

Company Valuation: Discounted Cash Flow

A company is a project that does not end. Everything in Chapter 8 carries over — incremental thinking, free cash flow, terminal value, the capital-expenditure rule — and four things change: the forecast is built from the whole firm rather than from one decision, the horizon is longer, the terminal value carries even more of the answer, and the result must be converted from the value of the business into the value of the shares.

That last step is where most of the avoidable errors live. A valuation can be well built for five years, sensibly terminated, correctly discounted, and still produce a number that is wrong by the size of the company's debt, because the analyst quoted an enterprise value where an equity value was required. The bridge in section 9.5 exists to prevent that.

HOW TO USE THIS CHAPTER

This chapter distinguishes the two cash-flow measures and the rate each must be paired with, gives the full bridge from enterprise value to equity value including the items that are usually forgotten, quantifies how much of a valuation typically sits in the terminal value, and sets out what makes one company's discount rate higher than another's.

The videos value a founder-owned contractor against an asking price, and end on a sensitivity grid in which fewer than half the plausible cells support the price.

The case is that negotiation, from the buyer's side.

9.1 What Changes When the Project Is a Whole Firm

PROJECT AGAINST COMPANY

ASPECT	A PROJECT	A COMPANY
Cash flows	Incremental to one decision	The entire firm
Horizon	Often the asset life	Explicit period plus a perpetuity
Terminal value	Sometimes a salvage figure	Usually the majority of the answer
Output	Accept or reject	A value, then a bridge to equity
Rate	Reflects the project	Reflects the firm, or its business units

One consequence of the second row deserves stating early. Because a company has no end date, the explicit forecast is a convenience rather than a boundary, and the choice of horizon is a modelling decision with a specific requirement: **the explicit period must run until the business has reached a steady state**. A perpetuity formula assumes constant growth, constant margins, and a constant reinvestment rate from that point forward. If the firm is still opening outlets, still improving margins, or still growing at twenty percent in the final forecast year, the perpetuity is being applied to a business that has not settled, and the answer is wrong regardless of the arithmetic.

In practice this means five years for a mature business, and eight to ten for one still expanding. Extending the explicit period is not a cost — it moves value from the terminal figure into forecast years, which is the direction that improves a valuation.

9.2 Two Cash Flows, Two Rates

Two measures of free cash flow are in use, they value different things, and each must be discounted at its own rate. Mixing them is the most common technical error in company valuation.

THE TWO MEASURES

MEASURE	WHAT IT IS	DISCOUNT AT, AND WHAT IT PRODUCES
Free cash flow to the firm	Cash available to all providers of capital, before any financing	The weighted average cost of capital, giving enterprise value
Free cash flow to equity	Cash available to shareholders, after interest and debt movements	The cost of equity, giving equity value directly

The construction of the first is Chapter 8's, applied to the whole firm.

$$\text{FCFF} = \text{EBIT} \times (1 - \text{tax}) + \text{Depreciation} - \text{Capital expenditure} - \text{Increase in working capital}$$

The second subtracts what the lenders take and adds what they contribute.

$$\text{FCFE} = \text{FCFF} - \text{Interest} \times (1 - \text{tax}) + \text{Net new borrowing}$$

A firm with FCFF of 120, interest of 18, a 30 percent tax rate, and net new borrowing of 25 has FCFE of $120 - 12.6 + 25$, or 132.4. Note that free cash flow to equity is **higher** here, because the firm borrowed more than it paid in interest that year. This is why the equity route is volatile and awkward for a firm with a changing debt profile, and why the firm route is the standard approach.

Use FCFF and the weighted average cost of capital unless there is a specific reason not to. The firm route separates operating performance from financing policy, which is what makes it comparable across companies and across time. The equity route is genuinely better in one case — valuing a bank or an insurer, where borrowing is the raw material of the business rather than a financing choice, and the distinction the firm route relies on does not exist.

The matching rule

Pre-financing cash flows pair with the blended rate; post-financing cash flows pair with the equity rate.

Discounting FCFE at the cost of equity treats cash that partly belongs to lenders as though it belonged to shareholders, and produces a number that is neither an enterprise value nor an equity value. The error is silent — the arithmetic works, the output looks like a valuation, and it is wrong by an amount that grows with leverage.

IN THE VIDEOS Videos 9.1 and 9.2 build a firm-level cash-flow forecast from a real set of accounts, including a capital-expenditure line that deliberately exceeds depreciation.

