LBO Modeling & Valuation Techniques

Comillas Private Equity & Venture Capital Club

Private Markets 101

Map of the Course

- Understanding Private Markets
- **Private Equity**
- Venture Capital
- Private Credit
- Infrastructure and Real Estate Investments

Private Equity Modules

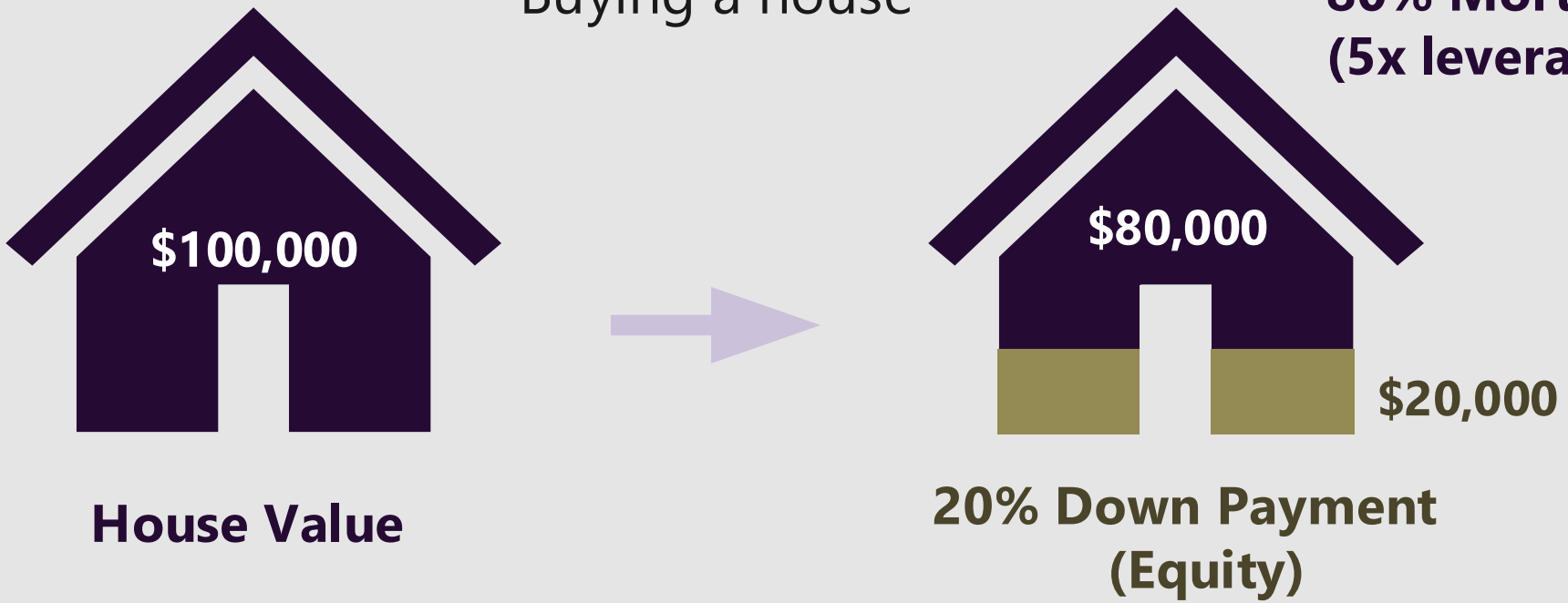
- Introduction to Private Equity
- Fund Structure & Investment Lifecycle
- PE Entry & Exit Strategies
- Understanding Legal Structures in PE
- Sustainability in PE
- **LBO model**

Understanding Leverage

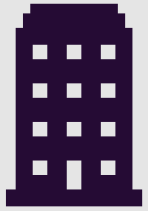
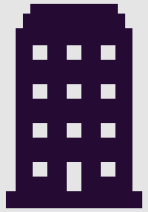
What Is Leverage?

Leverage is controlling more assets than equity contributed.
An example could be a mortgage on a house:

A common case:
Buying a house



Why Leverage? — Example: Company Buyout

1  100% Cash	EQUITY: $100M DEBT: $0	EXIT VALUE: $150M DEBT REPAYMENT[1]: -$0 NET PROCEEDS: $150M	MOIC[2]: X1.5
2  50% Leverage	EQUITY: $50M DEBT: $50M	EXIT VALUE: $150M DEBT REPAYMENT: -$50M NET PROCEEDS: $100M	MOIC: X2

1. For simplicity, debt repayment here excludes interest payments – in real LBOs interest affects the final return.
2. Multiple On Invested Capital (MOIC) measures how many times the original equity investment is returned at exit.

