

Forecasting the Financing Gap

Chapters 1 and 2 read a business that has already happened. This chapter builds one that has not. The purpose is narrower than the word "forecast" suggests: the object is not to predict next year's revenue, which nobody can do reliably, but to work out what a given plan would require and whether the firm can supply it.

That reframing matters because it changes what a good forecast looks like. A forecast that turns out to be right is luck. A forecast that correctly identifies how much funding a plan needs, which assumptions the answer depends on, and how much room exists before the plan becomes impossible, is useful regardless of what actually happens. **A forecast is a tool for interrogating a plan, not a claim about the future.**

HOW TO USE THIS CHAPTER

This chapter builds the percent-of-sales method in general form, explains what a plug is and why every model has one, derives the sustainable growth rate from first principles, and lists the modelling errors that produce plausible-looking wrong answers.

The videos construct a complete two-scenario forecast for a distributor whose bank has asked what next year requires, and rank the assumptions by how much each one moves the answer.

The case asks a management team to choose between two growth plans, using a set of exhibits that are partly built for you.

3.1 What a Forecast Is For

Three documents are routinely confused, and separating them clarifies what is being asked of you.

THREE DIFFERENT DOCUMENTS

DOCUMENT	PURPOSE	TEST OF A GOOD ONE
Forecast	What we expect to happen under stated assumptions	The assumptions are explicit and defensible
Budget	What we commit to spend and achieve	People are held to it
Plan	What we intend to do	It is internally consistent and funded

The finance question sits underneath all three and is the same in each case. **If this business does what it says it will do, how much money does it need, when, and from where?** That question has a definite answer for any given set of assumptions, and computing it is the subject of this chapter.

Two working rules make forecasts useful rather than decorative. First, **every assumption is written down as a separate, visible input** — a model in which the numbers are typed into the calculations cannot be interrogated and is worthless as an argument. Second, **the output is always a range**, because the answer is a function of assumptions nobody knows, and a single number invites a confidence that the method cannot support.

3.2 The Percent-of-Sales Method

The method rests on one observation: most of a firm's operating figures are roughly proportional to its revenue, because they are consequences of trading rather than independent decisions. Sell more and you buy more stock, employ more drivers, and are owed more by customers.

The mechanic is therefore simple. Express each line as a percentage of revenue in a base year, forecast revenue, apply the percentages, and see what the balance sheet requires.

- **Step 1.** Compute each line as a percentage of revenue over the last two or three years, and decide whether the percentage is stable enough to project.
- **Step 2.** Forecast revenue. This is the one input the method cannot supply, and it should come from the business, not from extrapolation.
- **Step 3.** Apply the percentages to the forecast revenue to build the income statement and the operating parts of the balance sheet.
- **Step 4.** Add the items that do not scale — interest, tax, and any stepped or policy-driven cost.
- **Step 5.** Total the assets required and the funding spontaneously available, and read the difference. That difference is the answer.

What actually scales, and what does not

The classification step is where the judgement lives, and treating everything as proportional is the most common way a first model goes wrong.

CLASSIFYING THE LINES

BEHAVIOUR	EXAMPLES	TREATMENT
Scales with revenue	Cost of sales, receivables, inventory, payables, variable overhead	A percentage of revenue or of cost of sales
Fixed in the short run	Rent, insurance, core salaries, audit	Held flat, or grown at inflation
Steps	Warehouse capacity, a depot, a supervisor layer	Flat until a threshold, then a jump
Driven by policy	Dividends, capital expenditure, debt repayment	Set explicitly, never inferred
Derived from the balance sheet	Interest, depreciation	Computed from the relevant balance, not scaled

The last row deserves emphasis because it is a genuine error rather than an approximation. Interest is a function of the debt balance, and depreciation is a function of the fixed-asset balance. Scaling either with revenue breaks the linkages from Chapter 1 and produces a model that does not describe a company. **Compute them from the balances they belong to.**

The stepped costs are the ones that most often make a plan fail in reality while the model says it is fine. A distributor can add thirty percent of volume through an existing warehouse and cannot add sixty percent; a proportional model shows a smooth cost line straight through the point at which a second building becomes necessary. Ask the operations side where the steps are before the model is built.