9.3 Building the Forecast

A firm-level forecast is Chapter 3's percent-of-sales machinery pointed at cash flow. The same discipline applies: classify each line by what actually drives it, and be able to defend every assumption separately.

Total reinvestment is the cash committed to expand the operating asset base: net capital expenditure plus incremental working capital and any economically equivalent acquisitions, leases, or intangible investment. Capital expenditure is an important component, not the whole concept.

WHAT DRIVES EACH LINE

LINE	USUALLY DRIVEN BY	WATCH FOR
Revenue	Volume and price, separately where possible	A single growth rate hides both
Operating margin	Cost structure and scale	Assumed improvement nobody owns
Depreciation	The fixed-asset schedule	Never a percentage of revenue
Capital expenditure	Maintenance plus growth requirements	Reconcile with capacity and the wider reinvestment plan
Working capital	The day-counts from Chapter 2	Improvement assumed without a plan
Tax	The statutory rate, adjusted for shields	The effective rate is not the statutory one

Two habits separate a defensible forecast from a decorative one. **Split revenue into volume and price** wherever the business allows it, because the two behave differently under stress and a combined growth rate conceals which is being assumed. And **make every assumed improvement someone's target**. A model that quietly improves the margin by two points over five years is asserting something about management performance; if nobody in the business has agreed to deliver it, it is not a forecast but a hope, and it should be moved into an upside scenario where it belongs.

Capital expenditure deserves particular attention at firm level, but the diagnostic must be applied to the economics rather than one accounting line. Across the explicit forecast, reconcile growth to **total reinvestment**. A firm may grow temporarily with capex below depreciation by using spare capacity, investing in working capital or intangibles, acquiring assets, or taking them under leases; depreciation also reflects historical cost and assumed lives. Capex below depreciation is therefore a question requiring explanation, not automatic proof that the model is wrong. In terminal steady state the constraint is stricter: growth must be supported by a positive total reinvestment rate, tested through $g = \text{ROIC} \times \text{reinvestment rate}$.

9.4 Terminal Value at Firm Level

The methods are Chapter 8's. What differs is proportion: for a company, the terminal value routinely carries more of the answer than the explicit forecast does, and knowing how much is a discipline worth adopting.

SHARE OF TOTAL VALUE SITTING IN THE TERMINAL VALUE

Five-year explicit forecast, first-year free cash flow of 100

DISCOUNT RATE	G = 3%	G = 5%	G = 7%	
12%	66%	72%	80%	
16%	55%	61%	67%	
20%	47%	51%	56%	

Two readings follow. **The terminal value is the majority of the answer in most realistic combinations**, which means the assumptions inside it deserve more scrutiny than the line-by-line forecast that occupies most of the modelling time. And a **lower discount rate concentrates value further into the terminal figure**, so valuations that use generous rates are also the ones most dependent on their least examined component.

Three disciplines follow directly, and applying them takes minutes.

- **Report the terminal-value share alongside the valuation.** A reader who knows that 78 percent of the answer sits beyond year five will ask the right questions.
- **Convert the perpetuity into the multiple it implies** and compare that against what similar businesses actually trade at. This is the single most effective cross-check available, and Chapter 11 supplies the comparison set. A perpetuity implying twelve times EBITDA in a market where such businesses change hands at five or six is telling you the growth assumption is unsupportable.
- **Bound the growth rate by the economy.** Nothing grows faster than the economy forever. In practice the ceiling is long-run nominal growth for the relevant country — and in a high-inflation currency this figure is large in nominal terms and much smaller in real terms, which Chapter 10 shows how to check.

IN THE VIDEOS *Video 9.3 computes a terminal value three ways for the same business and reconciles the perpetuity against the multiple it implies.*

9.5 From Enterprise Value to Equity Value

Discounting FCFF at the weighted average cost of capital gives the value of the operating business. The shareholders own what remains once the other claims are settled, and several items besides debt belong in that calculation.

