What capital costs a company

Corporate Issuers

1 Two bakeries, two price tags

- Top-down = the country and the market
- Rates, inflation, business cycle
- Market depth, courts, investor protection
- Currency, capital controls, political risk

IN THE LESSON

- Imagine two identical bakeries, same ovens, same sales, same debts.
- One is in a calm country with deep banks and stable prices.
- The other is in a country with high inflation, shaky courts and a currency that swings.
- Both ask for a loan.
- The second baker is quoted a much higher rate.
- Nothing about the bakery explains that.
- The country does.
- Analysts call forces like these top down factors, because they start at the level of the economy and the market and work down to the firm.
- They include interest rates, inflation and the business cycle, how deep the capital markets are, the legal system and how well contracts and investors are protected, currency risk, and political risk.

2 Bottom-up: what the company brings

- Bottom-up = the company itself
- Volatile revenue, earnings, cash flow
- Business model, size, tangible assets
- Leverage, seniority, collateral, covenants

IN THE LESSON

- Now keep the country fixed and change the firm.
- A bakery chain with steady sales, a long record and ovens it can pledge as security will borrow cheaply.
- A start-up whose revenue jumps around, with no assets a lender can seize, will pay more.
- These company specific forces are called bottom up factors.
- They include how volatile revenue, earnings and cash flow are, the business model and size, and the nature of the assets, since tangible assets that can be pledged support cheaper secured borrowing.
- Financial leverage matters too, and so do the features of each security: its seniority, any collateral behind it and the covenants that restrict the borrower.

3 Same company, two markets

Pre-tax cost of debt (%)

Market, dev.	**3.0**
Firm, dev.	**1.3**
Market, emg.	**7.0**
Firm, emg.	**1.3**

Developed 4.3%, emerging 8.3%: the whole gap is market

IN THE LESSON

- Here is the cost of secured borrowing for one company, drawn as bars.
- This is a made-up illustration.
- The first two bars are the company borrowing in a developed market.
- The first is the market part, the government's own borrowing rate, three per cent.
- The second is the company part, one point three per cent, which reflects its volatility, leverage and assets.
- Together that is four point three per cent.
- The last two bars are the same company in an emerging market.
- The company part is still one point three, because the company has not changed.
- But the market part is seven per cent, carrying inflation, currency and political risk.
- The total is eight point three per cent.
- The whole gap is top down, so cutting its borrowing would not close it.

4 Sort the factor: top-down or bottom-up?

Would every firm in the country feel it?

Factor	Group
Company's cyclical revenue	Bottom-up
The business cycle itself	Top-down
Weak contract enforcement	Top-down
Pledgeable assets, covenants	Bottom-up

IN THE LESSON

- The exam trap is swapping the two groups, so let us practise sorting.
- Cyclical revenue sounds like the business cycle, but it describes the company's own sales, so it is bottom up.
- The business cycle itself is the economy, so that one is top down.
- A weak legal system that does not enforce contracts is top down, because every borrower in that country faces it.
- A strong secured asset the lender can pledge is bottom up.
- And a loan that has strict covenants is a feature of the security, so bottom up.
- Ask one question: would every firm in the country feel this?
- If yes, top down.

5 Four ways to find what debt costs

Traded bonds: yield to maturity →
Thin trading: matrix pricing →
Unrated: synthetic rating →
Loans, leases: current rates

IN THE LESSON

- Now let us estimate what a firm's debt costs, before tax.
- The method depends on what you can observe, so think of a ladder you step down only when you must.
- At the top, the company's bonds trade, and the yield to maturity on them is the market's own price of its borrowing.
- Nothing to estimate.
- One step down, the bonds hardly trade.
- Then you borrow yields from liquid bonds with the same rating and similar maturity, a method called matrix pricing.
- Below that, the issuer has no rating, so you build a synthetic rating from its financial ratios and add the matching spread to a government yield.
- Bank loans, floating rate debt and leases sit alongside and need current rates on comparable new loans.

6 From pre-tax to after-tax

After-tax cost of debt = pre-tax cost × (1 − tax rate)

Pre-tax cost of debt	Yield, or built-up estimate
Tax rate	Marginal rate on profit
After-tax cost of debt	What goes into WACC

IN THE LESSON

- Whichever method you use, the answer is a pre tax cost.
- But interest is tax deductible, so the government shares the bill.
- If a firm pays interest of one hundred and its tax rate is twenty five per cent, it saves twenty five in tax, so the real cost is seventy five.
- That gives the formula.
- The after tax cost of debt equals the pre tax cost times one minus the tax rate.
- The tax rate here is the firm's marginal rate, the rate on the next dollar of profit.
- This is the number that goes into the weighted average cost of capital later in the lesson, so do not forget the adjustment.