When Is Leverage Good or Bad?

GOOD LEVERAGE

ROI[1] > Cost of Leverage[2]
Extra debt boosts returns.

BAD LEVERAGE

ROI < Cost of Leverage
Debt erodes returns, making the investment unprofitable.

PROS

- ✓ Larger ROE[3]
- ✓ Less equity needed

CONS

- ○ Losses are amplified
- ○ Interest payments reduce cash flow available for growth.

1. Return on Investment (ROI) measures the return generated by the asset or project itself, before considering how it's financed.
2. Cost of Leverage refers to the cost of borrowed capital – mainly the interest paid on debt.
3. Return on Equity (ROE) measures the profit generated to the equity invested.

LBO Fundamentals

The Buyout

A buyer acquires a **controlling stake** in a company, funding the acquisition primarily with **debt** and only **a portion** with **equity**.

DEBT

- Raised by the buying company.
- Repaid by the target company.
- With target company's assets as guarantee – no claims can be made against the buying company.

WHY AN LBO?

- ✓ Amplify returns – higher ROE.
- ✓ Discipline & Efficiency – debt creates pressure for operational improvements.
- ✓ Control – buyers gain a controlling stake using small amount of equity.

CHALLENGES / RISKS

- Exposure to interest rates.
- Less cash available for investment.

Key Players

Target Co.

The acquired company, typically a mature, cash-generating business with room for operational improvements.
Its future cash flows are expected to **repay** the **leverage**.
Its assets are **collaterals** for the debt

Sponsor

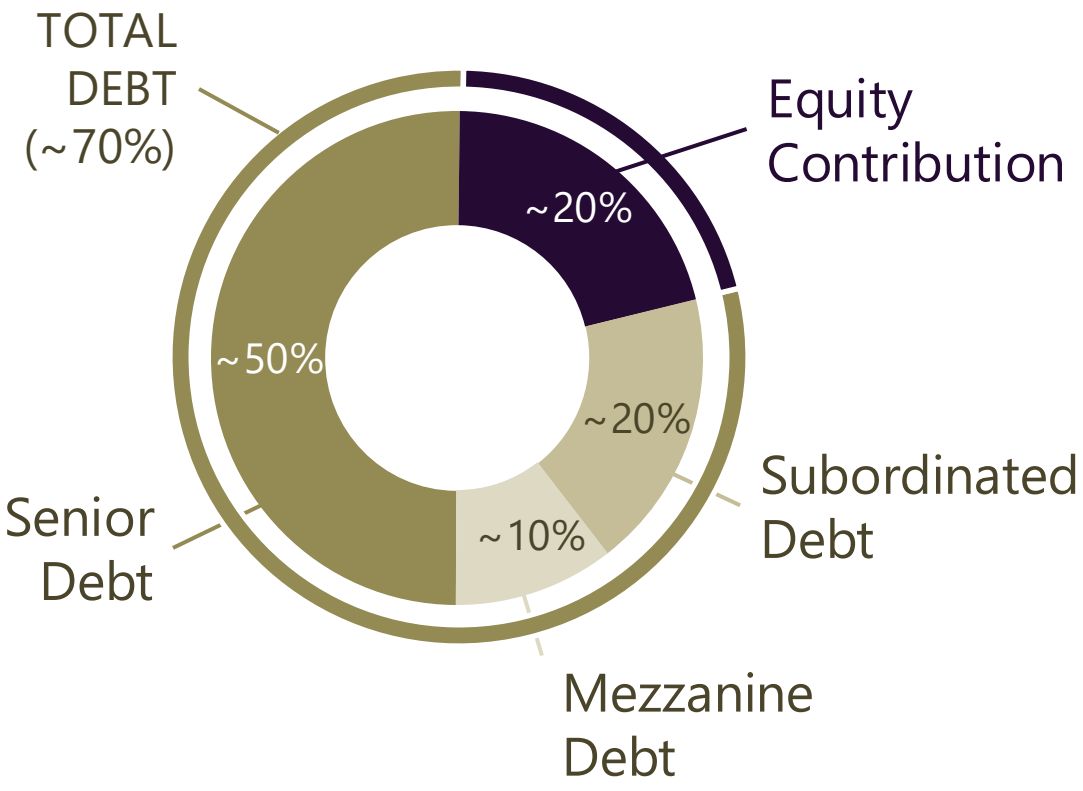
Usually a PE Firm that provides equity capital and leads the deal. It is responsible for managing the Target and design a **value creation** plan.
In a Management Buyout (MBO), the sponsor is the management team.