THE BRIDGE

ITEM	SIGN	REASON
Enterprise value	start	Value of the operating business
Less debt	–	Lenders are paid first
Plus cash and equivalents	+	Not needed to operate; belongs to owners
Less minority interests	–	Part of a consolidated subsidiary belongs to others
Plus associates and investments	+	Value not captured in operating cash flow
Plus surplus assets	+	Land or property not used by the business
Less unfunded pension and similar obligations	–	A debt-like claim
Less the value of outstanding share options	–	Dilution of the residual claim
Equals equity value	=	What the shares are worth

An enterprise value of 1,000, with debt of 260, cash of 45, minority interests of 30, associates of 55, and surplus assets of 40, produces an equity value of 850. Debt and cash are the two that everyone remembers; the other three are routinely omitted, as are the last two lines of the table, which this example does not even reach. Each omission moves the answer by real money.

Three of the lines deserve a note, because they are the ones that cause disputes.

- **Not all cash is surplus.** A business needs a working balance to operate. Only cash genuinely in excess of operating requirements should be added, and a common convention is to treat one or two percent of revenue as operating cash and add only the remainder.
- **Surplus assets are added but must also be excluded from the cash flows.** Land the business does not use generates no operating cash flow, so adding its value creates no double count — but if the forecast includes rental income from it, adding the asset as well counts it twice.
- **Debt-like items are debt.** Unfunded pension obligations, long-term provisions, and lease commitments not already capitalised are fixed claims ranking ahead of shareholders, and belong in the bridge even though the balance sheet may not label them debt.

IN THE VIDEOS *Video 9.4 works the full bridge on a contractor with land the business does not use, and shows how much of the answer that one line carries.*

9.6 Why One Company Deserves a Higher Rate Than Another

The arithmetic of the discount rate is Chapter 10. The judgement can be made now, and it decomposes into two kinds of risk that behave differently and are worth keeping separate.

TWO KINDS OF RISK

TYPE	SOURCE	CHANGED BY
Business risk	The nature of the operations	What the firm does
Financial risk	The fixed claims ahead of the owners	How the firm is funded

Business risk is a property of the activity. Contracted, recurring, non-cyclical revenue from creditworthy customers deserves a lower rate than lumpy, discretionary, project-based revenue from a concentrated customer base. A firm with half its revenue under multi-year service contracts is a materially different proposition from an otherwise identical firm selling the same work one job at a time, and the difference belongs in the rate.

Operating leverage sits inside business risk and is often overlooked. A firm with a high proportion of fixed costs amplifies every movement in revenue. Compare two firms with identical revenue of 100 and identical operating income of 15.

THE SAME PROFIT, DIFFERENT FRAGILITY

ITEM	FIRM A	FIRM B
Fixed costs	60	25
Variable costs, as a share of revenue	25%	60%
Operating income at revenue 100	15.0	15.0
Operating income at revenue 90	7.5	11.0
Change	(50%)	(27%)
Degree of operating leverage	5.00	2.67

Revenue less variable costs is **contribution** — what each unit of sales contributes toward covering the fixed costs before anything is left over as profit. Firm A's contribution at revenue of 100 is 75 against fixed costs of 60; Firm B's is 40 against fixed costs of 25. The degree of operating leverage is contribution divided by operating income, so Firm A's 75 over 15 gives 5.00 and Firm B's 40 over 15 gives 2.67. Read it as a multiplier: it is the percentage change in operating income produced by a one percent change in revenue.

A ten percent revenue shortfall therefore halves Firm A's profit and takes a quarter off Firm B's. At revenue of 80 Firm A earns nothing at all. **The two firms report identical profitability and are not equally risky**, and no ratio in Chapter 2 reveals the difference — it requires the cost structure to be split into fixed and variable, which the published accounts rarely do.

Financial risk compounds whatever business risk exists. Debt is a fixed claim ahead of the owners, so the residual becomes more volatile as borrowing rises. The two risks multiply rather than add: a firm with high operating leverage and high financial leverage has two amplifiers in series, and modest revenue disappointments become losses.

One further factor is specific to the markets this course addresses. **Country risk** — currency instability, policy change, and the difficulty of enforcing contracts — raises the rate for any business operating in an environment where those risks are material. Chapter 10 shows the three methods used to quantify it and why they disagree with one another by a great deal.

IN THE VIDEOS *Video 9.5 argues the rate for one specific company against its sovereign yield, without computing anything.*

9.7 Sensitivity, and Presenting a Valuation

A discounted cash flow produces a number with more decimal places than justification. The two inputs that dominate are the discount rate and the terminal growth rate, and displaying the answer across both is standard practice and should be automatic.

