CHARTA LEARNING · LESSON NOTES

Key terms: the financial statements

Key terminology

1 How to use these terms

- Twenty terms from the three statements
- One made-up company: Hollowbrook Toys
- Each term: meaning, example, where you meet it
- Order matters: each term builds on the last

IN THE LESSON

- Here is how to get the most from this lesson.
- There are twenty terms, and they come in an order, because later ones are built from earlier ones.
- First the income statement, which tells the story of a year of trading, from sales down to profit.
- Then the balance sheet, a photograph of what the company owns and owes on one single day.
- Then the cash flow statement, which follows the actual money.
- Hollowbrook Toys is a pretend company, and all its numbers are round and made up, in millions of dollars.
- If you know a term already, skip ahead.

2 Cost of goods sold

Cost of goods sold = opening inventory + purchases − closing inventory

Opening inventory	Stock on the shelf at the start
Purchases	Stock bought or made in the year
Closing inventory	Stock left unsold at the end
Cost of goods sold	Cost of what was actually sold

IN THE LESSON

- Start with a toy shop.
- In a year it buys or makes a great many toys, but it sells only some of them.
- The toys still on the shelf at year end have not earned anything yet, so their cost does not belong to this year's sales.
- Cost of goods sold, which people shorten to C O G S, is the cost of only the goods that were actually sold.
- The idea is called matching: put the cost in the same period as the revenue it helped to earn.
- To find it, start with the stock at the beginning of the year, add what was bought or made, and take away the stock left at the end.
- You will meet this in financial statement analysis, in corporate issuers and in equity investments.

3 Example: Hollowbrook's cost of goods sold

Hollowbrook Toys, one year, $ millions (made up)

Opening inventory	stock at the start	**100**
Add purchases	bought or made in the year	**+ 620**
Less closing inventory	still unsold	**− 120**
Cost of goods sold	100 + 620 − 120	**600**

IN THE LESSON

- Now Hollowbrook Toys, in millions of dollars.
- It began the year with toys costing one hundred in the warehouse.
- During the year it bought or made another six hundred and twenty of toys.
- At year end, one hundred and twenty of toys were still unsold.
- So the cost of the goods sold is one hundred plus six hundred and twenty, minus one hundred and twenty, which is six hundred.
- Six hundred is less than the six hundred and twenty spent, because the extra twenty went into stock.
- It becomes a cost only when those toys are sold.
- In plain words, you only count the cost of what you sell.

4 The profit ladder and its margins

Gross profit = revenue − COGS
Operating profit = gross profit − operating expenses
Margin = profit ÷ revenue

Gross profit	Product earnings, before overheads
Operating expenses	Wages, rent, marketing, wear
Operating profit	Profit before interest and tax
Margin	Cents kept from each sale

IN THE LESSON

- Next, the ladder of profits.
- Revenue is what customers paid for the goods.
- Take away the cost of goods sold and you have gross profit.
- Gross profit is what the product earns before any overheads, and gross profit divided by revenue is the gross margin.
- It speaks about the product only.
- Then take away operating expenses, such as wages, rent, marketing and the wear on equipment.
- What is left is operating profit, the profit from running the business, before interest and tax.
- Operating profit divided by revenue is the operating margin.
- You will meet gross profit and the margins in financial statement analysis, corporate issuers and equity, and operating profit in fixed income too.

5 Example: Hollowbrook's ladder

Hollowbrook Toys, $ millions (made up)

Revenue	what customers paid	**1,000**
Cost of goods sold	from the last slide	**− 600**
Gross profit	margin: 400 ÷ 1,000 = 40%	**400**
Operating expenses	includes 50 of depreciation	**− 250**
Operating profit	margin: 150 ÷ 1,000 = 15%	**150**

Gross margin: the product. Operating margin: the whole business

IN THE LESSON

- Here is Hollowbrook's year as a ladder, in millions of dollars.
- Revenue is one thousand.
- The cost of goods sold, from the last slide, is six hundred.
- That leaves gross profit of four hundred, and four hundred over one thousand is a gross margin of forty per cent.
- Then operating expenses of two hundred and fifty, which include fifty of depreciation, the wear on machines.
- That leaves operating profit of one hundred and fifty, an operating margin of fifteen per cent.
- The gross margin speaks about the product.
- The operating margin speaks about the whole business, because it has paid the overheads as well.

