

CHAPTER 5

Valuation Techniques with Claude

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 Level: Advanced

Learning Objectives

- Understand the two main valuation approaches: intrinsic (DCF) and relative (multiples)
- Build a complete Discounted Cash Flow (DCF) model using Claude, from free cash flow projection through implied share price
- Calculate the Weighted Average Cost of Capital (WACC) using CAPM and after-tax cost of debt
- Compute terminal value using both perpetuity growth and exit multiple methods
- Perform comparable company analysis (trading comps) and precedent transaction analysis
- Construct a football field valuation summary combining multiple methodologies
- Conduct a leveraged buyout (LBO) quick screen to assess private equity feasibility
- Apply the DARE framework to every valuation prompt for accuracy and completeness

5.1 Valuation Overview: Intrinsic vs. Relative

Valuation is the process of determining what a company, asset, or security is worth. It is the central skill of corporate finance, investment banking, equity research, and private equity. Every investment decision, merger negotiation, IPO pricing, and portfolio allocation ultimately depends on a valuation judgment.

There are two fundamental approaches to valuation, each grounded in different theoretical foundations. Intrinsic valuation (also called absolute valuation) estimates value based on the present value of expected future cash flows. Relative valuation estimates value by comparing the target company to similar companies or transactions using standardized multiples.

Source: Damodaran, A., Investment Valuation, 3rd ed. (Wiley, 2012), Chapter 1. NYU Stern.

Neither approach is inherently superior. Professional valuation always employs multiple methods and triangulates the results into a range. The art of valuation lies in understanding when each method is most appropriate and how to reconcile differences between them.

When to Use Each Approach

Intrinsic valuation (DCF) is most appropriate when the company has predictable cash flows, a stable or clearly defined growth trajectory, and when you have confidence in the discount rate assumptions. It is the gold standard for mature companies with operating histories and for situations where you need to understand value drivers at a granular level.

Relative valuation (comps) is most appropriate when there is a sufficiently large peer group of comparable companies, when the market is efficiently pricing those peers, and when you need a quick market-implied estimate. It is particularly useful for benchmarking and for cross-checking DCF results.

Comparison of Valuation Methods

Dimension	DCF	Comparable Companies	Precedent Transactions
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Basis of value	Intrinsic: PV of future cash flows	Market: peer trading multiples	Market: historical deal multiples
Key inputs	FCF, WACC, terminal growth	EV/EBITDA, P/E of peers	Transaction multiples, control premium
Strengths	Fundamental, assumption-transparent	Market-based, quick to compute	Reflects actual prices paid
Weaknesses	Sensitive to assumptions (WACC, g)	Assumes peers are fairly valued	Historical, may not reflect current conditions
Best for	Mature companies with stable FCF	Listed companies with clear peers	M&A advisory, fairness opinions
Time to build	Several hours (detailed model)	1–2 hours	1–2 hours (data permitting)
Typical use	Primary valuation in equity research	Cross-check and benchmarking	M&A negotiations, control premium analysis

In practice, investment banks produce valuations using all three methods and present the results in a football field chart (Section 5.7) that shows the implied value range from each approach.

5.2 Discounted Cash Flow (DCF) Methodology

The Discounted Cash Flow (DCF) method values a company by estimating its future free cash flows and discounting them back to the present at the weighted average cost of capital (WACC). It is the most theoretically rigorous valuation method because it derives value directly from the company's ability to generate cash for its investors.

Source: Koller, T., Goedhart, M., Wessels, D., Valuation: Measuring and Managing the Value of Companies, 7th ed. (McKinsey & Company / Wiley, 2020).

The DCF process follows seven sequential steps. Each step builds on the previous one, and errors in early steps compound through the model. This is why the Validate phase of the CFMF framework is especially critical in DCF analysis.

Step 1: Project Free Cash Flow (FCF)

Free Cash Flow to the Firm (FCFF) represents the cash available to all capital providers (both debt and equity holders) after operating expenses, taxes, and reinvestment. The standard formula is:

$$\text{FCF} = \text{NOPAT} + \text{Depreciation \& Amortization} - \text{Capital Expenditures} - \text{Change in Working Capital}$$

$$\text{Where NOPAT (Net Operating Profit After Tax)} = \text{EBIT} \times (1 - \text{Tax Rate})$$

Each component must be projected for the explicit forecast period (typically 5–10 years). Revenue growth drives the top line. EBIT margin assumptions determine operating profitability. D&A is typically estimated as a percentage of revenue or fixed assets. CapEx reflects the reinvestment required to sustain and grow the business. Working capital changes capture the cash impact of changes in receivables, inventory, and payables.