Debt Providers

Banks, institutional lenders and others that provide the bulk of the capital through senior and subordinated loans.
They **earn interest** and fees and hold claims on the company's assets as collateral.

Debt Used in LBOs — Providers of Capital

TYPICAL DEBT STRUCTURE



PROVIDERS OF CAPITAL

BANKS & SECURITIES FIRMS

- Provide **senior secured loans**.
- Lowest-cost debt.

INSTITUTIONAL INVESTORS

- Includes pension, hedge, mutual funds, insurance companies, CLOs & private debt funds.
- Provide **subordinated** and **mezzanine debt**.
- High-yield bond buyers in large deals.

PRIVATE EQUITY FUNDS

- Sponsors provide the **equity** portion.
- Sometimes inject mezzanine capital.

LBO Structure

Example: target company is valued at $100M; sponsor executes the deal leveraging $70M.

1 A **Bid Co.** is incorporated (created) by the sponsor.

2 **Target Co.** operates normally before the deal is closed.

BID CO.

ASSETS		LIABILITIES / EQUITY	
Cash	100	Debt	70
		Equity	30

+

TARGET CO.

ASSETS		LIABILITIES / EQUITY	
Cash	2	Debt	32
Fixed Assets	76	Equity	46

3 Bid Co. acquires Target Co. and merges it into a **New Co**.

LBO Structure

3 The resulting **New Co.** from the LBO has the following balance sheet:

New Co. receives all assets from Target Co.

NEW CO.			
ASSETS		LIABILITIES / EQUITY	
Cash	2	Debt	70
Fixed Assets	98	Equity	30

And maintains capital structure of the Bid Co.

To balance the books (Assets = Liabilities + Equity), any excess paid over the target's net asset value appears as goodwill on the New Co.'s balance sheet, increasing its fixed assets value.

Valuation Techniques

No LBO can be structured without first determining what the target is worth.

Valuation Methods

Valuing a company is always partly **subjective** as many **assumptions** must be made. Professionals use different techniques including:

ACCOUNTING-BASED VALUATION	Book Value Model
MARKET REFERENCE METHODS	Market Capitalization Market Multiples & Comparables Liquidation Value Model
ECONOMIC RESULTS FORECASTING	DCF Model Dividend Valuation Model APV (Adjusted Present Value)

Most Common Valuation Techniques in PE

Market Multiples & Comparables

Looks at how similar companies are valued and what prices have been paid in past deals. This provides a market-based reference point for negotiating a fair entry price.

DCF Model

The Discounted Cash Flow Model estimates the company's intrinsic value by forecasting future free cash flows and discounting them to present value. This helps check whether the expected returns justify the price paid.

Market Multiples & Comparables

In private equity, **EV/EBITDA** is the most commonly used metric as it reflects the core operating performance.

Enterprise Value (EV) can be calculated with the Target Co.'s EBITDA and a median multiple:

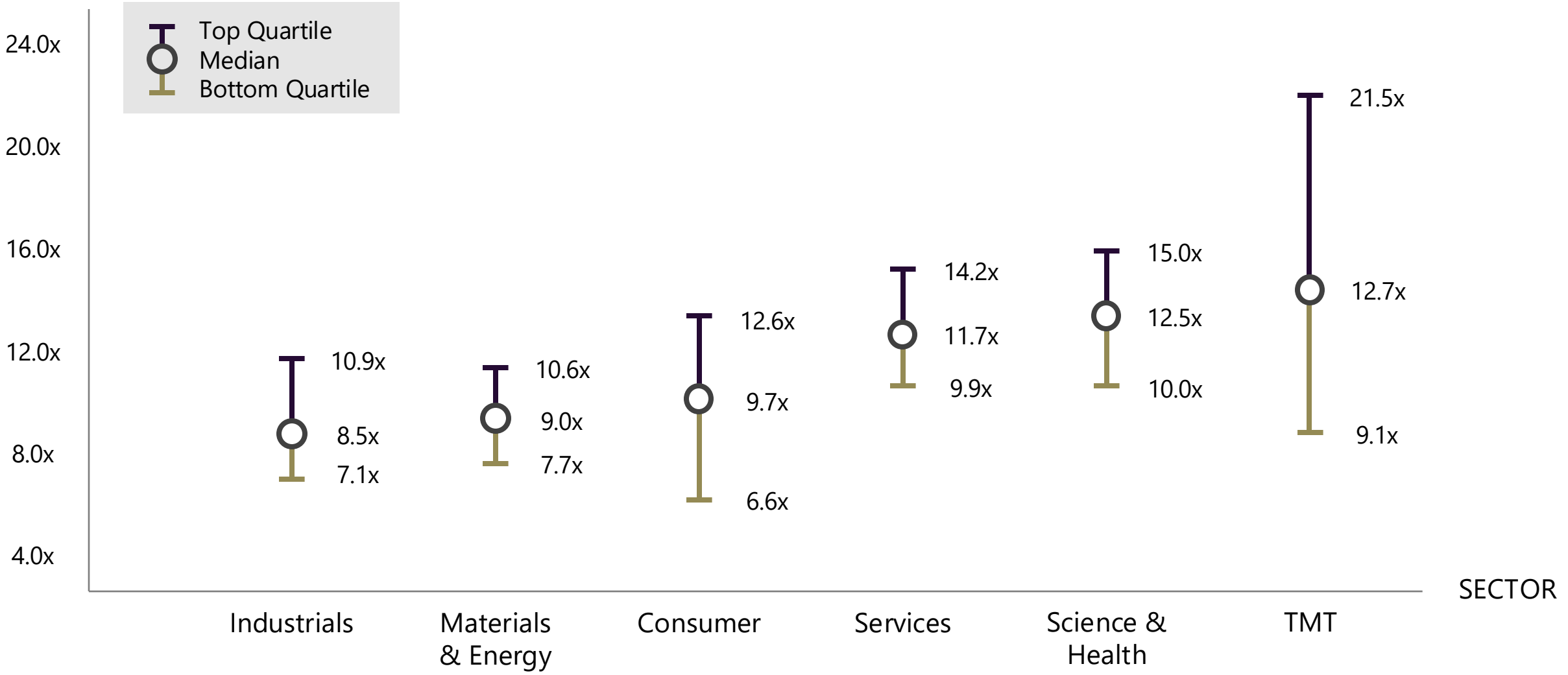
$$EV = EBITDA \cdot (EV/EBITDA)$$

1 TRADING COMPARABLES
Target Co. can be compared to **similar public companies** based on sector, size and growth.

2 PRECEDENT COMPARABLES
Multiples paid in **past deals** can be used for similar companies under similar market conditions.

EV/EBITDA Multiples by Sector

EV to EBITDA multiples for PE entries & exits in Europe (2024)



Discounted Cash Flow (DCF) Model

A Discounted Cash Flow model estimates the company's intrinsic value by **forecasting** its **future free cash flows** and discounting them back to present value.

A DCF is only as good as its assumptions. Estimating too highly will result in overvaluing.

This model is widely used across PE, M&A and corporate finance to test whether the expected return justifies the entry price.

$$EV = \sum \left(\frac{FCFi}{(1+r)^i} \right) + \frac{TV}{(1+r)^n}$$

SUM OF ALL FCF
Over the forecast period (n), discounted to the present.

RESIDUAL VALUE
At exit (time n), discounted to the present. It can represent 60-80% of total DCF value.

NOTATION

EV – Enterprise Value
FCF – Free Cash Flow
r – WACC[1]
TV – Terminal Value
n – Final year of the forecast
i – Each individual year (1 to n)

1. Weighted Average Cost of Capital (WACC) is the required return for all capital providers.

DCF Step-by-Step

1 BUSINESS REVIEW

Review **past performance**, **market position** and internal drivers to build realistic forecasts.

2 FREE CASH FLOW CALCULATIONS

Project operating cash flows, working capital (**WC**) needs and capital expenditures (**CAPEX**) to derive annual FCFs.

3 TERMINAL VALUE & WACC CALCULATIONS

Estimate the **company's value beyond forecast** through exit multiples and determine the appropriate **discount rate** (WACC).

4 APPLY DCF FORMULA

Discount all forecasted FCFs and the Terminal Value using the WACC.

5 SENSITIVITY ANALYSIS

Test **how changes** in key assumptions **impact final valuation**.

6 CONCLUSIONS

Interpret results, **compare** with market multiples and **validate** range.

DCF – FCF Calculation

FCF is the amount of cash that a company has left after accounting for spending on operations and capital asset maintenance. It can be calculated in several ways:

1 FROM OPERATING CASH FLOW

+ Cash Flow from Operating Activities
+ Interest Expense
- Tax Shield on Interest
- CAPEX

Free Cash Flow

2 FROM EBIT (most common)

+ EBIT x (1 – Tax Rate)
+ Non-cash expenses (Depreciation, Amortization)
- Change in WC[1]
- CAPEX

Free Cash Flow

3 FROM NET INCOME

+ Net Income
+ Interest Expense
- Tax Shield on Interest
+ Non-cash expenses
- Change in WC
- CAPEX

Free Cash Flow

All terms can be obtained from the P&L, Balance Sheet or Cash Flow Statement.
1. Working Capital (WC) is the difference between current assets and current liabilities.