IN THE VIDEOS *Video 3.2 builds a full income statement and balance sheet from a base year, and video 3.3 works through which lines were and were not allowed to scale.*

3.3 The Financing Gap

Growth requires assets, and assets require funding. Some of that funding arrives automatically, because suppliers extend more credit as more is bought; the rest has to be found. The difference is the financing gap, and in general form it is a subtraction of three quantities.

$$\text{Financing gap} = \text{Increase in assets} - \text{Increase in spontaneous liabilities} - \text{Retained earnings}$$

Each term has a plain reading. The **increase in assets** is what the plan consumes: more receivables, more inventory, and any capital expenditure the plan requires. The **increase in spontaneous liabilities** is the part suppliers fund for you without being asked. **Retained earnings** are the part the business funds out of its own profit, which is net income less anything paid out to owners.

Take a firm with revenue of 200 growing to 260. Its operating assets run at 40 percent of revenue, its spontaneous liabilities at 12 percent, its net margin is 5 percent, and it retains 60 percent of profit.

A FINANCING GAP IN FOUR LINES

COMPONENT	WORKING	AMOUNT
Increase in revenue	$260 - 200$	60.0
Assets required	$40\% \times 60$	24.0
Less spontaneous liabilities	$12\% \times 60$	(7.2)
Less retained earnings	$5\% \times 260 \times 60\%$	(7.8)
Financing gap		9.0

Nine units must be raised, or the plan must change. Notice how the arithmetic behaves, because the behaviour is general. **The first two terms scale with the increase in revenue; the third scales with the level of revenue.** Growth therefore consumes funding faster than it generates it, and the faster the growth, the wider the gap — which is the formal statement of the idea Chapter 4 is built around.

Notice also that the gap is a function of five inputs, only one of which is the growth rate. Asset intensity, supplier terms, margin, and payout policy each move the answer, and section 3.6 shows that some of them move it considerably more than growth does.

3.4 The Plug, and the Circularity It Creates

A forecast balance sheet does not balance on its own. Assets are built from operating assumptions and claims are built from policy assumptions, and the two sides land on different numbers. The difference is the gap, and something must be put in to absorb it. That something is called the **plug**.

The plug is not a fudge; it is the answer, given a name. What it should be depends on the sign and on how the firm intends to behave.

CHOOSING THE PLUG

SITUATION	PLUG	READS AS
Assets exceed funding	Debt, or new equity	The amount that must be raised
Funding exceeds assets	Cash, or debt repayment	The surplus the plan throws off
Debt capacity already exhausted	Equity	The plan requires owners to contribute
No funding available at all	Revenue	The plan must shrink to what can be funded

The last row is the useful one in practice and the one students least expect. If the answer is that no more can be raised, the model should be run backwards: hold funding fixed and solve for the growth rate the firm can support. That number is the subject of section 3.5.

The circularity problem

A subtle complication appears as soon as the plug is debt. New debt carries interest; interest reduces net income; lower net income reduces retained earnings; lower retained earnings widen the gap; a wider gap requires more debt. The model refers to its own output.

Continuing the example above, suppose the nine-unit gap is filled with debt at 15 percent, with tax at 25 percent and 60 percent of profit retained. The additional interest reduces retained earnings by 15 percent of the new borrowing, after tax, multiplied by the retention rate — and the gap settles at 9.65 rather than 9.00, about seven percent larger.

$$\text{Converged gap} = \text{First-pass gap} \div [1 - \text{interest rate} \times (1 - \text{tax rate}) \times \text{retention rate}]$$

Three ways to handle this are in common use, and all three are defensible provided you say which you used.

