

Corporate Valuation with LLMs

Cost of Capital, Equity Value, and Valuation Checks

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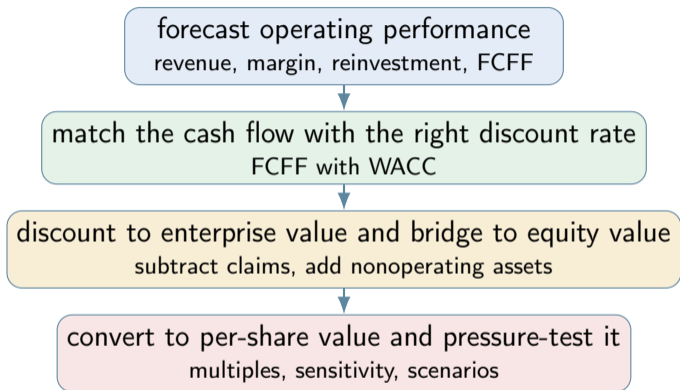
Overview

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- 3 Enterprise Value to Equity Value
- 4 Consistency and Common Adjustments
- 5 Multiples and Checks

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From forecasts to valuation



This topic turns the operating forecast into a valuation object, then into a **value per share**.

Four valuation objects you need today

Operating free cash flow to the firm (FCFF)

Cash flow generated by operations after operating tax and reinvestment, available to all capital providers.

Enterprise value

The value of the operating business before subtracting debt-like claims and before assigning value to common equity.

Equity value

What remains for common shareholders after subtracting debt-like claims and adding nonoperating assets.

Per-share value

Equity value divided by the diluted share count.

Operating free cash flow to the firm (FCFF) in plain English

$$\text{FCFF} = \text{NOPLAT} - \text{Reinvestment}$$

Plain-English definition

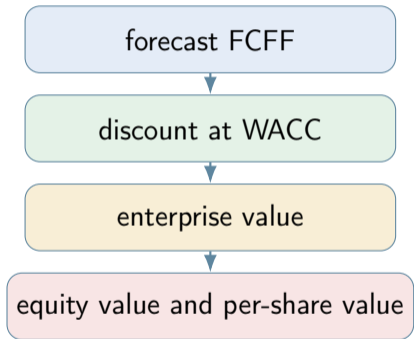
FCFF is the cash flow the **business** generates after operating tax and after the reinvestment needed to keep growing. It belongs to both debt and equity investors.

What it is not

- ▶ Not cash flow after interest payments
- ▶ Not cash flow only for equity holders
- ▶ Not the same thing as net income

FCFF is also called **operating free cash flow to the firm** or **unlevered free cash flow**.

What the DCF gives you vs. what common shareholders own



Key point

An FCFF DCF gives you **enterprise value** first. It does **not** give you the stock price directly.

Why the bridge matters

To get to common equity, subtract debt-like claims, add nonoperating assets such as excess cash, and then divide by diluted shares.

LLMs' role

Retrieve

find debt, leases,
cash, dilution, and
leverage
commentary across
filings

Classify

separate operating
items, financing
items, bridge items,
and nonoperating
assets

Organize

prepare clean
evidence tables for
WACC, bridge
items, and scenario
design

Consistency- check

spot double
counting,
mismatches, and
missing adjustments

The LLM can speed up the reading and the organization. The analyst still owns the **valuation judgment**.

ApexCo packet: what to feed the LLM

Source	Sections to feed	Why it matters in Topic 7
2024 10-K	Business; MD&A; Liquidity and Capital Resources; notes on debt, leases, SBC, EPS / equity	Operating definition, leverage, lease treatment, dilution, bridge items
Q1 2025 10-Q	MD&A; liquidity; debt and lease updates; shares outstanding	Near-term bridge items, financing updates, share-count changes
FY2024 earnings release	Guidance, capex and capital-allocation commentary, net debt discussion	Current operating backdrop and management framing of financing needs
Q4 / FY2024 call transcript	Management commentary on leverage policy, funding, margins, and risk	Useful language for scenarios, capital structure, and consistency checks
Outside-market inputs	Treasury yield, ERP assumption, peer betas, market cap, current debt spread	Inputs that do not come from the filings themselves

Use filings for **company facts**; use current market data for **market inputs**.