DCF – Terminal Value and WACC Calculations

The Terminal Value estimates the expected exit price for the business at the end of the forecast period.

There are **two** main methods to calculate it:

PERPETUITY GROWTH MODEL

Assumes the business grows at a constant rate forever.

$$TV = \frac{FCFn \cdot (1 + g)}{(WACC - g)}$$

EXIT MULTIPLE METHOD

Applying market multiple EV/EBITDA.

$$TV = EBITDA(n+1) \cdot \textit{Exit Multiple}$$

The WACC is the discount rate used in a DCF – it reflects the average return expected by all capital providers.

It combines the cost of equity (k_e) and the after-tax cost of debt (k_d).

$$WACC = \left(\frac{E}{E+D} \cdot k_e\right) + \left(\frac{D}{E+D} \cdot k_d \cdot (1 - \text{Tax Rate})\right)$$

E: Market Value of Equity
D: Market Value of Debt
k_d: Cost of debt -> average interest rate paid by the company.
k_e: Cost of equity –> Estimated using the CAPM[1]:

$$k_e = r_f + ß \cdot (r_m - r_f)$$

1. Capital Asset Pricing Model (CAPM) is a common model used to estimate the expected return for equity investors.

DCF – Sensitivity Analysis

Sensitivity Analysis shows how small changes in key assumptions affect a company's valuation or the deal's returns.

TYPICAL VARIABLES:

- WACC (higher WACC -> lower present value)
- Terminal Growth Rate
- EBITDA Margins

In LBO models, sensitivity analysis tests other key variables such as **exit multiples**, **leverage levels** and **EBITDA growth** assumptions.

Valuations depend heavily on assumptions like growth rates, discount rates (WACC), exit multiples and leverage. Sensitivity tables highlight **upside** and **downside risks** by showing how EV shifts under different scenarios – with the **central value** reflecting the **base case assumptions**.

		WACC				
	$MM	8.0%	8.5%	9.0%	9.5%	10.0%
Growth	1.0%	1,400	1,250	1,125	1,000	900
	1.5%	1,525	1,375	1,250	1,100	1,000
	2.0.%	1,675	1,525	**1,375**	1,250	1,100
	2.5%	1,825	1,675	1,525	1,375	1,250
	3.0%	2,000	1,825	1,675	1,525	1,375

Example Snapshot of a DCF

Given a fictitious company with projected EBIT on an assumed annual growth rate – WACC and Terminal Value calculations omitted for simplicity – FCFs are calculated:

	Year 1	Year 2	Year 3	Year 4	Year 5
EBIT	1,472.1	1,501.5	1,531.6	1,562.2	1,593.4
Tax on EBIT	(294.4)	(300.3)	(306.3)	(312.4)	(318.7)
NOPAT[1]	1,177.7	1201.2	1,225.2	1,249.7	1,274.7
D&A	379.3	382.8	386.4	390.3	394.3
ΔWC	(538.1)	34.6	35.5	36.0	36.8
CAPEX	(519.6)	(529.9)	(540.5)	(551.4)	(562.4)
FCF	**499.2**	**1,088.7**	**1,106.5**	**1,124.7**	**1,143.4**
Present Value of FCFs	471.8	972.6	934.3	897.6	862.5
Sum of Present Value of FCFs	4,138.8				

$$\frac{FCFn}{(1+WACC)^n}$$

WACC	5.8%
Present Value of Terminal Value	15,085.3

1. Net Operating Profit After Taxes.

Example Snapshot of a DCF (2)

Enterprise Value can be calculated with the sum of the present value of FCFs and the present value of the terminal value:

$$EV = \sum \left(\frac{FCFi}{(1+r)^i} \right) + \frac{TV}{(1+r)^n}$$

$$EV = 4{,}138.8 + 15{,}085.3$$

$$EV = \$19{,}224.1MM$$

RECAP

In this example, **future FCFs** were projected and, together with a given **Terminal Value** which could have been calculated through multiples or a perpetuity growth rate, value was captured beyond the forecast period. These cash flows were discounted to present value using the **WACC** as the discount rate and finally **Enterprise Value** was calculated.

A final sensitivity analysis would help to test how changes in key assumptions – like EBIT growth or WACC – could shift the company's valuation.