7 Example 1: matrix pricing

BBB bonds: 3 years 5.2%, 7 years 6.0%; target 5 years

Gap between maturities	7 − 3	**4 years**
Distance to our maturity	5 − 3	**2 years**
Interpolated yield	5.2% + 2/4 × 0.8%	**5.6%**
After tax at 25%	5.6% × 0.75	**4.2%**

IN THE LESSON

- Our first case.
- An analyst values a company with a five year bond that has not traded for months.
- It is rated triple B.
- Liquid triple B bonds are available with three years to maturity yielding five point two per cent, and with seven years yielding six point zero.
- Five years sits halfway between three and seven, because it is two years above three out of a gap of four.
- So we interpolate.
- The extra yield from three to seven is zero point eight.
- Half of that is zero point four.
- Add it to five point two, and the estimate is five point six per cent.
- The tax rate is twenty five per cent, so the after tax cost is five point six times zero point seven five, which is four point two per cent.
- Using the three year yield without interpolating would be a mistake.

8 A rating table for the unrated

Interest coverage = operating profit ÷ interest

Interest coverage	Rating, spread
8.0 or more	A, +1.2%
5.0 up to 8.0	BBB, +1.8%
3.0 up to 5.0	BB, +3.0%
Under 3.0	B, +4.5%

IN THE LESSON

- For a firm with no rating, analysts use a table like this one, made up for the example.
- It links interest coverage, which is operating profit divided by interest expense, to a rating and to a spread over the government yield.
- A coverage of eight or more earns an A, with a spread of one point two per cent.
- Between five and eight is triple B, one point eight.
- Between three and five is double B, three per cent.
- Below three, single B, four and a half.
- The trap is to use a different definition of coverage from the one the table was built on.
- If the table uses operating profit over interest, you must too, not cash flow or net income.

9 Example 2: a synthetic rating

Operating profit 90, interest 15, government yield 4.0%

Interest coverage	90 ÷ 15	**6.0**
Rating and spread	5.0 up to 8.0 band	**BBB, 1.8%**
Pre-tax cost of debt	4.0% + 1.8%	**5.8%**
After tax at 25%	5.8% × 0.75	**4.35%**

IN THE LESSON

- Now use the table.
- A private manufacturer has operating profit of ninety million and interest expense of fifteen million.
- Coverage is ninety divided by fifteen, which is six.
- That falls between five and eight, so the synthetic rating is triple B, with a spread of one point eight per cent.
- The government bond yield for the same maturity is four per cent.
- Add the spread, and the pre tax cost of debt is five point eight per cent.
- At a twenty five per cent tax rate, the after tax cost is five point eight times zero point seven five, which is four point three five per cent.
- Notice the order: rating first, spread second, government yield third, and tax last.

10 The extra return for owning shares

- ERP = expected equity return − risk-free benchmark
- Historical: average past excess returns
- Choices change the answer; survivors bias it up
- Forward-looking: surveys and models

IN THE LESSON

- Now to equity.
- Shareholders get no promised payment, so they ask for more than a safe government bond pays.
- That extra is the equity risk premium: the expected return on equities above a risk free benchmark, usually a long term government bond.
- It cannot be read off a screen, so analysts estimate it two ways.
- One looks back.
- Average the past excess returns.
- But the answer changes with the choices you make: the period, an arithmetic or a geometric average, and which benchmark.
- Survivorship bias also pushes it up, since failed markets and firms drop out of the data.
- The other way looks forward, using surveys or models built from today's yields and growth.

11 One history, four different premiums

Shares 9.8% arith., 8.4% geom.; long bond 5.1%, 4.8%

Choice of average and benchmark	Premium
Arithmetic, long bond: 9.8 − 5.1	4.7%
Geometric, long bond: 8.4 − 4.8	3.6%
Arithmetic, short rate: 9.8 − 3.5	6.3%
Survivors only: 10.3 − 5.1	5.2%

IN THE LESSON

- Here is one made up history, and how the choices move the answer.
- Over a long period, shares returned nine point eight per cent a year on an arithmetic average, and eight point four on a geometric average.
- Long term government bonds returned five point one arithmetic, and four point eight geometric.
- Short term bills returned three point five.
- Arithmetic shares minus long bonds gives four point seven.
- Geometric gives three point six.
- Using the short term rate as the benchmark gives six point three, which is the trap, because you are valuing long lived cash flows.
- And if the index only holds firms that survived, with shares at ten point three, the premium rises to five point two.