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Matching rule: the discount rate must fit the cash flow

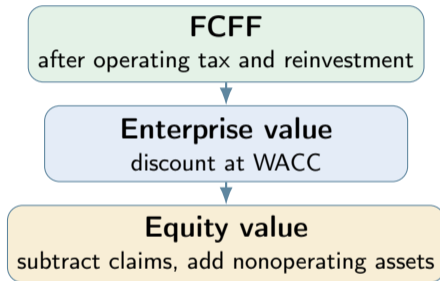
Cash flow	Discount rate	Why the match matters
FCFF / operating free cash flow to the firm	WACC	The cash flow belongs to both debt and equity investors
FCFE / equity cash flow	Cost of equity	The cash flow belongs only to equity holders
Nominal cash flow	Nominal discount rate	Both include inflation
Real cash flow	Real discount rate	Both exclude inflation

Most corporate DCFs in this course use **nominal FCFF** discounted at **WACC**.

WACC must match FCFF

$$\text{WACC} = \frac{E}{D + E} r_e + \frac{D}{D + E} r_d (1 - T)$$

- ▶ Use WACC with **FCFF**, not with equity cash flow.
- ▶ Use **market-value** weights, not book weights.
- ▶ Use a **nominal** WACC when the forecast is nominal.



What is the cost of equity in words?

Definition

The cost of equity is the return equity investors require for bearing the risk of owning the stock.

Why it is not arbitrary

It reflects the time value of money plus compensation for systematic risk.

Why it matters

A higher required return lowers value because future cash flows are discounted more heavily.

What it is not

It is not management's target return and not the historical stock return.

Cost of equity: build it from inputs

$$r_e = r_f + \beta \times ERP$$

Risk-free rate

long maturity, currency
matched, current market
yield

Beta

business risk, operating
leverage, financial leverage

Equity risk premium

market-wide compensation
for bearing equity risk

Add country, size, or specific premia only when the exposure is real and not already captured elsewhere.

Risk-free rate: what it should represent

Core idea

Use a default-free rate in the same currency as the cash flows.

Typical choice

A long-term government bond yield for a long-duration valuation.

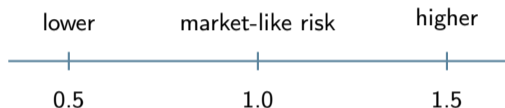
Common mistake

Using a short-term rate for a long-lived business without a reason.

Reminder

The risk-free rate can change market value even when company fundamentals do not.

Beta: how to read it



- ▶ $\beta = 1$: equity moves with the market.
- ▶ $\beta > 1$: more market-sensitive.
- ▶ $\beta < 1$: less market-sensitive.

Lower-beta intuition

A Coca-Cola-type consumer staple with steadier demand often sits lower on the beta range.

Higher-beta intuition

An airline or other cyclical business often sits higher because demand and margins move more with the cycle.

Why use peer betas instead of only ApexCo's own stock beta?

Why raw beta may be misleading

A beta estimated only from ApexCo's own stock returns can be noisy because it reflects:

- ▶ underlying business risk
- ▶ current leverage rather than target leverage
- ▶ short-window market noise or unusual events
- ▶ sentiment, thin trading, or temporary dislocations

Why peer betas help

Comparable firms provide market-based evidence on similar operating risk. The workflow is:

- ▶ observe peers' equity betas
- ▶ unlever them to isolate business risk
- ▶ average / judge across peers
- ▶ relever to ApexCo's target debt-to-equity

Where peer betas come from

Peer betas usually come from **stock-return regressions**, either run directly by the analyst or supplied by data platforms such as Bloomberg, FactSet, or Capital IQ.

Observed beta is not pure business risk

Business risk

How cyclical and volatile are the underlying operations?

- ▶ demand cyclical
- ▶ operating leverage
- ▶ margin stability
- ▶ business mix

Financial risk from leverage

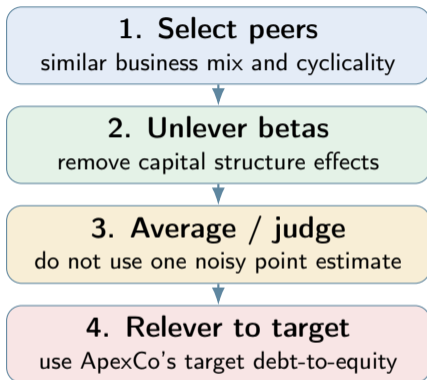
Debt makes equity riskier because debt holders have a prior claim. Equity becomes a thinner residual claim, so it swings more.

