
EBITDA:	100	110	121	133	146	161
(-) Depreciation & Amortization:		(8)	(9)	(10)	(11)	(12)
(-) Interest:						
Pre-Tax Income:		102	112	123	135	149
(-) Taxes:		(41)	(45)	(49)	(54)	(60)
Net Income:		**$ 61**	**$ 67**	**$ 74**	**$ 81**	**$ 89**

Cash Flow Projections:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Net Income:		$ 61	$ 67	$ 74	$ 81	$ 89
(+) Depreciation & Amortization:		8	9	10	11	12
(+/-) Change in Working Capital:		(4)	(4)	(5)	(5)	(5)
(-) CapEx:		(12)	(14)	(15)	(16)	(18)
Free Cash Flow:		53	58	64	71	78

Linked to the Change in Revenue each year; 15% of that here.

4.5% of Revenue each year in this projection.

Net Income + D&A +/- Change in Working Capital - CapEx; FCF tells us how much Debt the company can repay each year.

"Free Cash Flow" here is NEITHER Unlevered Free Cash Flow NOR Levered Free Cash Flow.

Instead, it's "Free Cash Flow" as most companies define it: Cash Flow from Operations – CapEx.

In our model, Cash Flow from Operations consists of Net Income, Depreciation & Amortization, and the Change in Working Capital, so it's the same definition.

At this point, we calculate the Debt and Cash balances each year:

Cash Flow Projections:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Net Income:		$ 61	$ 67	$ 74	$ 81	$ 89
(+) Depreciation & Amortization:		8	9	10	11	12
(+/-) Change in Working Capital:		(4)	(4)	(5)	(5)	(5)
(-) CapEx:		(12)	(14)	(15)	(16)	(18)
Free Cash Flow:		53	58	64	71	78
Cash Flow Used for Debt Repayment:		53	58	64	71	78
Debt Balance:	500	447	388	324	253	175
Cash Balance:	20	20	20	20	20	20

The Minimum between FCF and the previous year's Debt balance.

Previous Balance minus CF used for Debt Repayment.

Previous Cash + Any FCF NOT used for Debt Repayment.

In this example, we have enough FCF to repay substantial Debt each year.

We don't "have" to use that FCF to repay Debt; we could let it accumulate to the Cash balance or distribute it in the form of Dividends.

Since we've now projected the Cash and Debt balances each year, we can go back to the Income Statement and fill in the Interest Expense:

43														D&A % Revenue:									3.0%	
44			Initial Cash Balance:					$	20					CapEx % Revenue:									4.5%	
45			Interest Rate:						10.0%					Change in WC % Change in Revenue:									(15.0%)	
46			Tax Rate:						40.0%															
47																								
48			**Income Statement:**					**Year 0**		**Year 1**		**Year 2**		**Year 3**		**Year 4**		**Year 5**						
49			Revenue:					$	250	$	275	$	303	$	333	$	366	$	403					
50																								
51			EBITDA:						100		110		121		133		146		161					
52																								
53			(-) Depreciation & Amortization:								(8)		(9)		(10)		(11)		(12)					
54			(-) Interest:							=-F71*F45					(45)		(41)		(36)					
55																								
56			Pre-Tax Income:								52		64		78		94		113					
57			(-) Taxes:								(21)		(26)		(31)		(38)		(45)					
58			**Net Income:**							$	**31**	$	**39**	$	**47**	$	**57**	$	**68**					
59																								
60			**Cash Flow Projections:**					**Year 0**		**Year 1**		**Year 2**		**Year 3**		**Year 4**		**Year 5**						
61																								
62			Net Income:							$	31	$	39	$	47	$	57	$	68					
63																								
64			(+) Depreciation & Amortization:								8		9		10		11		12					
65			(+/-) Change in Working Capital:								(4)		(4)		(5)		(5)		(5)					
66			(-) CapEx:								(12)		(14)		(15)		(16)		(18)					
67																								
68			Free Cash Flow:								23		30		38		46		56					
69			Cash Flow Used for Debt Repayment:								23		30		38		46		56					
70																								
71			Debt Balance:						500		477		447		409		363		307					
72			Cash Balance:						20		20		20		20		20		20					

The Interest Expense decreases each year as the company repays more and more Debt, but it still dramatically reduces the company's Net Income and FCF.

FAR less Debt is repaid by the end with the Interest Expense factored in - company's FCF is much lower!

If the company generated significantly more Cash, we might put more time and effort into projecting the Interest Income.

But since its Cash balance starts out low and stays low, and since interest rates on Cash tend to be near-zero, we skipped it here.

Step 3: Make Exit Assumptions and Calculate the Returns

At the end of the projection period, you assume that the PE firm **sells the company** to a "strategic" (a normal company) or another private equity firm.

You could also assume that the PE firm takes the company public in an initial public offering (IPO) and gradually sells its stake over time, but it's more common to assume an Exit Multiple.