Step 2: Calculate WACC

The Weighted Average Cost of Capital blends the cost of equity and after-tax cost of debt, weighted by the target capital structure. WACC is covered in detail in Section 5.3.

Step 3: Discount FCFs to Present Value

Each projected free cash flow is discounted back to the present using the WACC as the discount rate:

$$\text{PV of FCF}(t) = \text{FCF}(t) / (1 + \text{WACC})^t$$

Where t is the number of years from the valuation date. The mid-year convention is often applied, which assumes cash flows are received in the middle of each year rather than at the end, providing a more realistic estimate.

Step 4: Calculate Terminal Value

Terminal value captures the value of all cash flows beyond the explicit forecast period. It is covered in detail in Section 5.4. Terminal value typically represents 50–80% of total enterprise value, making its assumptions critically important.

Step 5: Sum PV of FCFs + PV of Terminal Value = Enterprise Value

$$\text{Enterprise Value} = \text{Sum of PV of projected FCFs} + \text{PV of Terminal Value}$$

Enterprise value represents the total value of the company's operations to all capital providers. It is independent of capital structure, which makes it the appropriate starting point before bridging to equity value.

Step 6: Bridge to Equity Value

$$\text{Equity Value} = \text{Enterprise Value} - \text{Net Debt}$$

$$\text{Where Net Debt} = \text{Total Debt} - \text{Cash and Cash Equivalents}$$

The equity bridge may also adjust for minority interest, preferred equity, pension obligations, and other claims on the enterprise that rank ahead of common equity.

Step 7: Implied Price Per Share

$$\text{Implied Share Price} = \text{Equity Value} / \text{Diluted Shares Outstanding}$$

Diluted shares include all potentially dilutive securities: stock options (using the treasury stock method), convertible bonds, restricted stock units, and warrants. Using basic shares instead of diluted shares overstates the implied price per share.

[Demonstration — Hypothetical Data]

 Chat — Complete DCF Valuation Walkthrough

You are a senior equity research analyst. Build a complete DCF valuation for a hypothetical mid-cap industrial company with the following data:

Base Year (Year 0):

- Revenue: \$2,000M
- EBIT margin: 15%
- Tax rate: 25%
- D&A: \$120M
- CapEx: \$160M
- Change in working capital: \$30M (increase)
- Total debt: \$800M
- Cash: \$200M
- Diluted shares outstanding: 100M

Assumptions for projection (5 years):

- Revenue growth: Year 1: 8%, Year 2: 7%, Year 3: 6%, Year 4: 5%, Year 5: 4%
- EBIT margin: stable at 15%
- D&A as % of revenue: 6%
- CapEx as % of revenue: 8%
- Working capital change: 1.5% of revenue growth
- WACC: 10%
- Terminal growth rate: 2.5%

Show all 7 steps:

1. FCF projection table (Years 1-5)
2. WACC (use 10% as given)
3. PV of each year's FCF
4. Terminal value (perpetuity growth method)
5. Enterprise value = Sum PV of FCFs + PV of Terminal Value

6. Equity value = EV - Net Debt
7. Implied share price = Equity Value / Diluted Shares

Present each step with the formula, calculation, and result. Include a sensitivity table showing implied share price across WACC (8–12%) and terminal growth (1.5–3.5%).

Expected Output: *A complete 7-step DCF model with a populated FCF projection table, step-by-step calculations for enterprise value and equity value, an implied share price, and a WACC-growth sensitivity matrix.*

Refinement: *Follow up: “What is the terminal value as a percentage of total enterprise value? If it exceeds 75%, what does that imply about the model’s reliance on long-term assumptions?”*