12 Forward-looking: the Gordon growth premium

ERP = forward dividend yield + long-term growth − government bond yield

Forward dividend yield	Next year's dividend ÷ price
Long-term growth	Growth of dividends, long run
Government bond yield	Long maturity, same market

IN THE LESSON

- Now the first forward looking model.
- If you buy the whole market, you receive a dividend yield and you expect that income to grow.
- So the expected return on equities is roughly the forward dividend yield plus the long term growth rate.
- Subtract the government bond yield, and what remains is the premium for taking equity risk.
- The equity risk premium equals the forward dividend yield plus expected long term growth, minus the government bond yield.
- The dividend yield is next year's dividend over today's price, which is why it is called forward.
- And the bond should be a long term one, matching the long life of equities.

13 Forward-looking: the supply-side premium

ERP = (1 + inflation)(1 + real EPS growth)(1 + change in P/E) − 1 + income return − bond yield

Expected inflation	Expected inflation
Real EPS growth	Real earnings per share
Change in P/E	Per year; fall = negative
Income return	Dividend or buyback yield
Government bond yield	Taken off at the end

IN THE LESSON

- The second model builds the expected return from the supply side of the economy.
- Equity returns come from earnings growth and from income.
- Earnings growth has three parts: expected inflation, real growth in earnings per share, and any change in the price to earnings ratio.
- Compound the three, because they multiply, then take away one to get a growth rate.
- Add the income return, the dividend yield or the cash returned to shareholders.
- That gives the expected equity return.
- Finally, subtract the government bond yield to get the premium.
- Careful with the price to earnings term.
- A rise in the ratio adds to the return, and a fall takes away from it.

14 Example 3: both models, one market

Yield 2.1%, growth 5.1%, bond 4.0%, P/E 22 → 20 in 8 years

Gordon growth	2.1% + 5.1% − 4.0%	**3.2%**
P/E change a year	(20 ÷ 22)^(1/8) − 1	**−1.18%**
Growth, compounded	1.022 × 1.028 × 0.9882 − 1	**3.82%**
Supply-side premium	3.82% + 2.1% − 4.0%	**1.92%**

IN THE LESSON

- Let us run both on one market, made up.
- The forward dividend yield is two point one per cent, long term growth is five point one, and the twenty year government bond yields four per cent.
- Gordon growth: two point one plus five point one minus four is three point two per cent.
- For the supply side, expected inflation is two point two, and real earnings per share growth is two point eight.
- The analyst expects the price to earnings ratio to fall from twenty two to twenty over eight years.
- That is twenty over twenty two, to the power one eighth, minus one: negative one point one eight per cent a year.
- Compound one point zero two two, one point zero two eight and zero point nine eight eight two, giving three point eight two per cent.
- Add the income, take off the bond: one point nine two per cent.

15 Mistakes to avoid so far

- Cyclical revenue is bottom-up, not top-down
- Debt: no (1 − t), no interpolation, wrong coverage
- A falling P/E is a negative term, not a positive one
- Premium is against a long bond, not a short rate

IN THE LESSON

- Pause for the common slips, from everything we have covered.
- One.
- Swapping the groups of factors, such as calling a company's cyclical revenue a top down factor.
- Two.
- Forgetting the tax adjustment when you move debt into the weighted average, or using a different coverage definition from the rating table, or taking the nearest maturity instead of interpolating.
- Three.
- In the supply side model, giving the price to earnings change the wrong sign, so a falling ratio is added instead of subtracted.
- Four.
- Taking a short term rate as the benchmark for the premium, when you should use a long term government bond.
- Keep this list in your head, because the next sections build on it.

16 Four ways to set the required return

CAPM: rf + beta × ERP →
Multifactor: add factor premiums →
Build-up: add size, specific →
Bond yield + premium

IN THE LESSON

- Now that we have a premium, how do we get the return that shareholders require?
- There are four approaches.
- The capital asset pricing model starts from the risk free rate and adds beta times the equity risk premium.
- A multifactor model keeps that, but adds premiums for other exposures, such as size, value or liquidity.
- The build up approach, common for private firms, starts from the risk free rate and adds the equity risk premium plus a size premium and a company specific premium.
- And the bond yield plus risk premium approach starts from the yield on the company's own long term debt and adds a judgemental premium, often a few percentage points.
- That last one needs traded debt.