We used an **11x EBITDA Exit Multiple** here, and we assumed that the company generates $161.1 in EBITDA by Year 5, which produces an Exit Enterprise Value of $1,772:

Debt Balance:	500	477	447	409	363	307
Cash Balance:	20	20	20	20	20	20

Exit Calculations:		
Exit Enterprise Value:	$	1,772
(-) Debt:		(307)
(+) Cash:		20
Equity Proceeds:	**$**	**1,484**

Based on 11x * $161.

You assume the PE firm must repay the entire Debt balance upon exit, and that it can "take" the Cash for itself.

It's pretty safe to say that the PE firm must repay the company's remaining Debt balance upon exit: Just like when you sell a house and have to repay the mortgage, the PE firm must repay the company's Debt with its proceeds from the sale.

The assumption about Cash is murkier: If a company has significant Excess Cash, the PE firm might issue a Dividend to itself or otherwise claim the company's Cash.

In this case, the company has almost no Cash, so the PE firm might leave it alone.

However, the standard assumption in almost all LBO models is that you subtract Net Debt at the end to calculate the Proceeds to the PE Firm.

Since we invested $500 in Investor Equity in the beginning and received back $1,484 at the end, the Money-on-Money Multiple was approximately 3.0x here.

We can also calculate the **internal rate of return (IRR)**, which is 24.3% here.

Since there were no cash flows in between the purchase and sale, the IRR is simply: ($1,484 / $500) ^ (1 / 5) – 1, which equals 24.3%:

Exit Calculations:		
Exit Enterprise Value:	$	1,772
(-) Debt:		(307)
(+) Cash:		20
Equity Proceeds:	**$**	**1,484**

Money-on-Money (MoM) Multiple:	**3.0 x**
Internal Rate of Return (IRR):	**24.3%**

Equal to $1,484 / $500.

In this case, IRR = ($1,484 / $500) ^ (1/5) - 1 = ~24.3%.

If there were cash flows in between purchase and exit, we'd have to use Excel's IRR function to calculate this instead.

You look at both the IRR *and* the Money-on-Money (MoM) Multiple, also called the Multiple of Invested Capital (MOIC) or the Returns Multiple, **because deals can look good on an IRR basis but poor on a MoM basis or vice versa.**

For example, if a PE firm acquires a company for $1,000 and then sells it for $1,300 in one year, that's a 30% IRR but only a 1.3x multiple.

And if the PE firm acquires that same company for $1,000 and sells it for $3,000 in 9 years, the MoM of 3.0x is fine, but the IRR of 15% is not.

The question of whether the IRR or the MoM multiple is "more important" **depends completely on the holding period**.

If a PE firm does a "quick flip" in 1 year, the multiple is more important because the IRR is meaningless in such a short time frame.

But if it holds a company for 5, 6, or 7 years, the IRR is far more important.

Most firms have *specific targets* for both the IRR and the MoM multiple, and they aim to hold companies for a set number of years to make these targets more achievable.

For example, a middle-market private equity firm might plan to hold companies for **5 years**, on average, and aim for the following returns:

- **Downside Case:** Minimum of a 1.5x MoM multiple, with no specific minimum IRR
- **Base Case:** A 2.0x MoM multiple and a 15% IRR
- **Upside Case:** A 3.0x MoM multiple and a 25% IRR

Private equity funds are judged on their IRRs; funds' investors ("Limited Partners") allocate their money based on average annual returns.

If a PE firm consistently produces 20%+ IRRs over 5 or 10-year time frames, it will be able to raise capital more easily.

But if it returns LPs' money *too* quickly or it focuses on deals with high MoM multiples but poor IRRs, it will have difficulty raising capital.

PE firms must often earn above a "hurdle rate" to receive "carried interest," i.e. a performance fee, usually around 20% of the profits from investments.

This hurdle rate is based on IRR.

For example, if the hurdle rate is 8%, the PE firm needs its portfolio-wide IRR to be at least 8% before it can earn a performance fee from its investments.

For example, let's say the firm invests $100 into one deal and earns back $300.

Normally, the firm itself might receive 20% of the $200 in profits, or $40.

But if there's a "hurdle rate," **the firm will not receive 20% * $200 unless its portfolio-wide IRR is at least 8% first**.

As a result, you can think of this IRR vs. MoM multiple trade-off in the following way:

"PE firms always aim to exceed their hurdle rate, which is based on IRR. But above that minimum IRR threshold, they often optimize for the MoM multiple since *they get paid* based on a percentage of profits, and 'profits' are based on equity invested and earned back."

Rules of Thumb for Quickly Calculating IRR

Interviewers will often describe a deal and then ask you to approximate the IRR.

They might also give you the IRR and ask you to estimate the exit multiple or the purchase price, or other assumptions.

You can approximate IRR if you know the **Money-on-Money Multiple** and the **holding period:**

If you double your money in 1 year, that's a 100% IRR (e.g., invest $100 and get back $200 in 1 year → you've just earned 100% of what you put in).