6 Why operating profit is the line to compare

Same business; Hollowbrook borrowed, its twin did not. Tax 25%

Operating profit, both firms	same business	**150**
Operating margin, both	150 ÷ 1,000	**15%**
Twin, no debt: net income	150 × (1 − 0.25)	**112.5**
Hollowbrook, interest of 30	(150 − 30) × (1 − 0.25)	**90**

IN THE LESSON

- Why do analysts compare firms at operating profit?
- Because it stops above interest.
- Imagine two identical toy makers, one funded by its owners alone and one funded partly by borrowing.
- Both earn an operating profit of one hundred and fifty, an operating margin of fifteen per cent.
- The tax rate is twenty-five per cent.
- The firm with no debt pays tax on all of it and keeps one hundred and twelve point five.
- Hollowbrook pays interest of thirty first, so tax is charged on one hundred and twenty, and it keeps ninety.
- The net incomes differ, yet the businesses are equally good.
- Financing choices do not reach operating profit, so it is the fair line to compare.

7 EBITDA: a profit closer to cash

EBITDA = operating profit + depreciation + amortisation

Operating profit	from the ladder	**150**
Add depreciation, amortisation	wear written off, no cash	**+ 50**
EBITDA	150 + 50	**200**
Debt ÷ EBITDA	debt of 500	**2.5 times**
Buyer pays 8 times EBITDA	8 × 200	**1,600**

A proxy for cash earnings that ignores capital spending

IN THE LESSON

- Sometimes analysts want a profit even closer to cash.
- E B I T D A stands for earnings before interest, taxes, depreciation and amortisation.
- Start at operating profit and add back depreciation and amortisation, which are charges for the wearing out of assets that take no cash out of the till in the year.
- Hollowbrook's operating profit is one hundred and fifty, and it includes fifty of such charges, so E B I T D A is two hundred.
- It is a rough proxy for operating cash earnings, but a flawed one, because it ignores the money that must be spent replacing machines.
- Lenders quote debt as a multiple of it: debt of five hundred over two hundred is two and a half times.
- Buyers price businesses as a multiple too: eight times two hundred is sixteen hundred.
- You will meet it in five topics: financial statement analysis, corporate issuers, equity, fixed income and alternatives.

8 Operating leverage

Operating leverage = % change in operating profit ÷ % change in revenue

Change in operating profit	How far profit moved
Change in revenue	How far sales moved
Operating leverage	The multiple of the swing

IN THE LESSON

- Picture a cinema.
- The building, the lights and the staff cost the same whether the hall is empty or full.
- Those are fixed costs.
- Popcorn and tickets cost more as more people come.
- Those are variable costs.
- Operating leverage is how much a change in sales is magnified into a change in operating profit, because the fixed operating costs do not move.
- Measure it as the percentage change in operating profit divided by the percentage change in revenue.
- A result of three means profit moves three times as fast as sales.
- It works both ways, and it involves no debt at all, so a company with no borrowing can still be dangerously leveraged.
- You will meet this in financial statement analysis and in equity investments.

