CHARTA LEARNING · LESSON NOTES

Growth value, justified P/E and sustainable growth

Equity Investments

1 A story: the bakery and the branch plan

- Price = business as it is + plan for growth
- No-growth value: today's earnings paid out for ever
- PVGO: present value of growth opportunities
- Growth is worth paying for only if it earns enough

IN THE LESSON

- Suppose you are offered a bakery.
- Part of what the owner asks is for the bakery exactly as it stands today: the ovens, the loyal customers, the steady profit.
- Part is for the plan to open new branches.
- Those are two different things, and the second one is only worth paying for if the new branches really earn more than they cost.
- Analysts split a share price the same way.
- One piece is the value of current earnings if the company never grew and paid out every dollar.
- The other piece is the present value of growth opportunities, which we shorten to P V G O.
- Maya's task is to measure that second piece, and to ask whether it deserves what the market is paying.

2 Splitting the value of a share

V0 = E1 ÷ r + PVGO

V zero: value today	What the market pays
E1 ÷ r: no-growth value	Earnings held flat, all paid out
PVGO: growth opportunities	Positive only if returns beat r

IN THE LESSON

- Here is the split as a formula.
- Imagine a company that pays out all of its earnings and never grows.
- Its dividend equals next year's earnings, written E one, and that dividend lasts for ever, so it is a perpetuity.
- A perpetuity is worth the payment divided by the rate, so the no-growth value is E one divided by r, where r is the required return on the shares.
- Whatever the market pays above that is the price of growth opportunities.
- So value today, V zero, equals E one over r, plus P V G O.
- Turn it round and P V G O equals V zero minus E one over r.
- Notice that the no-growth value uses next year's earnings, the forward figure.
- That detail catches many candidates.

3 Example: Larkspur Foods

Price $60, next year's earnings E1 = $4.20, r = 10%, last year's E0 = $4.00

No-growth value	4.20 ÷ 0.10	**$42.00**
PVGO	60 − 42	**$18.00**
Leading P/E	60 ÷ 4.20	**14.29**
Split of the multiple	10.00 + 4.29	**14.29**
Growth's share	4.29 ÷ 14.29	**30.0%**

IN THE LESSON

- Maya studies Larkspur Foods, a made-up packaged food company.
- The share trades at sixty dollars.
- Next year's earnings are forecast at four dollars twenty cents, and the cost of equity is ten per cent.
- First, the no-growth value is four point twenty divided by point one zero, which is forty two dollars.
- So the growth plan is worth sixty minus forty two, eighteen dollars a share.
- Now the multiples.
- The leading price to earnings ratio is sixty divided by four point twenty, fourteen point two nine.
- It splits into one over r, which is ten, plus P V G O over E one, eighteen over four point twenty, four point two nine.
- Growth accounts for four point two nine out of fourteen point two nine, thirty per cent of the multiple.

4 Where the sixty dollars comes from

Value per share ($)

No-growth value	**42**
PVGO	**18**
Price	**60**

IN THE LESSON

- Here is the price as a picture.
- Each bar is a value per share, in dollars, and the side label tells you the unit.
- The first bar is the no-growth value, forty two dollars.
- That is Larkspur if it paid out everything and stood still.
- The second bar is P V G O, eighteen dollars.
- That is what investors pay for the plan to grow.
- The third bar is the price, sixty dollars, which is simply the first two added together.
- Notice what the picture says about risk.
- Nearly a third of the price rests on growth that has not happened yet.
- If the plans disappoint, that bar shrinks, while the forty two dollar base is far more secure.

5 The same split, as a price to earnings ratio

P0 ÷ E1 = 1 ÷ r + PVGO ÷ E1

Leading P/E	Price over next year's earnings
1 ÷ r: no-growth multiple	Multiple with no growth
PVGO ÷ E1: growth part	Extra turns paid for growth

IN THE LESSON

- Now divide every part of that split by next year's earnings.
- The left side becomes the leading price to earnings ratio, price over E one.
- The no-growth part becomes one over r, which is the multiple of a company that never grows.
- At a required return of ten per cent that is a multiple of ten.
- The growth part becomes P V G O divided by E one, the number of extra turns of earnings that investors pay for growth.
- So the leading multiple has two pieces: a base multiple fixed by the required return, and a growth premium.
- For Larkspur those were ten and four point two nine.
- Dividing the growth part by the whole multiple gives growth's share, thirty per cent.