🌀 API — DCF JSON Output

```
import anthropic

client = anthropic.Anthropic()

message = client.messages.create(
    model="claude-sonnet-4-20250514",
    max_tokens=4096,
    temperature=0,
    system="You are a senior financial analyst. Build a DCF model. "
        "Output structured JSON only.",
    messages=[{
        "role": "user",
        "content": "DCF for industrial company. Revenue Y0=$2000M, "
            "EBIT margin 15%, tax 25%, D&A 6% of rev, CapEx 8% of rev, "
            "delta WC 1.5% of rev growth. Growth: 8/7/6/5/4%. "
            "WACC 10%, terminal g 2.5%. Debt $800M, Cash $200M, "
            "100M diluted shares. Return JSON: "
            "{\"fcf_projections\": [{year, revenue, ebit, nopat, da, capex, "
            "dwc, fcf, pv_fcf}], terminal_value: float, "
            "pv_terminal: float, enterprise_value: float, "
            "net_debt: float, equity_value: float, "
            "implied_share_price: float, "
            "sensitivity: [{wacc, tg, price}]}"
    }]
```

```
)  
print(message.content[0].text)
```

Expected Output: *Parseable JSON containing the complete DCF output: FCF projections, terminal value, enterprise value, equity bridge, implied share price, and sensitivity matrix.*

5.3 WACC Calculation

The Weighted Average Cost of Capital (WACC) is the blended required rate of return for all of a company's capital providers. It serves as the discount rate in DCF analysis.

Getting WACC wrong by even 1–2 percentage points can swing the implied valuation by 20–30% or more, making this one of the most consequential calculations in all of finance.

$$\text{WACC} = (E / (D + E)) \times K_e + (D / (D + E)) \times K_d \times (1 - T)$$

Where:

E = Market value of equity

D = Market value of debt

K_e = Cost of equity

K_d = Cost of debt (pre-tax)

T = Marginal corporate tax rate

Cost of Equity: The Capital Asset Pricing Model (CAPM)

The CAPM is the standard model for estimating the cost of equity. It states that the expected return on an equity security equals the risk-free rate plus a premium for bearing systematic (market) risk:

$$K_e = R_f + \beta \times (R_m - R_f)$$

Where:

R_f = Risk-free rate (typically the 10-year government bond yield)

β = Beta, the stock's sensitivity to market movements

(R_m – R_f) = Equity risk premium (ERP), the excess return expected from the market

Source: Sharpe, W.F., "Capital Asset Prices: A Theory of Market Equilibrium," Journal of Finance, 1964.

Damodaran publishes updated equity risk premiums by country and region annually. As of January 2024, the implied ERP for the United States was approximately 4.6%, while emerging markets carried premiums of 6–10% depending on country risk ratings.

Source: Damodaran, A., Equity Risk Premiums, pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html

Cost of Debt

The cost of debt reflects the interest rate the company pays on its borrowings, adjusted for the tax deductibility of interest expense:

$$\text{After-tax Cost of Debt} = K_d \times (1 - T)$$

K_d can be estimated from the yield-to-maturity on the company's outstanding bonds, the company's credit rating (using a credit spread over the risk-free rate), or the weighted average interest rate on existing debt (interest expense / average total debt).

Putting WACC Together

Chat — Step-by-Step WACC Calculation

Calculate WACC for a hypothetical company with the following inputs:

[Demonstration – Hypothetical Data]

- Market cap (equity value): \$5,000M
- Total debt (market value): \$2,000M
- Risk-free rate (10-year UST yield): 4.2%
- Equity risk premium: 5.5%
- Company beta (levered): 1.15
- Pre-tax cost of debt: 5.8%
- Corporate tax rate: 25%

Show each step:

1. Cost of equity using CAPM: $K_e = R_f + \text{Beta} \times \text{ERP}$
2. After-tax cost of debt: $K_d \times (1 - T)$
3. Capital structure weights: $E/(D+E)$ and $D/(D+E)$
4. $\text{WACC} = \text{weight_equity} \times K_e + \text{weight_debt} \times K_{d_aftertax}$

Show the formula, plug in the numbers, and calculate the result for each step.

Expected Output: A 4-step calculation showing $K_e = 10.525\%$, $K_d \text{ after-tax} = 4.35\%$, weights of 71.4%/28.6%, and $\text{WACC} = \text{approximately } 8.76\%$.

Refinement: Follow up: “How would WACC change if the company took on \$1,000M more debt (increasing leverage)? Show the new WACC and explain the trade-off between lower after-tax cost of debt and higher equity beta.”

Typical WACC Ranges by Industry

WACC varies significantly by industry due to differences in business risk (beta), capital structure (leverage), and cost of debt (credit quality). The table below shows approximate WACC ranges for selected industries.