If you double your money in 2 years, you need to earn *roughly* 50% per year to get there.

Due to compounding, it's less than 50%; it's closer to 40% if you calculate it in Excel.

For "double your money" scenarios, you take 100%, divide by the # of years, and then estimate the IRR as about 75-80% of that value.

For example, if you double your money in 3 years, 100% / 3 = 33%, and 75% * 33% = 25%.

In this case, 25% is the approximate IRR (the exact IRR is 26%).

The most important approximations are as follows:

- Double Your Money in 1 Year = 100% IRR
- Double Your Money in 2 Years = ~40% IRR
- **Double Your Money in 3 Years = ~25% IRR**
- Double Your Money in 4 Years = ~20% IRR
- **Double Your Money in 5 Years = ~15% IRR**

- Triple Your Money in 3 Years = ~45% IRR
- **Triple Your Money in 5 Years = ~25% IRR**

Note that we've rounded these numbers so that you can do the math more easily in your head. It's easier to work with 40% or 25% rather than 41% or 26%.

"Triple Your Money" scenarios are similar, but the compounding effect is greater there.

For example, in the "Triple Your Money in 3 Years" scenario above, 200% / 3 = 66.7%; the IRR of 45% is only about 2/3 of that number.

And for the 5-year scenario, 200% / 5 = 40%; the IRR of 25% is about 63% of that.

You can use the same trick but approximate the IRR as "around 65%" of 200% / # Years.

If you receive other information, such as the IRR or MoM Multiple, you can back into whatever the interviewer is asking for.

For example, if the interviewer says that the 3-year IRR is 35% and the Exit Equity Proceeds are $1,000 and asks you for the Initial Equity Invested:

- 3x over 3 years is a ~45% IRR, and 2x over 3 years is a ~25% IRR, so a 35% IRR is around a 2.5x multiple.

- $1,000 / 2.5 = $400.

There are many examples like this one in the Interview Questions & Answers section.

Returns Attribution

You can also create a "Returns Attribution Analysis" to determine the **returns drivers:**

Returns Attribution Analysis:		
EBITDA Growth:	$ 611	62.0%
Multiple Expansion:	161	16.4%
Debt Paydown and Cash Generation:	213	21.6%
Return to Equity Investors:	**$ 984**	**100.0%**

Over 80% of the returns come from EBITDA growth, Debt Paydown, and Cash Generation, which is what we want to see; deals that depend on Multiple Expansion are very speculative.

Based on (Ending EBITDA - Beginning EBITDA) * Purchase Multiple.

Based on Ending EBITDA * (Exit Multiple - Purchase Multiple).

With the EBITDA Growth calculation, you're saying, "Let's imagine that the Purchase Multiple *stayed the same* – how much value would we get *solely* from the company's EBITDA growing?"

The Multiple Expansion calculation uses similar logic: "Let's imagine that the company's final year EBITDA stayed the same as its initial EBITDA – how much extra value could we get *solely* from the multiple increasing?"

The "Return to Equity Investors" line is based on the $1,484 in Equity Proceeds at the end minus the $500 Equity Contribution in the beginning.

And the "Debt Paydown and Cash" line is **the plug**: It equals $984 – $611 – $161.

You might wonder how this equals $213 since we repaid only $193 of Debt and did not generate any extra Cash.

The answer is that we're including the **$20 of Cash at the end**, which, as we mentioned above, is a bit questionable.

Some LBO models remove this and include only *additional Cash Generated* in the Returns Attribution Analysis.

If we did that here, the Return to Equity Investors would be $964 and the "Debt Paydown and Cash Generation" would equal $193 instead.

Step 4: Draw Conclusions

You might now look at sensitivity tables for the deal to assess it at different Purchase and Exit Multiples, different Debt levels, and different Revenue Growth and EBITDA Margin levels.

We'll cover an example of that later in this guide, but here's what we can say about this imaginary deal so far:

First, a 3.0x MoM multiple and a 24% IRR over 5 years are good results for most PE firms.

It's not a blowout success, but 95% of firms would do this deal if they were reasonably confident of these numbers.

Second, since EBITDA Growth and Debt Paydown drive the returns, this deal is not dependent on a "Greater Fool" paying a much higher multiple for the company.

Even if the Exit Multiple were *equal* to the Purchase Multiple, we'd still earn a 22% IRR and a 2.6x MoM multiple, which are "good enough" for most funds.

This deal is also not dependent on a high level of Debt; 50% Debt is on the *low side* for traditional leveraged buyouts.

All signs point to a relatively positive deal, but we'd have to see how the numbers hold up under lower growth rates and margins to gain **conviction**.

If we find out, for example, that the MoM multiple drops to 1.5x even in the most pessimistic case, we might decide to do the deal.

But if it drops to 0.5x, we might turn down the deal because we'd *lose money* in that case, which is a risk that PE firms avoid like the plague.

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