- **Iterate.** Recalculate until the answer stops moving, which usually takes three or four passes. Spreadsheets do this with iterative calculation enabled.
- **Solve directly,** using the expression above. Exact, and only available in simple structures.
- **Compute interest on the opening balance** and ignore the circularity. This is what most practical models do. It understates the gap slightly, and the understatement is small when leverage is moderate and large when it is not.

The point is not that one of these is correct. It is that a model with a debt plug always contains this loop, and an analyst who does not know it is there will be unable to explain why the answer changed when someone altered the interest rate.

IN THE VIDEOS *Video 3.4 builds two scenarios whose plugs differ by a large multiple of the profit given up to move between them.*

3.5 The Sustainable Growth Rate

Turn the question around. Rather than asking what a given growth rate requires, ask how fast a firm can grow **without issuing new equity**, while its profitability, asset use, payout policy, and

debt-to-equity ratio remain unchanged. That rate has a closed form, and deriving it takes three lines.

Hold the asset-to-equity ratio constant. Equity grows through retained earnings, which are net income multiplied by the retention rate. Keeping the asset-to-equity ratio constant permits debt and other financing to grow proportionally with equity. And if assets grow at the same rate while asset turnover is held constant, revenue grows at that rate. Therefore:

$$\text{Sustainable growth rate} = \text{Return on equity} \times \text{Retention rate}$$

A firm earning 20 percent on equity and retaining 60 percent of its profit can grow at 12 percent a year indefinitely without issuing new equity or changing its leverage. That does **not** mean no new borrowing. If opening equity is 100 and debt is 100, retained profit of 12 raises equity to 112; maintaining D/E of 1.0 requires debt to rise to 112 as well. The sustainable plan therefore includes 12 of new debt. Grow faster than 12 percent and the firm must improve its operating ratios, retain more, increase leverage, or issue equity. If new debt is prohibited as well, the relevant ceiling is the lower **internal growth rate**, based on return on assets rather than return on equity.

A convention worth knowing

Two versions of the formula are in circulation and they give different answers. If return on equity is computed on **opening** equity, the rate is simply the product above. If it is computed on **closing** equity, the retained profit is already inside the denominator and the formula becomes a ratio.

THE TWO CONVENTIONS, ROE 20% AND RETENTION 60%

CONVENTION	FORMULA	RESULT
Opening equity	$\text{ROE} \times b$	12.00%
Closing equity	$\text{ROE} \times b / (1 - \text{ROE} \times b)$	13.64%

A gap of more than one and a half percentage points is not trivial when the whole quantity is twelve. Neither version is wrong; they answer slightly different questions, and published figures rarely say which was used. **Recompute it yourself from the underlying figures rather than comparing two sources.**

What the formula assumes, and what to do when it binds

The derivation held four things constant, and each is a lever available to a firm growing faster than its sustainable rate.

- **Margin.** A higher net margin raises return on equity and therefore the sustainable rate directly.
- **Asset turnover.** Collecting faster or holding less stock means the same revenue needs fewer assets, so the same equity supports more growth. This is usually the fastest lever to pull and the subject of Chapter 4.
- **Leverage.** Borrowing more raises return on equity and the sustainable rate with it – while adding the fixed obligations that make a bad year dangerous.
- **Retention.** Paying out less leaves more inside. This is the only lever entirely within the owners' control, and the only one with no operational cost.

Read the formula as a constraint rather than a target. A firm growing well above its sustainable rate is not doing anything wrong; it is announcing that it will need capital, and the value of knowing the number is that the announcement arrives early enough to act on.

IN THE VIDEOS Video 3.5 computes the sustainable rate for a firm growing well above it, and identifies which lever would close the gap fastest.

3.6 Sensitivity, and Finding What Matters

Every output of a forecast is a function of inputs nobody knows. Sensitivity analysis is the discipline of finding out which of them the answer actually depends on, and it is more valuable than the forecast itself.