Industry	Typical Beta	Typical D/E	WACC Range
Utilities	0.4–0.7	100–200%	4–6%
Telecommunications	0.6–0.9	60–120%	5–8%
Consumer Staples	0.5–0.8	30–70%	6–8%
Healthcare / Pharma	0.8–1.2	10–40%	7–10%
Industrials	0.9–1.3	30–70%	8–11%
Consumer Discretionary	1.0–1.4	20–60%	8–12%
Technology (mature)	1.0–1.3	5–30%	8–12%
Energy (Oil & Gas)	1.0–1.5	20–60%	8–13%
Technology (growth)	1.3–1.8	0–20%	10–15%
Biotech (pre-revenue)	1.5–2.5	0–10%	12–20%+

Demonstration Note: WACC ranges are approximate and based on aggregated sector data. Actual company WACC depends on company-specific beta, credit rating, and capital structure. Always calculate WACC using company-specific inputs rather than relying on sector averages.

Source: Damodaran, A., Cost of Capital by Sector, pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/wacc.html

5.4 Terminal Value

Terminal value captures the value of all cash flows beyond the explicit forecast period. Because it is impossible to project individual year cash flows indefinitely, terminal value provides a single number that represents the present value of perpetual cash flows starting after the final projection year.

Terminal value is the single largest component of most DCF valuations, typically representing 50–80% of total enterprise value. This makes terminal value assumptions among the most important—and most debated—inputs in any DCF model.

Method 1: Perpetuity Growth Method (Gordon Growth Model)

The perpetuity growth method assumes free cash flow grows at a constant rate forever beyond the final projection year:

$$TV = FCF(n) \times (1 + g) / (WACC - g)$$

Where:

FCF(n) = Free cash flow in the final projection year

g = Perpetuity growth rate (typically 2–3%, approximating long-term GDP or inflation)

WACC = Weighted average cost of capital

Critical constraint: g must be less than WACC. If g equals or exceeds WACC, the formula produces an infinite or negative value, which is economically meaningless. In practice, g should not exceed long-term nominal GDP growth for the company's primary market.

Method 2: Exit Multiple Method

The exit multiple method assumes the company is sold at the end of the projection period at a specified EBITDA (or revenue) multiple:

$$TV = EBITDA(n) \times \text{Exit Multiple}$$

The exit multiple is typically set equal to the current trading multiple of comparable companies, or a small discount to the current multiple to reflect maturation. This method is grounded in market observations rather than theoretical assumptions about perpetual growth.

Comparing the Two Methods

Dimension	Perpetuity Growth	Exit Multiple
Basis	Theoretical: Gordon Growth Model	Market: comparable trading multiples
Key assumption	Perpetual growth rate (g)	Exit EV/EBITDA multiple
Sensitivity	Highly sensitive to g vs. WACC spread	Moderate sensitivity to multiple choice
Best used when	Stable, predictable businesses	Cyclical or high-growth businesses

Best practice is to calculate terminal value using both methods and compare the results. If the two methods produce significantly different terminal values, investigate whether the growth rate assumption and exit multiple assumption are internally consistent.

Chat — Terminal Value: Both Methods Compared

Using the DCF model from the previous exercise:

- Final year FCF (Year 5): use the value calculated
- Final year EBITDA (Year 5): use EBIT / (1 - D&A adjustment) or calculate from revenue and margins
- WACC: 10%
- Terminal growth rate: 2.5%
- Exit EV/EBITDA multiple: 9.0x

Calculate terminal value using both methods:

1. Perpetuity Growth: $TV = FCF(5) \times (1 + g) / (WACC - g)$
2. Exit Multiple: $TV = EBITDA(5) \times 9.0$

Compare the two results. What implied perpetual growth rate does the exit multiple method assume? (Solve for g in the Gordon Growth formula using the exit multiple TV.)

Show terminal value as a percentage of total enterprise value for each method.

Expected Output: *Two terminal value calculations with comparison, implied growth rate cross-check, and TV as percentage of enterprise value.*

Refinement: *Follow up: “Create a sensitivity table showing terminal value across growth rates (1–4%) and WACC (8–12%). Highlight the cell closest to the exit multiple terminal value.”*

5.5 Comparable Company Analysis (Trading Comps)

Comparable company analysis (trading comps) values a company by comparing its financial metrics and valuation multiples to those of similar publicly traded companies. The logic is straightforward: if similar companies trade at certain multiples of their earnings or cash flows, then the target company should trade at similar multiples.