Key idea

Observed stock beta = business risk + leverage effect

That is why a peer's raw beta cannot be copied directly. First isolate business risk, then apply ApexCo's target leverage.

Beta workflow: peer, unlever, relever



$$\beta_u = \frac{\beta_l}{1 + (1 - T)\frac{D}{E}}$$

$$\beta_{l, target} = \beta_u \left(1 + (1 - T)\frac{D}{E_{target}} \right)$$

Notation

- ▶ β_u = unlevered beta
- ▶ β_l = levered beta, observed from the peer's stock
- ▶ T = tax rate
- ▶ D/E = debt-to-equity ratio

What the formula is doing

First strip out the peer's leverage to isolate business risk. Then apply ApexCo's target leverage to recover the beta that fits ApexCo's equity.

Mini-example: peer beta to ApexCo target beta

	Peer	ApexCo target
Levered beta	1.25	?
Tax rate	25%	25%
Debt / equity	30%	10%
Unlevered beta	1.02	1.02
Relevered beta	–	1.10

The target beta should reflect ApexCo's **business risk** and its **target leverage**, not a random peer's current leverage.

Why beta falls from 1.25 to 1.10

The peer has more leverage than ApexCo:

- ▶ Peer $D/E = 30\%$
- ▶ ApexCo target $D/E = 10\%$

Once the peer's leverage is stripped away and ApexCo's lower leverage is applied, ApexCo's equity should be **less risky** than the peer's equity.

Equity risk premium: the market price of risk

$$\text{ERP} = E[r_m] - r_f$$

- ▶ ERP is the extra return investors demand for holding the market instead of a risk-free asset.
- ▶ In CAPM, beta scales how much of that premium a stock should earn.
- ▶ Use one coherent ERP assumption across the valuation, not multiple conflicting ERPs.

Cost of debt and capital structure

Cost of debt

- ▶ Use the **current marginal borrowing cost** or YTM.
- ▶ Do not use the average coupon on old debt if market rates have changed.
- ▶ WACC uses the **after-tax** cost of debt.

$$r_d^{\text{after-tax}} = r_d(1 - T)$$

Capital structure

- ▶ Use **market-value** debt and equity weights.
- ▶ Aim for a **target structure**, not a one-day accident.
- ▶ Peer medians and management policy can help anchor the target.

Matching rule

If operations and invested capital are lease-adjusted, the debt, beta, and bridge should be lease-adjusted too.

Assembling ApexCo's WACC

Input	Illustrative value	Comment
Risk-free rate	4.25%	Long-term nominal government yield
Levered beta	0.95	Peer-informed and matched to ApexCo's target leverage
Equity risk premium	5.50%	Coherent market-wide ERP assumption
Cost of equity	9.48%	From CAPM: $4.25\% + 0.95 \times 5.50\%$
Pre-tax cost of debt	5.75%	Current marginal borrowing cost
Tax rate	25.0%	Used to convert debt cost to after-tax basis
After-tax cost of debt	4.31%	$5.75\% \times (1 - 25\%)$
Target weights	80% equity / 20% debt	Market-value target structure
WACC	8.45%	Illustrative ApexCo discount rate for FCFF

Frequent WACC errors

Wrong input

- ▶ Book-value capital structure
- ▶ Historical coupon instead of current debt cost
- ▶ One noisy regression beta
- ▶ Pre-tax debt cost inside WACC

Wrong match

- ▶ Equity cash flow discounted at WACC
- ▶ Real cash flow discounted at nominal WACC
- ▶ Lease-adjusted operations with non-adjusted bridge
- ▶ Country or size premium double counted

LLM prompt: assemble company-specific WACC evidence

Prompt

You are supporting ApexCo's WACC build. Use the 2024 10-K (MD&A; Liquidity and Capital Resources; debt note; lease note), the Q1 2025 10-Q (liquidity; borrowings; leases), the FY2024 earnings release, the Q4 / FY2024 call transcript, and a short external market-input sheet (Treasury yield, ERP assumption, peer betas, market cap, debt spread). Retrieve and organize only the evidence relevant to **risk-free rate choice**, **peer / beta selection**, **cost of debt**, and **target capital structure**. Return a concise table with columns: **WACC input**; **Evidence retrieved**; **Why it matters**; **Source anchor**. Use filings for company facts and the market-input sheet for market data. Do **not** compute the final WACC yet.