A grid of nine cells, with three rates against three growth rates, communicates more than any single figure. Read it for two things. **The spread** across the grid tells you how much the valuation is worth arguing about. And **the asymmetry** — whether the rate or the growth rate moves the answer further — tells you where the argument should be. In most valuations the rate dominates, often by two or three times, which is worth knowing before a negotiation begins, because it means the discussion about long-run growth is usually the less important one.

Three rules for presenting the result.

- **Give a range, not a point.** The method does not support a point, and offering one invites a decision the analysis cannot bear.
- **Say what the answer depends on.** The single most useful sentence in a valuation memo names the assumption that would have to be wrong for the conclusion to change.
- **Never average across methods.** A discounted cash flow, a multiple, and an asset value are three different arguments; averaging them produces a number that no method supports and that nobody can defend. Present them side by side and reason about why they differ. Chapter 11 returns to this.

Sanity checks before a valuation leaves your desk

Nine checks catch most of what goes wrong, and running them takes a few minutes.

- **Do the three linkages from Chapter 1 tie across every forecast year** — equity, cash, and fixed assets?
- **Does total reinvestment support the forecast growth**, and is any capex below depreciation explained by spare capacity, asset mix, acquisitions, leases, or accounting lives?
- **Has the business reached a steady state** by the final explicit year, or is the perpetuity being applied to something still in motion?
- **What multiple does the terminal value imply**, and is it plausible against businesses of this kind?
- **Is the terminal growth rate below long-run nominal economic growth**, and what is it in real terms?
- **Do the cash flows and the rate share a currency**, and were they converted with the Fisher relation rather than by assumption?
- **Is the rate matched to the cash-flow measure** — WACC with FCFF, cost of equity with FCFE?
- **Does the bridge include every claim**, not only debt?
- **What share of the value sits in the terminal figure**, and is that share disclosed alongside the answer?

A valuation that survives these nine is not necessarily right, but it is at least internally consistent, and the disagreements it produces will be about judgement rather than about arithmetic. That is

the only kind of disagreement worth having.

IN THE VIDEOS Video 9.6 builds the sensitivity grid for one acquisition and finds that fewer than half its cells support the price being asked.

9.8 Errors Worth Naming

- **Mismatching cash flow and rate.** FCFF at the cost of equity, or FCFE at the weighted average cost. Silent and large.
- **Applying a perpetuity to a business that has not settled.** The formula assumes a steady state that the final forecast year must actually have reached.
- **Growth with no economic reinvestment.** In explicit years, reconcile capex, working capital, acquisitions, leases, intangibles, and spare capacity; in the terminal period, test $g = ROIC \times \text{reinvestment rate}$.
- **Forgetting the bridge, or half of it.** Debt is usually remembered; minorities, associates, surplus assets, and pension obligations frequently are not.
- **Adding all cash.** Some of it is required to run the business.
- **A terminal growth rate above long-run economic growth.** Implies the firm eventually becomes the economy.
- **Presenting a point estimate.** The grid exists for a reason.

9.9 Reference

CHAPTER 9 • FORMULA REFERENCE

QUANTITY	FORMULA	NOTE
FCFF	$EBIT(1-t) + \text{depreciation} - \text{capex} - \Delta WC$	Discount at WACC
FCFE	$FCFF - \text{interest}(1-t) + \text{net new borrowing}$	Discount at the cost of equity
Enterprise value	$\sum FCFF_t / (1+WACC)^t + \text{PV of terminal value}$	The operating business
Terminal value	$FCFF \text{ next year} / (WACC - g)$	Apply the capex rule
Implied exit multiple	$\text{Terminal value} / \text{final-year EBITDA}$	The cross-check that matters
Equity value	$EV - \text{debt} + \text{surplus cash} - \text{minorities} + \text{associates} + \text{surplus assets} - \text{debt-like items}$	The full bridge
Degree of operating leverage	$\text{Contribution} / \text{Operating income}$	How far profit moves per unit of revenue
Terminal-value share	$\text{PV of terminal value} / \text{total value}$	Report it alongside the answer

CARRY FORWARD

Match the cash flow to the rate. Pre-financing flows with the blended rate; post-financing flows with the equity rate. The error is silent and grows with leverage.

The terminal value is usually most of the answer. Report its share, and convert it into the multiple it implies before believing it.

The bridge has more than two lines. Minorities, associates, surplus assets, and pension obligations are forgotten far more often than debt is.

Operating leverage and financial leverage multiply. Two firms with identical margins can have entirely different fragility, and no ratio in Chapter 2 will show it.