Source: Rosenbaum, J. & Pearl, J., Investment Banking: Valuation, LBOs, M&A, and IPOs, 3rd ed. (Wiley, 2020), Chapter 3.

Selecting the Peer Group

The quality of a comparable company analysis depends entirely on the quality of the peer group. Peers should be selected based on multiple criteria:

Industry and sub-sector: Companies should operate in the same industry and, ideally, the same sub-sector. A fast-food chain is not comparable to a fine-dining restaurant group despite both being in “food services.”

Size: Revenue, market cap, and enterprise value should be within a reasonable range (typically 0.5x–2.0x the target’s size).

Growth profile: Companies with similar revenue growth rates and margin trajectories are more comparable than companies at different lifecycle stages.

Geography: Companies in the same region face similar macro, regulatory, and currency conditions.

Capital structure: EV-based multiples normalize for capital structure, but companies with extreme leverage may still distort comparisons.

Key Valuation Multiples

The four most commonly used multiples in comparable company analysis are:

EV/EBITDA: Enterprise Value / EBITDA. The most widely used multiple. Capital-structure neutral. Useful across industries. Typical range: 5–15x.

P/E: Price / Earnings Per Share. The most recognized equity multiple. Affected by capital structure and tax rates. Typical range: 10–25x.

EV/Revenue: Enterprise Value / Revenue. Useful for high-growth or pre-profit companies.
Typical range: 1–5x (higher for SaaS/tech).

P/B: Price / Book Value. Useful for asset-heavy industries (banks, real estate, insurance). Typical range: 0.5–3.0x.

Calculating Implied Valuation

Once you have the peer multiples, calculate the median and mean for each multiple. Then apply these multiples to the target company's metrics to derive an implied valuation range:

$$\text{Implied EV} = \text{Target's EBITDA} \times \text{Peer Median EV/EBITDA}$$

$$\text{Implied Equity Value} = \text{Target's EPS} \times \text{Peer Median P/E}$$

[Demonstration — Hypothetical Data]

Chat — Comparable Company Analysis

Perform a comparable company analysis for a hypothetical target company in the industrial sector.

Target Company:

- Revenue: \$2,000M
- EBITDA: \$360M
- Net income: \$180M
- EPS: \$1.80
- Book value per share: \$12.00
- Current stock price: \$28.00
- Diluted shares: 100M
- Total debt: \$800M, Cash: \$200M

Comparable Companies (hypothetical):

1. IndustryCo A: EV \$4,500M, EBITDA \$500M, Revenue \$3,200M, P/E 14.0x, P/B 2.2x
2. IndustryCo B: EV \$3,000M, EBITDA \$375M, Revenue \$2,500M, P/E 12.5x, P/B 1.8x
3. IndustryCo C: EV \$5,200M, EBITDA \$650M, Revenue \$4,000M, P/E 16.0x, P/B 2.5x

4. IndustryCo D: EV \$2,200M, EBITDA \$275M, Revenue \$1,800M, P/E 11.0x, P/B 1.5x

5. IndustryCo E: EV \$3,800M, EBITDA \$420M, Revenue \$2,800M, P/E 13.5x, P/B 2.0x

For each comparable:

1. Calculate EV/EBITDA, EV/Revenue, P/E, P/B
2. Calculate median and mean for each multiple
3. Apply median multiples to the target to derive implied EV and implied equity value
4. Calculate implied share price range (low, median, high)
5. Compare to current price of \$28.00 – is the stock undervalued or overvalued?

Expected Output: *A peer comparison table with all four multiples for each company, sector statistics (median, mean), and an implied valuation range for the target company with upside/downside to current price.*

Refinement: *Follow up: “Remove IndustryCo C (outlier) and recalculate. Does the conclusion change?”*