9 Example: Hollowbrook's operating leverage

Sales 1,000; goods cost 60% of sales; fixed costs 250

Sales up 10%: operating profit	1,100 × 40% − 250	**190**
Rise in operating profit	190 ÷ 150 − 1	**26.7%**
Operating leverage	26.7 ÷ 10	**2.67**
Sales down 10%: operating profit	900 × 40% − 250	**110**
Fall in operating profit	110 ÷ 150 − 1	**−26.7%**

IN THE LESSON

- Let us test it on Hollowbrook.
- Its goods cost sixty per cent of sales, so forty per cent of each sales dollar is left, while the running costs stay fixed at two hundred and fifty.
- Sales rise ten per cent, from one thousand to one thousand one hundred.
- Forty per cent of one thousand one hundred, less two hundred and fifty, is an operating profit of one hundred and ninety.
- That is a rise of twenty-six point seven per cent.
- Divide twenty-six point seven by ten and operating leverage is two point six seven.
- Run it backwards.
- If sales fall ten per cent, to nine hundred, profit is one hundred and ten, a fall of twenty-six point seven per cent.

10 Financial leverage

Financial leverage = operating profit ÷ (operating profit − interest)
Also: equity multiplier = assets ÷ equity

Operating profit	Profit before interest and tax
Interest	The fixed bill to lenders
Financial leverage	The multiple of the swing
Equity multiplier	Assets for each dollar of equity

IN THE LESSON

- Now a second kind of leverage, from the other end of the income statement.
- Think of a mortgage.
- The payment is fixed whatever your income does, so a small rise in pay feels like a big rise in what is left, and a small fall hurts badly.
- A company's interest bill works the same way.
- Financial leverage is how much fixed financing costs, chiefly interest, magnify a change in operating profit into a change in net income.
- As a formula, it is operating profit divided by operating profit minus interest.
- More interest, bigger multiple.
- Careful, though.
- One topic uses the same words for a balance sheet ratio, total assets divided by equity, also called the equity multiplier.
- Both show how much borrowing is in play.
- You will meet it in financial statement analysis and in equity investments.

11 Example: Hollowbrook's financial leverage

Interest fixed at 30, tax 25%

Net income now	(150 − 30) × 0.75	**90**
Operating profit up to 190	(190 − 30) × 0.75	**120**
Rise in net income	120 ÷ 90 − 1	**33.3%**
Rise in operating profit	190 ÷ 150 − 1	**26.7%**
Financial leverage	33.3 ÷ 26.7	**1.25**

Down case: profit 110, net income 60, a 33.3% fall

IN THE LESSON

- Back to Hollowbrook, with interest fixed at thirty and tax at twenty-five per cent.
- Net income today is one hundred and fifty minus thirty, times zero point seven five, which is ninety.
- Now let operating profit rise to one hundred and ninety, as it did in the last example.
- Net income becomes one hundred and ninety minus thirty, times zero point seven five, which is one hundred and twenty.
- That is a rise of thirty-three point three per cent, against a rise in operating profit of only twenty-six point seven.
- Divide them, and financial leverage is one point two five.
- It works downwards too, as the note shows.
- Interest does not shrink in a bad year.

12 Two levers, one swing

Rise (%)

Sales	**10%**
Operating profit	**26.7%**
Net income	**33.3%**

2.67 × 1.25 = 3.33 times the swing in sales

IN THE LESSON

- Here are the two levers as a picture.
- The bottom line names three things in turn, and the height of each bar is how much it rose when sales rose ten per cent.
- The first bar is sales, at ten per cent.
- The second is operating profit, at twenty-six point seven per cent, because the fixed operating costs did not rise.
- The third is net income, at thirty-three point three per cent, because the interest did not rise either.
- Each lever multiplies the one before it.
- Two point six seven times one point two five is three point three three.
- So a ten per cent change in sales became a thirty-three point three per cent change in net income.
- In a fall, the bars would point downwards.

13 Return on equity

ROE = net income ÷ average equity
= net profit margin × asset turnover × equity multiplier

Net profit margin	Profit kept from each sale
Asset turnover	Sales per dollar of assets
Equity multiplier	Assets per dollar of equity

IN THE LESSON

- Return on equity answers the owner's question: for every dollar shareholders put in, how much profit came back?
- It is net income divided by the shareholders' equity, usually the average over the year.
- Two firms can report the same figure and still be different propositions.
- The DuPont breakdown shows why.
- Return on equity equals net profit margin, the profit kept from each sale, times asset turnover, the sales produced by each dollar of assets, times the equity multiplier, the assets supported by each dollar of equity.
- That last piece is financial leverage in its balance sheet meaning.
- You will meet it in financial statement analysis, corporate issuers and equity investments.