Other Valuation Methods

While these valuation methods are less common in private equity, they provide useful perspectives to help build a broader understanding on how companies can be valued.

BOOK VALUE MODEL

Based on the company's net assets on the balance sheet. Too conservative.

MARKET CAPITALIZATION

Calculated as *share price x number of shares***.** Represents the public market's equity value estimate.

LIQUIDATION VALUE MODEL

Estimates what could be recovered if the company's assets were sold off. Used in distressed scenarios.

DIVIDEND DISCOUNT MODEL

Values a company based on the present value o projected dividends.

ADJUSTED PRESENT VALUE (APV)

Separates the value of a business as if it were all-equity financed and then adds the present value of financial benefits (like tax shields).

LBO Modeling

Deal Overview & Key Assumptions

An LBO model starts by defining clear assumptions about how the transaction will be structured and financed.

LBO MODEL FRAMEWORK

1. Transaction Assumptions
2. Sources & Uses
3. Purchase Price Allocation
4. Financial Projections[1]
5. Debt Repayment Schedule
6. Exit & Returns Analysis

KEY ASSUMPTIONS

- Target Company – set using valuation multiples or comparable transactions to estimate EV.
- Equity Contribution – sponsor decides what % of total price to fund with equity.
- Debt Structure – define the mix of debt instruments.
- Transaction costs – estimate fees for legal, advisory and financing.

1. Projections follow the same logic as a DCF model to forecast cash flows.

Sources & Uses

The Sources & Uses table shows where the capital to fund the transaction comes from and exactly how it will be spent.

SOURCES — Total funds raised to complete the buyout.

USES — How raised capital will be allocated.

This table is often presented with key multiples to show the deal's leverage and capital structure at a glance.

EXAMPLE

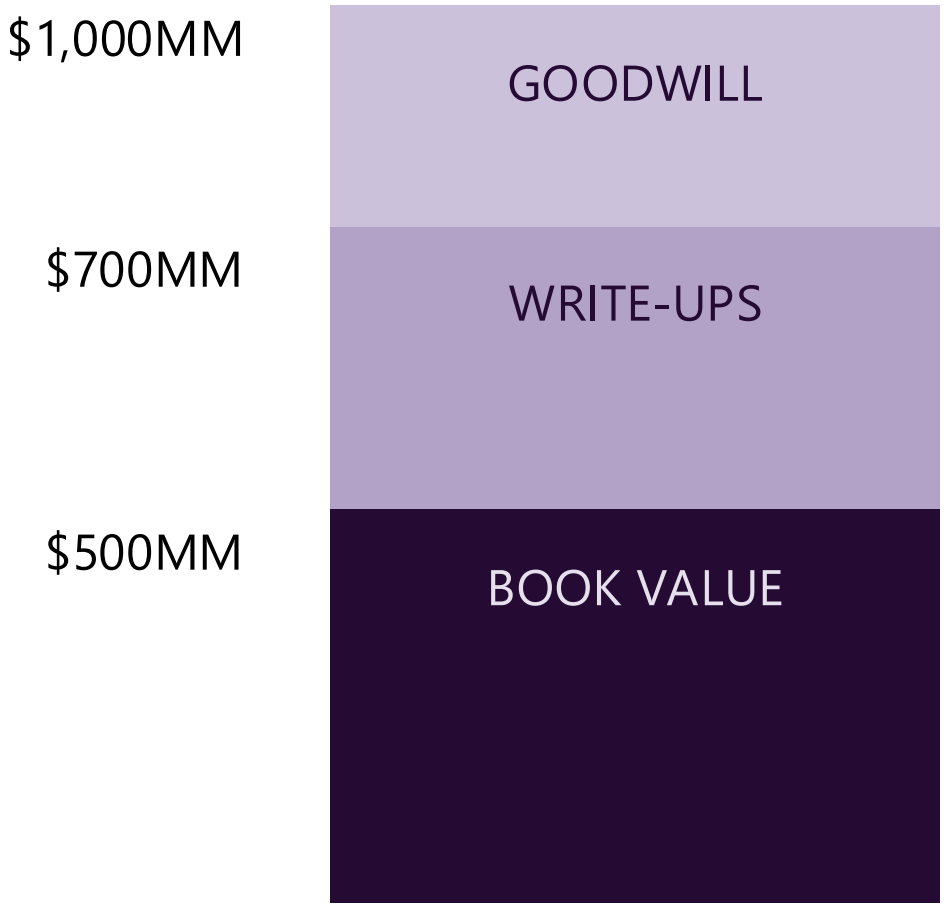
Enterprise Value	($MM)
EBITDA	$100
EV/EBITDA Multiple	10x
Enterprise Value	**$1,000**

Sources		Multiple
Senior Term Debt	$550	5.5x
Subordinated Debt	$200	2x
Equity	$300	3x
Total	**$1,050**	**10.5x**

Uses		Multiple
Seller Proceeds	$850	8.5x
Old Co. Debt	$150	1.5x
Transaction Expenses	$30	0.3x
Financing Fees	$20	0.2x
Total	**$1,050**	**10.5x**

Purchase Price Allocation (PPA)

When buying a company, PPA explains exactly what PE firms are paying for – making sure every dollar paid has a clear place.