ApexCo WACC evidence map

Input	Where to look	Why the evidence matters
Risk-free rate	External market-input sheet	This is a market input, not a filing item
Beta peers	10-K business description plus comparable public companies	Business mix determines which peers belong in the beta set
Cost of debt	10-K and 10-Q debt / liquidity disclosures plus current spread evidence	Filings identify the debt profile; market data updates the current cost
Target capital structure	Market cap, debt disclosures, management leverage commentary, peer medians	WACC should reflect a sustainable financing mix rather than a temporary one

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What belongs in the EV-to-equity bridge?

Subtract

debt, leases, preferreds,
minority interest, pension
deficits, and similar claims

Add

excess cash and
nonoperating assets that
were not valued inside
enterprise value

Divide

diluted share count after
reflecting options, RSUs,
and similar claims

The bridge is where an enterprise valuation becomes a **common-equity** valuation.

From enterprise value to equity value

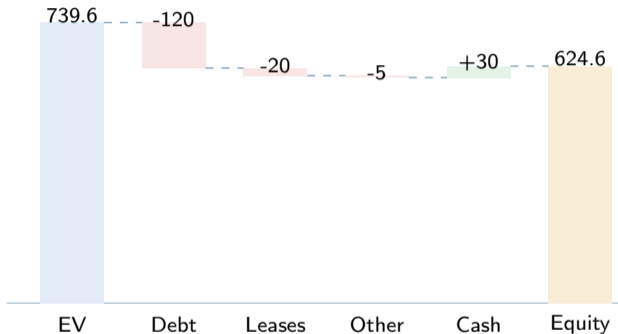
Bridge formula

Equity value

= enterprise value - debt
 - lease liabilities - other claims
 + excess cash + nonoperating as-
 sets

ApexCo illustration (\$m)

EV 739.6 - debt 120 - leases 20 - other
 claims 5 + excess cash 30 = **equity 624.6**



Nonoperating assets and debt-like claims

Often added to EV

Excess cash, marketable securities, non-core equity stakes, and other assets not already valued inside operating FCFF.

Often subtracted from EV

Debt, lease liabilities, pension deficits, preferred stock, minority interest, and other claims that come ahead of common equity.

Excess cash is not all cash

Operating cash

Cash needed to run the business, support working capital, and absorb short-term volatility.

Excess cash

Cash not needed for core operations and therefore available to common equity holders.

ApexCo question: how much cash is needed to support ordinary seasonality, working capital, and operating flexibility? Only the **surplus** belongs in the add-back.

Bridge example: from ApexCo EV to per-share value

$$\begin{array}{r} \text{EV} = 739.6 \\ + \text{ Excess cash} = 30.0 \\ - \text{ Debt-like claims} = (145.0) \\ \hline \text{Equity value} = 624.6 \end{array}$$

- ▶ If diluted shares are 72.6 million, then value per share is about \$8.60.
- ▶ A wrong bridge can ruin an otherwise good DCF.
- ▶ A good DCF still needs the right **claims** and the right **share count**.

LLM prompt: classify valuation objects and bridge items

Prompt

You are supporting an FCFF DCF for ApexCo. Using the 2024 10-K (Business; MD&A; Liquidity and Capital Resources; debt, lease, SBC, and EPS / equity notes), the Q1 2025 10-Q (MD&A; liquidity; borrowings; leases; shares outstanding), the FY2024 earnings release, and the Q4 / FY2024 call transcript, classify every valuation-relevant item into three groups: **debt-like claims**, **nonoperating assets**, and **dilution / share-count items**. Return a concise table with columns: **Item**; **Classification**; **Why it matters**; **Source anchor**. Use only explicit disclosures. Do **not** value the company. Do **not** forecast. This step is only to build a clean valuation map.

ApexCo bridge retrieval checklist

Item	Treatment	Why it matters
Gross debt	subtract	Debt holders are senior to common equity
Lease liabilities	subtract	Lease-adjusted obligations behave like debt-like claims
Other fixed claims	subtract	Preferreds, pension deficits, or similar obligations reduce common equity value
Excess cash	add	Not needed for core operations, so it belongs to equity holders
Diluted shares	divide	Options, RSUs, and similar claims affect value per share

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Consistency framework: operations, WACC, bridge, share count

Operations

How are leases, SBC, and other items treated in operating profit and invested capital?