14 Example: Hollowbrook's return on equity

Net income 90, revenue 1,000, assets 1,125, equity 450

Net profit margin	90 ÷ 1,000	**9%**
Asset turnover	1,000 ÷ 1,125	**0.89**
Equity multiplier	1,125 ÷ 450	**2.5**
Return on equity	9% × 0.89 × 2.5	**20%**
Check: net income ÷ equity	90 ÷ 450	**20%**

IN THE LESSON

- Hollowbrook earned a net income of ninety on revenue of one thousand.
- It holds assets of one thousand one hundred and twenty-five and equity of four hundred and fifty, in millions.
- Net profit margin is ninety over one thousand, nine per cent.
- Asset turnover is one thousand over one thousand one hundred and twenty-five, about zero point eight nine.
- The equity multiplier is one thousand one hundred and twenty-five over four hundred and fifty, which is two point five.
- Multiply them: nine per cent times zero point eight nine times two point five is twenty per cent.
- Check it directly: ninety over four hundred and fifty is also twenty per cent.
- Every dollar the owners invested earned twenty cents, and the multiplier is where the borrowing shows up.

15 Same return, three routes

Margin × turnover × multiplier, three ways to reach 20%

Route	ROE
Fat margins: 20% × 0.5 × 2.0	20%
Fast turnover: 4% × 2.5 × 2.0	20%
Heavy borrowing: 5% × 1.0 × 4.0	20%

IN THE LESSON

- Now three firms that all report a return on equity of twenty per cent.
- The first has fat margins.
- It keeps twenty per cent of each sale, turns its assets over only half a time a year, and has a multiplier of two.
- The second sells cheaply.
- It keeps four per cent of each sale but turns its assets two and a half times a year, again with a multiplier of two.
- The third is a thin-margin business, five per cent with one turn, that reaches twenty only by borrowing, with a multiplier of four.
- The headline is identical, but the third firm has the least room for error.
- So always ask which route a return came by.

16 Stock dividend: more slices, same pie

Hollowbrook: 100m shares at $30; 10% stock dividend

Value before	100m × $30	**$3,000m**
New shares issued	10% × 100m	**10m**
Price after	3,000 ÷ 110	**$27.27**
Holder of 1,000 shares	now 1,100 shares ≈ $30,000	**$30,000**
Earnings per share	90 ÷ 100 → 90 ÷ 110	**0.90 → 0.82**

No cash moves, so nothing of value changes hands

IN THE LESSON

- Think of a pizza cut into more slices.
- Nobody has more to eat.
- A stock dividend is a dividend paid in new shares rather than cash.
- Hollowbrook has one hundred million shares at thirty dollars each, so the company is worth three thousand million.
- It pays a ten per cent stock dividend, ten new shares for every hundred held, so ten million new shares and one hundred and ten million in all.
- No cash left the company, so it is still worth three thousand million, and the price per share falls to twenty-seven dollars and twenty-seven cents.
- A holder of one thousand shares now has eleven hundred, worth about thirty thousand dollars, the same as before.
- Earnings per share fall from ninety cents to eighty-two cents.
- A cash dividend is different, because cash leaves.
- You will meet this in financial statement analysis and equity.

17 Fair value: ranked by what you can see

- Level one: a quoted price
- Level two: similar items
- Level three: own model

IN THE LESSON

- Imagine selling a second-hand car.
- There is the price you paid, the price in a brochure, and the price a buyer would hand over today.
- Fair value is the last one: the price something would fetch in an orderly transaction today.
- Accounting ranks fair values by how much of them you can see.
- Look at the line.
- On the left, level one: a quoted price in an active market for the identical thing, like a share on an exchange.
- In the middle, level two: no exact quote, but inputs you can observe, such as the price of similar items.
- On the right, level three: the company's own model and assumptions.
- You will meet fair value in financial statement analysis, equity, derivatives and portfolio management.