Excess paid above net asset value, capturing intangible value like **brand** or **customer base**.

Adjustments to increase the value of certain assets to **fair market value**.

Value of net tangible assets on the company's **balance sheet**.

PURCHASE PRICE

Financial Projections & Debt Repayment Schedule

FINANCIAL PROJECTIONS

Financial Projections estimate how much FCF the company can generate to cover debt service forecasting **revenue**, **margins**, **CAPEX** and **working capital**.

- Same logic as DCF – forecasting operating performance and cash generation.
- Shows how much FCF is really available to pay interest and repay debt.
- Helps test if the deal can meet all debt obligations and deliver strong returns.

DEBT SCHEDULE

A Debt Schedule shows how the company plans to pay interest and repay principal over the life of the investment.

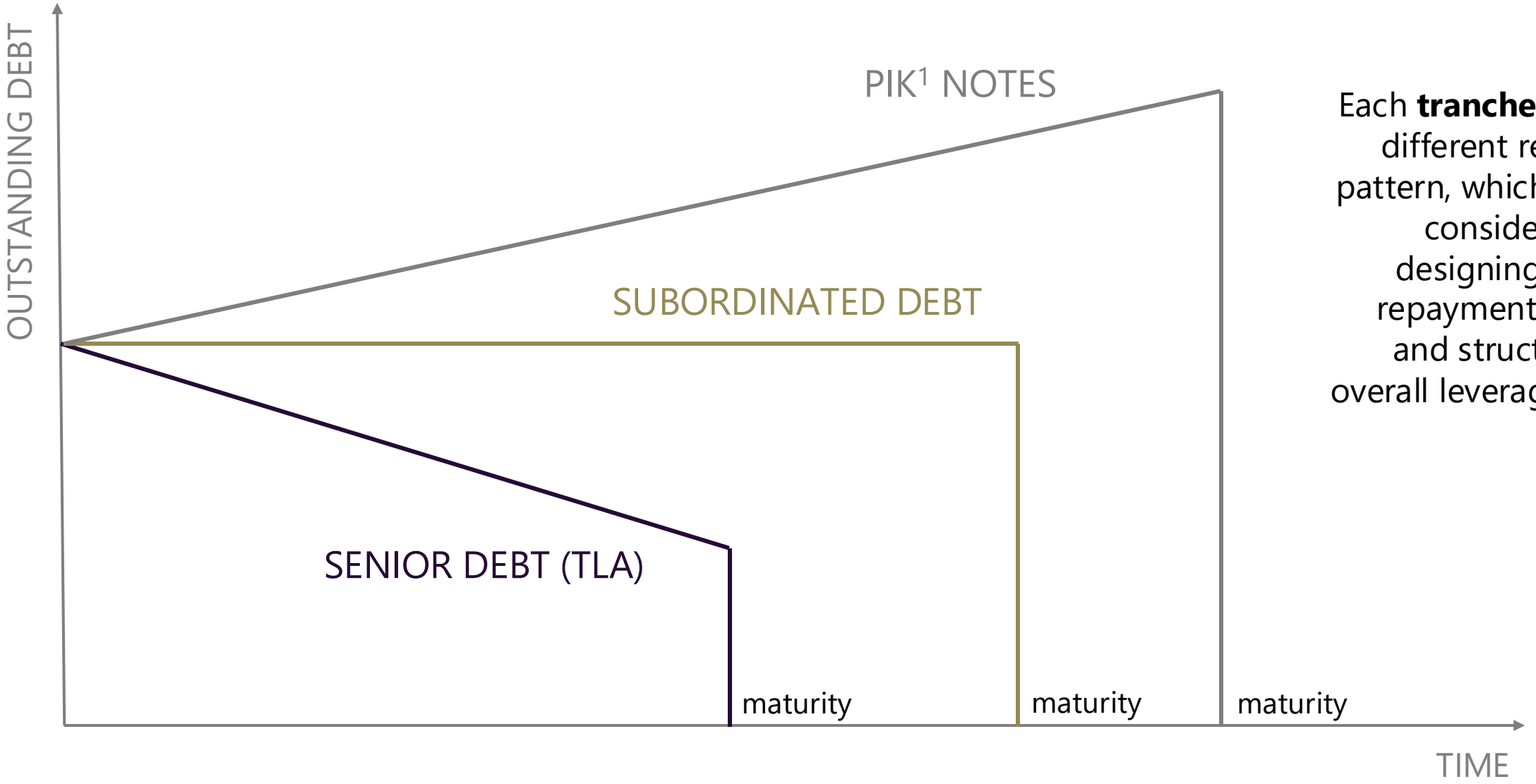
- Required Repayments – some loans require fixed principal payments each year.
- Optional Repayments – excess FCF may be used to pay down debt faster (cash sweep).
- Different debt layers (senior, subordinated) have different interest rates and repayment terms.
- The schedule tests if cash flow projections can cover all obligations on time.