WACC

Do leverage, debt, and lease adjustments match the operating treatment?

Bridge

Are debt-like claims and nonoperating assets treated consistently with the operating setup?

Share count

Does the per-share calculation reflect dilution consistently with SBC treatment?

Most valuation errors in practice come from **inconsistency**, not from arithmetic.

Leases and stock-based compensation: be consistent

Leases

Preferred for comparability

- ▶ Capitalize operating leases.
- ▶ Adjust operating profit and invested capital.
- ▶ Treat lease liabilities as debt-like in the bridge.

If you do not adjust operations: do not subtract the lease liability again.

Stock-based compensation

Preferred in equity valuation

- ▶ Treat SBC as a real operating expense.
- ▶ Use diluted shares in per-share value.
- ▶ Avoid adding back SBC without modeling the offsetting dilution or cash replacement.

Lease consistency example

If leases stay in operations

Keep lease expense in operating profit and include lease liabilities in the EV-to-equity bridge.

If leases are treated as debt

Adjust operating profit and invested capital accordingly, then reflect leases in WACC and in the bridge.

Either approach can work. **Inconsistency** is the real problem.

SBC: expense and dilution

Why it matters

Stock-based compensation is part of employee pay. Ignoring it can overstate margins.

Dilution effect

Awards increase the share count and reduce value per share for existing owners.

Good habit

Treat SBC consistently in the forecast and in the share count.

Common error

Ignoring the expense and also forgetting the dilution.

LLM prompt: run a consistency audit on the valuation setup

Prompt

You are auditing an ApexCo FCFF valuation for internal consistency. Using the operating forecast summary, the WACC build, the EV-to-equity bridge, and the diluted share-count assumptions, check whether the treatment of **leases**, **SBC**, **debt-like claims**, **excess cash**, and **dilution** is internally consistent. Return a short table with columns: **Issue**; **Why it may be inconsistent**; **What to verify**. Do **not** change the valuation. This is a consistency audit, not a new valuation.

ApexCo consistency audit: what to check

Issue	Question	Why it matters
Leases	Are leases treated the same way in operations, WACC, and the bridge?	A mismatch can double count or miss a debt-like claim
SBC	Is SBC expensed while diluted shares are also used?	Ignoring either piece can overstate value per share
Cash	Is only excess cash added back?	Adding all cash can overstate equity value
Claims	Are all debt-like claims subtracted before equity value is calculated?	Missing claims overstates common equity

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What is a multiple?

Definition

A multiple is a compact way to express how the market prices a **valuation object** relative to some operating or equity measure.

Why they help

Multiples are useful as a **reasonableness check**. They are faster than a DCF, but less explicit about the operating story.

Examples

- ▶ EV / EBIT or EV / NOPLAT: enterprise value relative to operating profit
- ▶ P / E: equity value relative to net income

Quality intuition

A Visa-type durable network can often support a higher operating multiple than a more cyclical, capital-intensive business.

Enterprise vs. equity multiples

**EV / NOPLAT or
EV / EBIT**

Best aligned with DCF logic. Capital-structure neutral.

EV / EBITDA

Fast, but can hide capex and working-capital needs.

P / E

Useful only when leverage, taxes, and accounting are comparable.

How to pick the right multiple

Multiple	Best fit	Warning
EV / NOPLAT	DCF-style operating valuation	Requires clean operating adjustments
EV / EBITDA	Quick screening and broad market practice	Ignores reinvestment needs
P / E	Equity valuation with stable leverage	Distorted by financing and nonoperating items

What is an implied terminal multiple?

The basic idea

$$\text{Implied terminal EV/NOPLAT} = \frac{CV_t}{\text{NOPLAT}_{t+1}}$$

This asks: **What enterprise multiple is hidden inside my continuing value?**

Why this helps

A DCF can look precise even when the terminal assumptions are too aggressive. The implied multiple is a quick reasonableness check.

How to interpret it

- ▶ **CV_t**: continuing value at the end of the explicit forecast
- ▶ **NOPLAT_{t+1}**: the first mature-state operating profit after the explicit forecast
- ▶ The ratio tells you what multiple the DCF is effectively assuming

How to use implied terminal multiples in practice

Step-by-step use

1. Compute the implied multiple from the DCF.
2. Compare it with **public peers** that have similar business mix, margins, returns, and maturity.
3. Compare it with the firm's **own history**, if the business model has been reasonably stable.
4. Compare it across the **bull, base, and bear** cases.
5. If it looks extreme, revisit g , **margin**, **RONIC**, or **WACC**.