18 Example: Hollowbrook's land

Hollowbrook's land, $ thousands (made up)

Land at original cost	bought years ago	**200**
Similar plot sold last month	an orderly sale	**320**
Fair value today	level two evidence	**320**
Gain not shown at cost	320 − 200	**120**

IN THE LESSON

- A small example, in thousands of dollars.
- Hollowbrook owns a plot of land that it bought years ago for two hundred.
- Last month a similar plot nearby sold for three hundred and twenty, in an ordinary sale between a willing buyer and a willing seller.
- So the fair value of Hollowbrook's land today is about three hundred and twenty.
- Because the evidence is a similar plot, not the identical one, this is a level two measure.
- Compared with the original cost, there is a hidden gain of one hundred and twenty.
- Some assets are carried at cost and some at fair value, but an analyst who wants today's worth looks at fair value, not the old receipt.

19 Goodwill

Goodwill = price paid − fair value of identifiable net assets

Goodwill	What cannot be named separately
Price paid	Paid for the whole business
Identifiable net assets	Assets less debts, at fair value

IN THE LESSON

- Suppose a company buys a famous bakery.
- The ovens and recipes can be listed and valued.
- But the buyer also pays for the loyal customers and the good name, which nobody can label.
- That extra payment is goodwill.
- Formally, goodwill is the price paid for an acquired business minus the fair value of its identifiable net assets, meaning its assets less its debts, each measured at fair value on the purchase date, not at old book values.
- It sits on the buyer's balance sheet as an asset.
- It is not amortised, but it is tested regularly for impairment.
- If the business turns out to be worth less than was thought, the goodwill is written down, which is an admission that the price paid was too high.
- You will meet it in financial statement analysis and in equity investments.

20 Example: buying Thistledown Games

Hollowbrook buys 100% of Thistledown, $ millions

Assets at fair value	brands, factory, stock	**620**
Less liabilities taken on	at fair value	**– 220**
Identifiable net assets	620 − 220	**400**
Price paid for 100%	in cash	**500**
Goodwill	500 − 400	**100**

A later write-down of 40 leaves goodwill of 60

IN THE LESSON

- An example in millions of dollars.
- Hollowbrook buys all of Thistledown Games for five hundred in cash.
- Thistledown's assets, including its brands and a factory, are valued at fair value at six hundred and twenty.
- Its liabilities taken on are two hundred and twenty.
- So the identifiable net assets are four hundred.
- Hollowbrook paid five hundred, which is one hundred more than the net assets it could name.
- That hundred is goodwill.
- Later, Thistledown does badly, and an impairment test says the goodwill is worth only sixty.
- Hollowbrook writes it down by forty, to sixty, and the loss runs through the income statement.
- Writing goodwill down concedes that the price was too high.

21 Working capital, current ratio and quick ratio

Working capital = CA − CL
Current ratio = CA ÷ CL
Quick ratio = (cash + securities + receivables) ÷ CL

Current assets	Turns to cash within a year
Current liabilities	Bills due within a year
Working capital	An amount: the cushion
Quick ratio	Leaves out the inventory

IN THE LESSON

- Imagine your rent is due next month.
- What could you use?
- Cash is certain, money friends owe you is nearly as good, and old furniture sells slowly.
- Company liquidity tests work the same way.
- Working capital is the current assets and current liabilities a business runs on.
- As an amount, it is current assets minus current liabilities, the cushion if every short-term bill were paid from short-term assets.
- The current ratio is current assets divided by current liabilities, and it counts inventory, the asset least likely to become cash when needed.
- The quick ratio counts only cash, short-term securities and receivables, which is money customers owe.
- You will meet these in financial statement analysis and corporate issuers, and working capital in equity too.