API — Comps Analysis JSON Output

```
import anthropic

client = anthropic.Anthropic()

message = client.messages.create(
    model="claude-sonnet-4-20250514",
    max_tokens=4096,
    temperature=0,
    system="Senior equity analyst. Calculate trading comps. JSON only.",
    messages=[{
        "role": "user",
        "content": "Comps for industrial target. "
            "Target: Rev $2000M, EBITDA $360M, NI $180M, EPS $1.80, "
            "BV/sh $12, Price $28, 100M shares, Debt $800M, Cash $200M. "
            "Peers: [A: EV 4500, EBITDA 500, Rev 3200, PE 14, PB 2.2], "
            "[B: EV 3000, EBITDA 375, Rev 2500, PE 12.5, PB 1.8], "
            "[C: EV 5200, EBITDA 650, Rev 4000, PE 16, PB 2.5], "
            "[D: EV 2200, EBITDA 275, Rev 1800, PE 11, PB 1.5], "
```

```
    "[E: EV 3800, EBITDA 420, Rev 2800, PE 13.5, PB 2.0]. "  
    "Return JSON: {peers: [{name, ev_ebitda, ev_rev, pe, pb}], "  
    "statistics: {median: {}, mean: {}}, "  
    "implied_valuation: {ev_ebitda: {ev, equity, price}, "  
    "pe: {equity, price}, ev_rev: {ev, equity, price}, "  
    "pb: {equity, price}}, summary: str]"  
    }]  
)  
print(message.content[0].text)
```

Expected Output: *Structured JSON with peer multiples, sector statistics, and implied valuation across all four methodologies.*

5.6 Precedent Transaction Analysis

Precedent transaction analysis values a company by examining the multiples paid in recent acquisitions of comparable companies. Unlike trading comps, which reflect the market value of minority stakes, precedent transactions reflect the full purchase price including any control premium paid by the acquirer.

Source: Rosenbaum, J. & Pearl, J., Investment Banking: Valuation, LBOs, M&A, and IPOs, 3rd ed. (Wiley, 2020), Chapter 4.

Control Premium

The control premium is the amount by which the acquisition price exceeds the target's pre-announcement trading price. It reflects the value of controlling the company's strategy, capital allocation, and management.

$$\text{Control Premium} = (\text{Offer Price} - \text{Pre-Announcement Price}) / \text{Pre-Announcement Price}$$

Empirical research shows that control premiums typically range from 20–40% above the undisturbed trading price, with the median around 25–30% depending on the industry, deal rationale, and competitive dynamics. Higher premiums are observed in competitive auction processes and strategic transactions with significant synergies.

Source: Pratt, S.P. & Niculita, A.V., Valuing a Business, 5th ed. (McGraw-Hill, 2008), Chapter 17.

Key Multiples in M&A Context

The same multiples used in trading comps apply to precedent transactions, but the values are typically higher due to the control premium. The most commonly referenced multiples in M&A analysis are:

- EV/EBITDA (most common in M&A due to capital structure neutrality)
- EV/Revenue (common for high-growth or pre-profit targets)
- EV/EBIT (used when D&A differences between acquirer and target are meaningful)
- P/E of the offer price (for all-cash deals to equity holders)

Adjustments for Precedent Transactions

Precedent transactions require several adjustments that trading comps do not. First, the time of the transaction matters: a deal from 5 years ago may reflect very different market conditions. Second, the deal structure (all-cash vs. stock vs. mixed) affects the effective premium. Third, the strategic rationale (horizontal consolidation vs. diversification vs. financial buyout) influences the multiple paid.

🗨 Chat — Precedent Transaction Analysis

Analyze precedent transactions in the industrial sector for a company with EBITDA of \$360M.

[Demonstration – Hypothetical Data]

Recent transactions:

1. AcquirerX bought TargetA for \$4,800M (EBITDA \$400M) – 2024
2. AcquirerY bought TargetB for \$3,600M (EBITDA \$330M) – 2023
3. AcquirerZ bought TargetC for \$2,700M (EBITDA \$225M) – 2023
4. AcquirerW bought TargetD for \$5,500M (EBITDA \$500M) – 2022
5. AcquirerV bought TargetE for \$3,200M (EBITDA \$290M) – 2022

For each transaction:

1. Calculate EV/EBITDA
2. Note the year and context
3. Calculate median and mean transaction multiples
4. Apply to target EBITDA (\$360M) to derive implied EV
5. Compare to trading comps valuation (from Section 5.5)
6. Calculate the implied control premium over the trading comps median

Expected Output: *A precedent transaction table with deal multiples, statistics, implied valuation, and control premium analysis comparing to trading comps.*

Refinement: *Follow up: “Exclude the 2022 transactions (stale). How does the implied valuation change?”*

5.7 The Football Field Summary

The football field chart is the standard way to present multiple valuation methods on a single page. Named for its resemblance to an American football field, it shows horizontal bars representing the implied value range from each valuation method, allowing the reader to quickly identify where the ranges overlap and where the current price sits relative to the various estimates.