Use peers as a **benchmark**, not as a mechanical answer. The goal is not to force the DCF to equal the peer multiple; it is to ask whether the terminal assumptions look commercially believable.

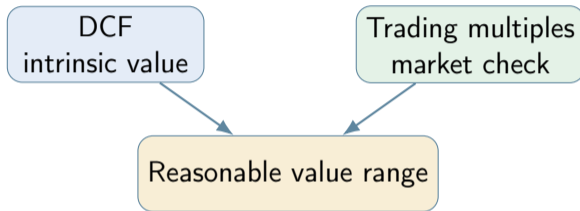
Matching matters

Enterprise	EV/NOPLAT, EV/EBIT, EV/EBITDA
Equity	P/E, P/B, P/FCFE

Common mistake

Do not use **P/E** to justify a terminal **enterprise value**. An FCFF DCF produces enterprise value, so the check should use an enterprise multiple.

DCF and multiples should triangulate



Multiples do not replace the DCF. They help you spot a DCF story whose implied valuation level looks implausible.

Why WACC and continuing-value assumptions move value most

Long-duration cash flows

A large share of value often sits in cash flows far in the future, so small discount-rate changes matter a lot.

Scenario importance

Changes in margin, reinvestment, or growth matter more when they persist into continuing value.

Small denominator effect

Terminal value formulas are sensitive to the spread between WACC and steady-state growth.

Teaching lesson

Present a valuation range, not a false point estimate.

Scenario design: bull, base, bear for ApexCo

Bull

- ▶ Controls attach rises faster
- ▶ Service contract penetration improves
- ▶ Automation savings arrive sooner
- ▶ Capex intensity fades sooner

Base

- ▶ Growth normalizes gradually
- ▶ Mix shifts modestly toward Service and Controls
- ▶ ROIC stays above WACC
- ▶ Capital intensity remains elevated near term, then fades

Bear

- ▶ Backlog normalization lasts longer
- ▶ Attach-rate improvement stalls
- ▶ Automation underdelivers
- ▶ Capex stays high for longer

Each scenario should change a **coherent bundle** of assumptions: growth, margins, reinvestment, returns, and continuing value.

Sensitivity: valuation is a range

g / WACC	7.5%	8.0%	8.5%	9.0%	9.5%
2.0%	7.44	6.69	6.05	5.51	5.04
2.5%	7.66	6.83	6.14	5.56	5.06
3.0%	7.93	7.00	6.25	5.61	5.08
3.5%	8.26	7.21	6.37	5.68	5.11
4.0%	8.69	7.47	6.52	5.76	5.14

ApexCo per-share value

Illustrative sensitivity to two inputs that dominate continuing value:

- ▶ WACC
 - ▶ steady-state growth
-
- ▶ Report a **range**, not a false point estimate.
 - ▶ Stress the **economic story**, not only the formula.

How to read a sensitivity table

Rows and columns

Each cell shows the value under a different pair of assumptions, usually WACC and terminal growth.

Direction

Higher WACC usually lowers value; higher terminal growth usually raises value.

Best use

Focus on a plausible range, not on the single middle cell.

Bad habit

Treating the base case as precise because it has more decimal places.

LLM prompt: propose coherent ApexCo scenario bundles

Prompt

You are pressure-testing an ApexCo valuation. Using the completed forecast build, the WACC assumptions, and the continuing-value setup, propose coherent **bull**, **base**, and **bear** scenario bundles. Each scenario should change a connected set of assumptions across **growth**, **margin**, **reinvestment**, and **continuing value**; it should not change only one isolated input. Return a concise table with columns: **Scenario**; **Operating story**; **Key assumptions changed**; **Why the bundle is internally coherent**. Do **not** assign probabilities. Do **not** produce a final valuation range unless asked.

Takeaways

- ▶ Discount rates must match the cash-flow definition.
- ▶ An FCFF DCF produces enterprise value first, then common-equity value after a careful bridge.
- ▶ Leases, dilution, nonequity claims, and excess cash can matter as much as debt.
- ▶ Use multiples, sensitivity, and scenarios to pressure-test the valuation rather than to replace it.