22 Example: Hollowbrook's liquidity

Hollowbrook's current items, $ millions (made up)

Current assets	cash 80, owed 200, stock 120	**400**
Current liabilities	suppliers 60, loan 90, other 50	**200**
Working capital	400 − 200	**200**
Current ratio	400 ÷ 200	**2.0**
Quick ratio	(80 + 200) ÷ 200	**1.4**

IN THE LESSON

- Here are Hollowbrook's current items, in millions.
- Current assets: cash of eighty, customers owe two hundred, and inventory is one hundred and twenty, a total of four hundred.
- Current liabilities: suppliers are owed sixty, a short-term loan is ninety and other accrued bills are fifty, a total of two hundred.
- Working capital is four hundred minus two hundred, so two hundred.
- The current ratio is four hundred over two hundred, which is two.
- The quick ratio drops the inventory.
- Eighty plus two hundred, over two hundred, is one point four.
- There are no securities here.
- So Hollowbrook has two dollars of current assets for every dollar due, but only one dollar and forty cents of readily spendable ones.

23 Same current ratio, different quick ratio

Both firms: current assets 400, current liabilities 200, ratio 2.0

Look inside	Quick ratio
Hollowbrook: cash 80, owed 200	1.4
Sandpiper: cash 20, owed 40	0.3
Sandpiper's stock makes up the rest: 340	n/a

IN THE LESSON

- Two firms can share a current ratio and differ in safety.
- Sandpiper Hardware, like Hollowbrook, has current assets of four hundred and current liabilities of two hundred, so its current ratio is also two.
- But look inside.
- Hollowbrook holds cash of eighty and customer debts of two hundred.
- Sandpiper holds cash of only twenty and debts owed to it of forty.
- The rest of its current assets, three hundred and forty, is stock on the shelves.
- Its quick ratio is twenty plus forty over two hundred, which is zero point three, against Hollowbrook's one point four.
- If customers stop buying, Sandpiper cannot easily turn its stock into cash.

24 The cash conversion cycle

CCC = DIO + DSO − DPO
DIO = inventory ÷ COGS × 365
DSO = receivables ÷ revenue × 365

Days of inventory	Days stock sits unsold
Days of receivables	Days customers take to pay
Days of payables	Payables ÷ COGS × 365
Cash conversion cycle	Days our cash is tied up

IN THE LESSON

- A market stall owner pays the farmer for fruit, the fruit sits on the stall, they sell on credit, and the customer pays later.
- The cash conversion cycle measures how long their cash is tied up, using three clocks.
- Days of inventory is how many days stock sits unsold: inventory over cost of goods sold, times three hundred and sixty-five.
- Days of receivables is how many days customers take to pay: receivables over revenue, times three hundred and sixty-five.
- Days of payables is how many days the firm takes to pay its own suppliers: payables over cost of goods sold, times three hundred and sixty-five.
- The cash conversion cycle is days of inventory plus days of receivables, minus days of payables.
- It can be negative, when suppliers fund the whole business.
- You will meet it in financial statement analysis and corporate issuers.

25 Example: Hollowbrook's cash cycle

Inventory 120, receivables 200, payables 60

Days of inventory	120 ÷ 600 × 365	**73**
Days of receivables	200 ÷ 1,000 × 365	**73**
Operating cycle	73 + 73	**146 days**
Days of payables	60 ÷ 600 × 365	**36.5**
Cash conversion cycle	146 − 36.5	**109.5 days**

IN THE LESSON

- We use Hollowbrook's year end figures to keep things simple.
- Inventory is one hundred and twenty and cost of goods sold is six hundred.
- One hundred and twenty over six hundred, times three hundred and sixty-five, is seventy-three days.
- Receivables are two hundred on revenue of one thousand, which is also seventy-three days.
- Together, that is an operating cycle of one hundred and forty-six days from buying toys to collecting the cash.
- But suppliers are owed sixty, which against six hundred of cost is thirty-six and a half days of credit.
- Subtract that, and the cash conversion cycle is one hundred and nine and a half days.
- For that long, Hollowbrook must find the cash itself.