A typical football field includes:

- 52-week trading range (market reference point)
- DCF valuation range (based on WACC and growth sensitivity)
- Comparable company analysis range (low to high peer multiples)
- Precedent transaction range (based on deal multiples)
- LBO analysis range (based on achievable IRR thresholds, if applicable)
- Analyst consensus price target (if available)

Constructing the Football Field

For each valuation method, you need three values: the low end of the range, the midpoint (or most likely estimate), and the high end. These can come from sensitivity analysis (DCF), quartile analysis (comps), or deal-specific ranges (precedent transactions).

Chat — Football Field Valuation Summary

Create a football field valuation summary for the hypothetical industrial company we analyzed in Sections 5.2-5.6.

[Demonstration – Hypothetical Data]

Compile valuation ranges from each method:

1. 52-Week Range: Low \$22.00, High \$32.00
2. DCF (WACC/growth sensitivity): Low \$26.50, Mid \$31.00, High \$37.00
3. Comparable Companies (median multiples +/- 1 turn): Low \$24.00, Mid \$28.50, High \$33.00
4. Precedent Transactions (median multiples +/- 1 turn): Low \$29.00, Mid \$34.00, High \$39.00

5. Current stock price: \$28.00

Present as a horizontal bar chart description (since Claude cannot generate images, describe the chart structure). For each method, show the bar from low to high with the midpoint marked. Show where \$28.00 current price falls relative to each range. Then provide a synthesis paragraph: What is the overall implied valuation range? What is the composite midpoint? Is the stock undervalued, fairly valued, or overvalued?

[Demonstration – Hypothetical Data]

Compile valuation ranges from each method:

1. 52-Week Range: Low \$22.00, High \$32.00
2. DCF (WACC/growth sensitivity): Low \$26.50, Mid \$31.00, High \$37.00
3. Comparable Companies (median multiples +/- 1 turn): Low \$24.00, Mid \$28.50, High \$33.00
4. Precedent Transactions (median multiples +/- 1 turn): Low \$29.00, Mid \$34.00, High \$39.00
5. Current stock price: \$28.00

Present as a horizontal bar chart description (since

Expected Output: *A structured football field summary with 4–5 valuation ranges, a current price overlay, and a synthesis paragraph with an overall conclusion on fair value.*

Refinement: *Follow up: “Weight the methods (DCF 40%, Comps 30%, Precedents 20%, 52-week 10%) and calculate a weighted-average implied price. Is there upside to current?”*

5.8 LBO Quick Screen

A leveraged buyout (LBO) is the acquisition of a company using a significant amount of borrowed money (leverage) to fund the purchase price. The acquiring entity (typically a private equity firm) contributes equity and finances the remainder with debt, which is then serviced and repaid from the target company's cash flows.

Source: Stowell, D.P., Investment Banks, Hedge Funds, and Private Equity, 3rd ed. (Academic Press, 2018), Chapters 16–18.

LBO analysis is relevant in several contexts: assessing a company's attractiveness as a private equity target, establishing a floor valuation (the maximum price a financial buyer would pay), and evaluating management buyout feasibility. In competitive M&A processes, LBO analysis helps determine whether financial sponsors can compete with strategic bidders.

LBO Mechanics

The LBO value creation model has three primary levers:

Debt paydown: The company uses its free cash flow to repay acquisition debt. As debt decreases, the equity value grows (deleveraging). This is often the largest source of value creation in stable businesses.

EBITDA growth: Operational improvements, revenue growth, and margin expansion increase the company's earnings. More earnings at the same multiple means higher enterprise value at exit.

Multiple expansion: If the exit multiple exceeds the entry multiple, the private equity sponsor benefits from the multiple arbitrage. This is the least controllable lever.

Quick Screen Metrics

An LBO quick screen tests whether a company can deliver acceptable private equity returns without building a full LBO model. The key metrics are:

Entry EV/EBITDA multiple: The price paid expressed as a multiple of EBITDA. Lower entry multiples create more room for value creation. Typical PE entry multiples: 7–12x.

Debt capacity: Maximum leverage the company can support, expressed as Debt/EBITDA. Investment-grade companies can typically support 3–4x; LBO targets often lever to 4–6x.

5-Year IRR: Internal rate of return to the equity sponsor over a 5-year hold. The minimum threshold for most PE firms is 20–25%.