17 CAPM and the build-up approach

CAPM: r = risk-free + beta × ERP
Build-up: r = risk-free + ERP + size + specific

Risk-free rate	Government bond yield
Beta	Sensitivity to the market
Equity risk premium	Market return − risk-free
Size premium	Small firms earn more
Company-specific premium	Judgement, evidence needed

IN THE LESSON

- Here are the two core formulas.
- The capital asset pricing model says the required return equals the risk free rate plus beta times the equity risk premium.
- Beta measures how strongly the firm's shares move with the market.
- A beta above one means more risk than the market, and so a higher required return.
- Notice that beta multiplies the premium, not the market return.
- The build up approach starts from the same place but has no beta.
- It adds the risk free rate, the equity risk premium, a size premium for small firms, and a premium for risks specific to the company.
- Each approach has weaknesses: beta is estimated with error, and the premiums involve judgement.

18 Example 4: one company, four answers

Beta 1.2, rf 4.0%, ERP 5.0%, own bond yield 6.5%

CAPM	4.0% + 1.2 × 5.0%	**10.0%**
Multifactor	market, size, value	**11.3%**
Bond yield + premium	6.5% + 3.5%	**10.0%**
The trap	4.0% + 3.5%	**7.5%**

IN THE LESSON

- Let us compare approaches for one listed company.
- Its beta is one point two.
- The risk free rate is four per cent and the equity risk premium is five.
- The capital asset pricing model gives four plus one point two times five, which is ten per cent.
- A multifactor model gives it a market loading of one point one, so five point five, plus a size loading of zero point six at a premium of two, so one point two, plus a value loading of zero point three at two, so zero point six, all on top of four.
- That is eleven point three.
- The company's long term bonds yield six point five, and an analyst judges a premium of three point five, so ten per cent.
- The trap: adding three point five to the government yield gives seven point five, only a point above what the firm already pays its bondholders.

19 Example 5: a listed company, directly

Marlowe: bond yield 6.0%, beta 1.1, market return 9.5%, rf 4.0%

After-tax cost of debt	6.0% × 0.75	**4.5%**
Equity risk premium	9.5% − 4.0%	**5.5%**
Cost of equity	4.0% + 1.1 × 5.5%	**10.05%**
Trap: beta × market return	4.0% + 1.1 × 9.5%	**14.45%**

IN THE LESSON

- For a listed company, you apply the methods directly, because the market supplies the inputs.
- Take Marlowe Components, a made up listed firm.
- Its bonds trade with a yield to maturity of six per cent, so that is the pre tax cost of debt.
- The tax rate is twenty five, so the after tax cost is six times zero point seven five, or four point five per cent.
- Its beta is one point one.
- The risk free rate is four per cent and the market is expected to return nine and a half.
- So the equity risk premium is the market return minus the risk free rate, five and a half.
- The cost of equity is four plus one point one times five and a half, ten point zero five per cent.
- The trap is to multiply beta by the market return itself, which gives fourteen point four five.

20 Borrowing a beta: unlever and relever

βU = βE ÷ [1 + (1 − t) × D/E]
βE = βU × [1 + (1 − t) × D/E]

Unlevered beta	Business risk only
Equity beta	Includes financing risk
Tax rate	Marginal tax rate
Debt-to-equity ratio	Peer's, then the target's

IN THE LESSON

- A private company has no share price, so it has no beta of its own.
- The fix is to borrow one from listed peers in the same business.
- But a peer's beta mixes two risks: the risk of the business, and the extra risk from its debt.
- So we first strip out the debt effect.
- That is called unlevering.
- The unlevered beta equals the equity beta divided by one plus one minus the tax rate times the debt to equity ratio.
- This is the pure business risk.
- Then we put back the financing of the company we are valuing, using its target debt to equity ratio.
- That is relevering.
- The equity beta equals the unlevered beta times one plus one minus the tax rate times debt to equity.

21 Example 6: unlever the peer, relever at the target

Peer beta 1.40, D/E 0.60; target D/E 0.25; tax 25%

Unlevering factor	1 + 0.75 × 0.60	**1.45**
Unlevered beta	1.40 ÷ 1.45	**0.966**
Relevering factor	1 + 0.75 × 0.25	**1.1875**
Relevered beta	0.966 × 1.1875	**1.147**

IN THE LESSON

- A private firm, Tidewater Tools, has a target debt to equity ratio of zero point two five.
- The best listed peer has an equity beta of one point four and a debt to equity ratio of zero point six.
- Both pay tax at twenty five per cent.
- First the unlevering factor: one plus zero point seven five times zero point six is one point four five.
- One point four divided by one point four five is zero point nine six six, the pure business beta.
- Now relever at the target.
- One plus zero point seven five times zero point two five is one point one eight seven five.
- Multiply zero point nine six six by that, and you get one point one four seven.
- Tidewater has less debt than the peer, so its equity beta is lower than the peer's.