26 Look-alikes and mistakes

- Gross margin ignores overheads; operating margin does not
- Operating leverage: fixed costs. Financial leverage: interest
- Current ratio counts inventory; quick ratio leaves it out
- A stock dividend moves no cash; a cash dividend does
- EBITDA looks like cash flow but skips capital spending

IN THE LESSON

- Five look-alikes that cost marks.
- One.
- Gross margin and operating margin.
- Gross margin stops at the product and says nothing about overheads.
- Operating margin has paid them.
- Two.
- The two leverages.
- Operating leverage comes from fixed operating costs and works on sales.
- Financial leverage comes from fixed interest and works on operating profit.
- Three.
- The current ratio and the quick ratio.
- The first counts inventory and the second leaves it out, so the second is stricter.
- Four.
- Stock dividends and cash dividends.
- A stock dividend hands out new shares, no cash moves, and the price per share falls.
- A cash dividend does take money out.
- Five.
- E B I T D A is not cash flow, because it ignores the spending needed to keep the machines running.

27 Operating cash flow

Operating cash flow = net income + depreciation and amortisation ± working capital change

Net income	Profit after interest and tax
Depreciation and amortisation	Charges that took no cash
Working capital change	Cash tied up or freed
Operating cash flow	Cash from the trading

IN THE LESSON

- A shop can report a record profit and still have an empty till.
- Profit is counted when sales are made, not when cash moves.
- Operating cash flow is the cash actually generated by the trading that produces net income.
- We reach it by starting from net income, adding back charges such as depreciation, which reduced profit but took no cash, and then adjusting for working capital.
- If customers owe more or stock has grown, cash was tied up, so we subtract it.
- Cash is far harder to manage than profit, so strong profit with weak operating cash flow deserves questions.
- You will meet this in financial statement analysis and in fixed income, where lenders care about cash to repay debt.

28 Example: Hollowbrook's operating cash flow

Hollowbrook's year, $ millions (made up)

Net income	from the income statement	**90**
Add depreciation and amortisation	no cash left the till	**+ 50**
Less rise in working capital	stock and customers took cash	**− 20**
Operating cash flow	90 + 50 − 20	**120**

Cash flow of 120 against profit of 90: explain the gap

IN THE LESSON

- For Hollowbrook, in millions.
- Net income is ninety, from the income statement.
- Depreciation and amortisation of fifty reduced profit but no cash left the till, so add it back.
- Then working capital.
- Customers owed more and more stock was held, which absorbed twenty of cash, so subtract twenty.
- Operating cash flow is ninety plus fifty minus twenty, which is one hundred and twenty.
- Here cash is more than profit, because depreciation was large.
- When it is the other way round, ask what absorbed the cash: unpaid customers or unsold stock.

29 Free cash flow, to the firm and to equity

Free cash flow = OCF − capex
FCFF = OCF + interest × (1 − tax rate) − capex
FCFE = OCF − capex + net borrowing

Operating cash flow	Cash from the trading
After-tax interest	Added back, only if deducted
Capital expenditure	Spent on long-term assets
Net borrowing	New borrowing less repayments

IN THE LESSON

- Now the cash that is really free.
- Some of the till must go back into the business to keep it going: new ovens, a repaired van.
- Free cash flow is operating cash flow after that investment, called capital expenditure.
- It is what is genuinely available to the people who funded the business.
- Free cash flow to the firm is available to all capital providers, lenders and owners together.
- Add back interest after tax, but only if interest was deducted in operating cash flow.
- Discounted at the weighted average cost of capital, it values the whole firm, and debt is then deducted to reach equity.
- Free cash flow to equity is what is left for shareholders after lenders: operating cash flow, less capital expenditure, plus net borrowing.
- Discount it at the cost of equity.