THREE TECHNIQUES

TECHNIQUE	METHOD	ANSWERS
One-way sensitivity	Move one input, hold the rest	Which assumptions matter
Two-way grid	Move two inputs across a table	How the two interact
Scenario	Move a coherent set together	What a recognisable future looks like

One-way sensitivity has a specific discipline that makes the results comparable: **move each input by an amount that is equally plausible**, not by an equal percentage. Moving growth by ten percentage points and margin by ten percentage points is not a fair comparison, because one of those is an ordinary year and the other has never happened. Ask what a realistic move in each input would be, apply that, and rank the results. The output is a list of drivers in order of importance, and it usually contains a surprise.

The general finding — which holds far more often than students expect — is that **operating discipline moves a financing gap more than growth does**. Collecting ten days faster, or holding a week less stock, frequently outweighs a substantial change in the growth rate, because working capital scales with the level of revenue while growth affects only the increment. Two consequences follow. A firm that cannot raise money has more levers than it thinks. And a plan whose viability depends on a growth assumption is more fragile than one whose viability depends on a collections target, because the second is inside management's control.

Scenarios are the third technique and the one most often done badly. A scenario is not a single input moved; it is a coherent story in which several inputs move together in the directions they would actually move. A downturn does not reduce revenue while leaving collection periods and margins untouched — customers pay more slowly and discounting increases at the same time. **Building scenarios one input at a time understates how bad a bad year is**, because in a real bad year the inputs are correlated.

IN THE VIDEOS Video 3.6 ranks seven assumptions by how far each moves one firm's funding requirement, and builds a two-way grid over the two that matter most.

3.7 Errors That Produce Plausible Wrong Answers

A forecast can be internally consistent, well presented, and wrong. These are the failures worth recognising by name, because each produces an answer that looks entirely reasonable.

- **Scaling what does not scale.** Interest, depreciation, and stepped costs projected as a percentage of revenue. The model balances and describes no real company.
- **Forgetting capital expenditure.** A firm cannot grow revenue by half through unchanged capacity. Omitting the capital spending makes the gap look far smaller than it is, and the omission is invisible unless the fixed-asset roll-forward is checked.
- **Ignoring the circularity** and then being unable to explain why the answer moved when the interest rate changed.
- **Holding working-capital days constant when the plan says they improve.** If a plan assumes better collection, the model must show it, and someone must own the target. Assumed improvements that nobody is accountable for are the most common way a forecast flatters a plan.
- **Failing the linkage checks.** Equity, cash, and fixed assets must roll forward from Chapter 1. If they do not, the error is arithmetic and it is yours.
- **Presenting one number.** A single answer implies a precision the method does not have and invites a decision the analysis does not support.

3.8 Reference

CHAPTER 3 • FORMULA REFERENCE

QUANTITY	FORMULA	NOTE
Financing gap	$\Delta \text{Assets} - \Delta \text{Spontaneous liabilities} - \text{Retained earnings}$	The core identity
Retained earnings	$\text{Net income} \times \text{retention rate}$	$\text{Retention rate} = 1 - \text{payout}$
Spontaneous liabilities	Payables and accruals that scale with trading	Excludes debt
Sustainable growth, opening equity	$\text{ROE} \times \text{retention rate}$	The common form
Sustainable growth, closing equity	$\text{ROE} \times b / (1 - \text{ROE} \times b)$	Higher; state which you used
Converged debt plug	$\text{Gap} / [1 - r \times (1 - \text{tax}) \times \text{retention}]$	Resolves the interest circularity
Interest expense	$\text{Rate} \times \text{relevant debt balance}$	Never a percentage of revenue
Depreciation	From the fixed-asset schedule	Never a percentage of revenue

CARRY FORWARD

A forecast is a tool for interrogating a plan. Its value lies in identifying what the plan requires and which assumptions the requirement depends on, not in being right.

Growth consumes funding faster than it generates it. Asset requirements scale with the increase in revenue; retained profit scales with the level.

Every model has a plug, and naming it is the answer. When nothing can be raised, plug the growth rate instead and read off what the firm can afford to do.

Rank the drivers before presenting the number. Operating discipline usually moves a financing gap further than the growth rate does, and it is the lever management actually controls.