22 Example 7: Tidewater's cost of equity

rf 4.0%, ERP 5.5%, size 2.0%, specific 1.0%

Beta × premium	1.147 × 5.5%	**6.3%**
CAPM cost of equity	4.0% + 6.3%	**10.3%**
Plus size premium	+ 2.0%	**12.3%**
Plus specific risk	+ 1.0%	**13.3%**

IN THE LESSON

- Now the cost of equity for Tidewater.
- The risk free rate is four per cent and the equity risk premium five and a half.
- Beta times premium is one point one four seven times five and a half, which is six point three.
- Add the risk free rate, and the capital asset pricing model gives ten point three per cent.
- But Tidewater is small and private, so the analyst adds a size premium of two per cent and a company specific premium of one per cent, where the evidence supports them.
- That brings the cost of equity to thirteen point three per cent.
- Had the peer's beta of one point four been used without adjusting, the answer would be fourteen point seven, charging Tidewater for debt it does not have.

23 Building the private cost of equity

Percentage points of return

Risk-free	**4.0**
Beta × ERP	**6.3**
Size	**2.0**
Specific	**1.0**

Total cost of equity: 13.3%

IN THE LESSON

- Here are the building blocks of that thirteen point three per cent, as bars.
- This is the same example.
- The first bar is the risk free rate, four per cent.
- It is what you earn for waiting, with no risk.
- The second bar is beta times the equity risk premium, six point three, the reward for the business and financing risk Tidewater carries.
- The third is the size premium, two per cent, because small firms are harder to sell and fail more often.
- The fourth is the company specific premium, one per cent.
- Add the four bars and you reach thirteen point three.
- And what about the debt side?
- Tidewater has no traded bonds, so its cost of debt would come from a synthetic rating, as in example two, or from a bank quote.

24 Is our cost of capital out of line?

- Compare structure and cost with peers
- Gaps: leverage, business risk, size, liquidity
- More debt: cheap financing, dearer equity and debt
- Copying leverage rarely fixes risk-driven gaps

IN THE LESSON

- Our last job is to judge a company's cost of capital against its peers.
- A number on its own tells you little.
- Is ten per cent high?
- It depends on who else is in the business.
- So analysts compare the firm's capital structure and its cost of capital with those of peers, then ask whether the differences are justified.
- They can come from leverage, from business risk, from size, from liquidity or from risks specific to the firm.
- More debt brings cheap after tax financing.
- But it also raises the cost of equity and the cost of debt, because the firm becomes riskier.
- So copying a peer's leverage rarely removes a gap that is really driven by risk premiums.

25 The weighted average cost of capital

WACC = We × ke + Wd × kd × (1 − t)
Wd = D ÷ (D + E) not D ÷ E

Weight of equity	Equity ÷ total funding
Cost of equity	Required return on equity
Weight of debt	Debt ÷ total funding
Pre-tax cost of debt	Before the tax shield
Tax rate	Tax shield on interest

IN THE LESSON

- The tool for the comparison is the weighted average cost of capital, or W A C C.
- A firm funds itself with equity and debt, so its overall cost is the average of the two, weighted by how much of each it uses.
- The formula: weight of equity times cost of equity, plus weight of debt times cost of debt times one minus the tax rate.
- The weights come from market values, or from a target structure.
- A very common trap is hiding in the data.
- If you are told the debt to equity ratio is zero point three, that is not the debt weight.
- The debt weight is debt divided by debt plus equity, which is zero point three over one point three, about twenty three per cent.

26 Example 8: our company's WACC

D/E 0.30, ke 12.0%, kd 6.8%, tax 25%

Debt weight	0.30 ÷ 1.30	**23.1%**
After-tax cost of debt	6.8% × 0.75	**5.1%**
Weighted costs	0.769 × 12.0% + 0.231 × 5.1%	**10.4%**
Company WACC	equity part + debt part	**10.4%**

IN THE LESSON

- Take a small company with a debt to equity ratio of zero point three.
- Its cost of equity is twelve per cent, including a one and a half per cent size premium.
- Its debt costs six point eight before tax, and the tax rate is twenty five.
- The debt weight is zero point three divided by one point three, twenty three point one per cent, not thirty.
- The equity weight is the rest, seventy six point nine.
- The after tax cost of debt is six point eight times zero point seven five, five point one.
- Now average: zero point seven six nine times twelve is nine point two three, and zero point two three one times five point one is one point one eight.
- Add them, and the W A C C is ten point four per cent.