30 Example: Hollowbrook's free cash flows

OCF 120, capex 80, interest 30, tax 25%, net borrowing 20

Free cash flow	120 − 80	**40**
After-tax interest	30 × (1 − 0.25)	**22.5**
FCFF, to the firm	40 + 22.5	**62.5**
FCFE, to equity	40 + 20	**60**
Check: FCFF to FCFE	62.5 − 22.5 + 20	**60**

IN THE LESSON

- Hollowbrook again.
- Operating cash flow is one hundred and twenty, capital expenditure is eighty, interest is thirty, the tax rate is twenty-five per cent and net borrowing is twenty.
- Free cash flow is one hundred and twenty minus eighty, which is forty.
- For the firm, add back interest after tax.
- Thirty times zero point seven five is twenty-two and a half.
- Forty plus twenty-two and a half is sixty-two and a half.
- For the shareholders, keep the interest deducted and add the twenty of net new borrowing.
- Forty plus twenty is sixty.
- The two connect: sixty-two and a half, less twenty-two and a half, plus twenty, is sixty.
- One cash flow, two views.

31 Match the cash flow to its rate

The whole firm

Free cash flow to the firm →
Discount at the WACC →
Firm value, then take off debt

The shareholders

Free cash flow to equity →
Discount at the cost of equity →
Equity value directly

IN THE LESSON

- Here is the choice as a picture.
- The top row is the firm's view.
- The cash flow is free cash flow to the firm, available to everyone who funded the business.
- It is discounted at the weighted average cost of capital, the blend of what lenders and owners each expect.
- That gives the value of the whole firm, and taking off the debt leaves the equity.
- The bottom row is the shareholders' view.
- The cash flow is free cash flow to equity, which is already after the lenders.
- It is discounted at the cost of equity alone, and the answer is the value of the equity directly.
- Match the cash flow to its rate.

32 Recap: the relationships to remember

Operating profit = revenue − COGS − operating expenses
ROE = margin × asset turnover × equity multiplier
FCFE = FCFF − after-tax interest + net borrowing

Profit ladder	Gross, operating, EBITDA
Leverage	Fixed costs, fixed interest
Return	Margin, turnover, multiplier
Liquidity	Current, quick, cash cycle
Free cash flow	Firm before lenders, equity after

IN THE LESSON

- The profit ladder runs from revenue, less cost of goods sold, to gross profit, then less operating expenses to operating profit, with a margin at each rung.
- E B I T D A adds depreciation and amortisation back.
- Operating leverage comes from fixed operating costs, and financial leverage from fixed interest.
- Return on equity is margin times asset turnover times the equity multiplier.
- Liquidity is working capital, the current ratio, the quick ratio and the cash conversion cycle.
- On the cash side, operating cash flow starts from net income, free cash flow takes off capital expenditure, free cash flow to the firm comes before the lenders and free cash flow to equity comes after them.
- Fair value, goodwill and stock dividends complete the list.

33 Try three quick questions

1. Which ratio leaves out inventory: current or quick?
   Answer: Quick: inventory is the slowest asset to turn into cash.
2. Revenue 800, COGS 520, operating costs 160. Operating margin?
   Answer: Profit 800 − 520 − 160 = 120; 120 ÷ 800 = 15%.
3. Which is paid after lenders and uses the cost of equity?
   Answer: FCFE. FCFF comes before lenders and uses the WACC.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- Which ratio leaves out inventory, the current ratio or the quick ratio?
- The quick ratio, because inventory is the slowest asset to turn into cash.
- Question two.
- Revenue is eight hundred, cost of goods sold is five hundred and twenty, and operating costs are one hundred and sixty.
- What is the operating margin?
- Operating profit is eight hundred minus five hundred and twenty minus one hundred and sixty, which is one hundred and twenty, and one hundred and twenty over eight hundred is fifteen per cent.
- Question three.
- Which cash flow is paid after the lenders and discounted at the cost of equity?
- Free cash flow to equity.
- The firm version comes before the lenders and uses the weighted average cost of capital.
- Well done.