Debt Repayment Schedule Example

Debt Schedule ($MM)	Rate	20x1	20x2	20x3	20x4
Senior Debt (TLA[1])	5%				
Opening Balance		$550	$495	$440	$385
Required Repayments		$55	$55	$55	$385
Closing Balance		$495	$440	$385	$0
Interest Expense (avg. balance)		$26	$23	$21	$10
Subordinated Debt	12%				
Opening Balance		$200	$200	$200	$200
Required Repayments		$0	$0	$0	$200
Closing Balance		$200	$200	$200	$0
Interest Expense (avg. balance)		$24	$24	$24	$12
Total Interest Expense		**$50**	**$47**	**$45**	**$22**

1. Some senior debt loans as TLA (Term Loan A) have mandatory annual amortization, while TLB (Term Loan B) typically has minimal required payments and repays principal mainly at maturity.

Debt Repayment Profile



Each **tranche** follows a different repayment pattern, which must be considered when designing the debt repayment schedule and structuring the overall leverage profile.

1. Payment-In-Kind (PIK) interest is added to the principal balance and repaid at maturity instead of paying cash interest periodically.

Exit & Returns

Final step is to estimate what the company will be worth at exit and calculate the sponsor's return.

EXIT ENTERPRISE VALUE

Using the same multiple or slightly adjusted from entry.

$$\text{Exit EV} = \text{EBITDA} \cdot \text{Exit Multiple}$$

RETURN METRICS

IRR: annualized return on invested equity.
MOIC: total cash returned divided by equity invested.

EQUITY PROCEEDS

Equity Value returned to the sponsor:

$$\text{Equity Proceeds} = \text{Exit EV} - \text{Debt Remaining}$$

SENSITIVITY ANALYSIS

Tests how changes in exit multiples, EBITDA growth or leverage affect final returns.

Wrap-Up

Key Takeaways

Leverage **amplifies returns** – but also increases risk. A well-structured capital stack is essential.

LBOs rely on the **target's cashflows** to repay debt and generate investor returns, making cashflow forecasting central to any model.

Valuation is the first step – market multiples and DCF are the most used techniques to estimate a fair entry price and test potential return.

Returns are calculated at exit, combining **MOIC** and **IRR**, and tested with sensitivity analysis around key assumptions.

Each **debt tranche** has **unique features** (amortization, PIK, maturity) which affect cash needs and must be reflected in the model.

Key Terms

Term	Definition
Leverage	Use of debt to finance a transaction, increasing potential returns (and risk) for equity holders.
ROI	Return on Investment – ratio of profit over invested capital, used to asses efficiency.
ROE	Return on Equity – return generated on the equity portion of capital structure.
EV	Enterprise Value – total value of a business, including equity and net debt.
FCF	Free Cash Flow – cash available after taxes, changes in working capital and capital expenditures.
WACC	Weighted Average Cost of Capital – used to discount cash flows in DCF.
CAPEX	Capital Expenditures – investments in long-term assets like machinery or equipment.
TV	Terminal Value – estimated value of the business at the end of the projection period.
Sensitivity Analysis	Tests how variations in key assumptions (e.g. WACC, TV multiple) affect valuation outcomes.
Sources & Uses	Table summarizing how the deal is financed (sources) and where the funds are allocated (uses).
PPA	Purchase Price Allocation – accounting exercise that explains how the purchase price is allocated across assets, liabilities and goodwill.
MOIC	Multiple On Invested Capital – total return over the initial equity investment.
IRR	Internal Rate of Return – annualized return that discounts future cash flows to a zero NPV.

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