27 Example 9: against the peers

Peers: D/E 0.60, ke 11.0%, kd 6.0%; tax 25%

Peer debt weight	0.60 ÷ 1.60	**37.5%**
Peer WACC	0.625 × 11.0% + 0.375 × 4.5%	**8.6%**
Company at peer leverage	0.625 × 12.7% + 0.375 × 5.55%	**10.0%**
Gap that leverage cannot close	10.0% − 8.6%	**1.4 pts**

IN THE LESSON

- Now the peers.
- They average a debt to equity ratio of zero point six, a cost of equity of eleven, and debt at six per cent before tax.
- The debt weight is zero point six over one point six, thirty seven point five per cent, and the after tax cost of debt is four and a half.
- Their W A C C is zero point six two five times eleven, plus zero point three seven five times four point five.
- That is eight point six per cent.
- Our company sits one point eight points higher.
- Could it simply borrow like its peers?
- At peer leverage its debt would cost seven point four and its equity twelve point seven.
- Its W A C C would be ten point zero.
- So copying leverage closes only zero point four.
- The rest comes from the size premium and the dearer debt.

28 Where the gap comes from

WACC (%)

Company now	**10.4**
At peer leverage	**10.0**
Peer average	**8.6**

Leverage explains 0.4; risk premiums explain 1.4

IN THE LESSON

- Here are the three W A C C figures side by side.
- The first bar is our company as it stands, ten point four per cent.
- The second bar is the same company if it matched peer leverage, ten point zero.
- The third bar is the peer average, eight point six.
- Read the bars left to right.
- The step from the first to the second, zero point four, is what leverage explains.
- The step from the second to the third, one point four, remains even after copying the peers, so it is driven by risk: a size premium and dearer debt for a small firm.
- The lesson for a manager is that benchmarking tells you whether a gap is worth chasing, and where it comes from.

29 Recap: the formulas to remember

After-tax kd = kd × (1 − t) ERP = yield + growth − bond
ke = rf + β × ERP βE = βU × [1 + (1 − t) D/E]
WACC = We × ke + Wd × kd × (1 − t)

After-tax cost of debt	Debt after the tax shield
Equity risk premium	Premium over the bond
Cost of equity	rf + beta × premium
Equity beta	Relevered at the target
WACC	Weights by funding shares

IN THE LESSON

- Let us pull it together.
- The cost of debt starts as a yield, from traded bonds, matrix pricing or a synthetic rating, and after tax it is the pre tax cost times one minus the tax rate.
- The equity risk premium comes from history or from Gordon growth and supply side models.
- The required return on equity is the risk free rate plus beta times that premium.
- For a private company, unlever a peer's beta and relever it at your target.
- Finally, the weighted average cost of capital weights equity and debt by their shares of total funding, with the debt taxed.
- Compare it with peers to see what is driving the gap.

30 Try three quick questions

1. Yield 2.5%, growth 4.0%, bond 4.5%. Gordon ERP?
   Answer: 2.5% + 4.0% − 4.5% = 2.0%
2. βU 0.80, D/E 0.50, tax 20%. Relevered beta?
   Answer: 0.80 × (1 + 0.8 × 0.5) = 1.12
3. D/E = 0.25. What is the debt weight in WACC?
   Answer: 0.25 ÷ 1.25 = 20%, not 25%

IN THE LESSON

- Now try three questions yourself.
- Pause after each one.
- Question one.
- A market has a forward dividend yield of two point five per cent, expected long term growth of four per cent, and a government bond yield of four and a half.
- What is the Gordon growth equity risk premium?
- Two point five plus four minus four point five is two per cent.
- Question two.
- A peer's unlevered beta is zero point eight.
- The target has a debt to equity ratio of zero point five, and the tax rate is twenty per cent.
- What is the relevered beta?
- One plus zero point eight times zero point five is one point four, times zero point eight, is one point one two.
- Question three.
- A debt to equity ratio of zero point two five.
- What is the debt weight?
- Zero point two five over one point two five is twenty per cent.
- Well done.