MOIC: Multiple of Invested Capital. A 2.0x MOIC means the sponsor doubled their equity. Most PE firms target 2.0–3.0x over 5 years.

[Demonstration — Hypothetical Data]

Chat — LBO Quick Screen

Perform an LBO quick screen for the hypothetical industrial company.

[Demonstration – Hypothetical Data]

- Current EV: \$3,400M (based on \$28 stock price, 100M shares, \$800M debt, \$200M cash)
- Current EBITDA: \$360M
- Entry EV/EBITDA: 9.4x (based on current EV)
- EBITDA growth: 5% per year
- CapEx: 8% of revenue, D&A: 6% of revenue
- Tax rate: 25%
- Debt capacity: 5.0x EBITDA (total acquisition debt = \$1,800M)
- Equity contribution: \$3,400M - \$1,800M = \$1,600M
- Exit multiple: 9.0x EBITDA (assume modest compression)
- Hold period: 5 years
- Mandatory debt repayment: \$100M per year from FCF

Calculate:

1. Year 5 EBITDA
2. Exit enterprise value (Year 5 EBITDA x exit multiple)
3. Remaining debt at exit (initial debt minus 5 years of repayment)
4. Exit equity value = Exit EV - remaining debt
5. MOIC = Exit equity / Entry equity
6. IRR (annualized return over 5 years)

Is this an attractive LBO candidate? What entry price would be needed for a 25% IRR?

Expected Output: *A complete LBO quick screen with entry/exit analysis, MOIC and IRR calculations, and a sensitivity showing the maximum entry price for a 25% IRR threshold.*

Refinement: *Follow up: “Show a sensitivity table: IRR across entry multiples (7x–11x) and EBITDA growth rates (3–7%). Highlight cells that meet the 20% IRR minimum.”*

Key Takeaways

- Professional valuation always uses multiple methods (DCF, trading comps, precedent transactions) and triangulates the results into a range. No single method should be used in isolation.
- The DCF method is the most theoretically rigorous but is highly sensitive to two assumptions: WACC and the terminal growth rate. Always run sensitivity analysis on both.
- Terminal value typically represents 50–80% of total enterprise value. Models where terminal value exceeds 80% are excessively dependent on long-term assumptions and should be scrutinized.
- WACC must be calculated with company-specific inputs (beta, credit spread, capital structure). Using generic industry averages introduces material error.
- The CAPM formula ($K_e = R_f + \text{Beta} \times \text{ERP}$) is the standard for cost of equity. Use Damodaran's updated equity risk premium data for current estimates.
- Comparable company analysis requires a carefully selected peer group. The quality of the peer group determines the quality of the implied valuation.
- Precedent transactions incorporate a control premium (typically 20–40%) over trading values. Always distinguish between minority (trading) and control (transaction) valuations.
- The football field chart is the standard deliverable for presenting valuation conclusions. It shows all methods on one page and makes the overall range immediately visible.

أساليب تقييم الشركات

Valuation — تقييم

Intrinsic Value — القيمة الجوهرية

Discounted Cash Flow (DCF) — التدفقات النقدية المخصومة

Free Cash Flow (FCF) — التدفق النقدي الحر

WACC (Weighted Average Cost of Capital) — المتوسط المرجح لتكلفة رأس المال

Cost of Equity — تكلفة حقوق الملكية

Cost of Debt — تكلفة الدين

CAPM (Capital Asset Pricing Model) — نموذج تسعير الأصول الرأسمالية

Beta — بيتا (معامل المخاطرة)

Risk-Free Rate — معدل العائد الخالي من المخاطر

Equity Risk Premium — علاوة مخاطر الأسهم

Terminal Value — القيمة النهائية

Perpetuity Growth — النمو الدائم

Exit Multiple — مضاعف الخروج

Enterprise Value — قيمة المنشأة

Equity Value — قيمة حقوق الملكية

Comparable Company Analysis — تحليل الشركات المماثلة

Precedent Transactions — الصفقات السابقة

Control Premium — علاوة السيطرة

Football Field Chart — مخطط ملعب كرة القدم

Leveraged Buyout (LBO) — الاستحواذ بالرافعة المالية

Internal Rate of Return (IRR) — معدل العائد الداخلي

Multiple of Invested Capital (MOIC) — مضاعف رأس المال المستثمر

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