6 When does growth add value?

Chart: Value added per $100 reinvested vs Return earned on reinvested money

- Return = r: adds nothing
- Above r: creates value
- Below r: loses value
- r = 10%

IN THE LESSON

- Does more growth always mean more value?
- Here is the picture.
- Along the bottom is the return the company earns on each dollar it reinvests.
- Up the side is the value that reinvestment adds to the share, per hundred dollars invested.
- The grey line across the middle is zero.
- The solid line rises from left to right.
- Find the dashed vertical line: that marks the cost of equity, ten per cent.
- Where the return equals the cost of equity, the line crosses zero, so the growth adds nothing.
- To the right, the company earns more than investors require, and each dollar kept is worth more than a dollar.
- To the left, it earns less, and growth destroys value.

7 Example: one hundred dollars, three projects

Spend $100 of retained earnings on a perpetual project, r = 10%

Project returns 15%	15 ÷ 0.10 = 150	**+$50**
Project returns 10%	10 ÷ 0.10 = 100	**$0**
Project returns 7%	7 ÷ 0.10 = 70	**−$30**
Cost of each project	retained earnings	**$100**

Earnings grow in all three cases; only the first adds value

IN THE LESSON

- Let us put numbers on that picture.
- Larkspur keeps a hundred dollars of earnings and spends it on a project that pays a steady return for ever.
- Value the payments as a perpetuity at ten per cent.
- If the project returns fifteen per cent, it pays fifteen dollars a year, which is worth a hundred and fifty.
- The project cost a hundred, so it adds fifty.
- If it returns exactly ten per cent, it pays ten dollars, worth a hundred, so it adds nothing, even though earnings still grow.
- If it returns only seven per cent, it pays seven dollars, worth seventy, and it destroys thirty.
- So growth is good news only when the return beats the cost of equity.

8 The trap: capitalising last year's earnings

Price $60, r = 10%, E0 = $4.00, E1 = $4.20

Right: capitalise E1	4.20 ÷ 0.10	**$42.00**
Right PVGO	60 − 42	**$18.00**
Slip: capitalise E0	4.00 ÷ 0.10	**$40.00**
Slip PVGO	60 − 40	**$20.00**
PVGO overstated by	20 − 18	**$2.00**

IN THE LESSON

- Here is the most common slip with P V G O.
- Maya must capitalise next year's earnings, four twenty, at ten per cent, which gives forty two dollars, and P V G O of eighteen.
- But suppose a hurried candidate capitalises last year's earnings, four dollars, instead.
- Four divided by point one zero is forty dollars.
- Subtract that from sixty and P V G O comes out at twenty dollars.
- That is two dollars too high.
- The reason is that the extra twenty cents of earnings growth between last year and next has been credited to growth opportunities, when it really belongs in the base.
- Always use forward earnings, E one, in the no-growth value, and the same for the leading multiple.

9 A story: what is a fair multiple?

- P/E: price paid for each dollar of earnings
- Justified P/E: the multiple fundamentals deserve
- Faster growth or lower r: higher multiple
- Leading uses next year's E; trailing uses last year's

IN THE LESSON

- A price to earnings ratio is simply the price you pay for each dollar of earnings.
- Ten times means ten dollars buys one dollar of yearly profit.
- Everyone quotes the market's multiple.
- The better question is what multiple a company deserves.
- Think of two houses on the same street, one with a tenant who pays more rent each year, and one with a flat rent.
- The first deserves a higher price per dollar of rent.
- In the same way, a company that grows faster, or that investors discount at a lower rate, deserves a higher multiple.
- The dividend discount model lets us write that multiple as a formula, called the justified price to earnings ratio.

10 Justified leading P/E from the Gordon model

Leading P/E = P0 ÷ E1 = (D1 ÷ E1) ÷ (r − g)

D1 ÷ E1: payout ratio	Share of earnings paid out
r: required return	What investors demand
g: growth rate	Constant growth for ever
Leading P/E	On next year's earnings

IN THE LESSON

- Start with the Gordon growth model, which says value today equals next year's dividend divided by r minus g.
- Here r is the required return and g is the constant growth rate of dividends.
- Now divide both sides by next year's earnings, E one.
- On the left we get price over E one, the leading multiple.
- On the right we get D one over E one, then divided by r minus g.
- D one over E one is simply the payout ratio, the share of earnings paid as dividends.
- So the justified leading multiple is the payout ratio divided by r minus g.
- Three levers move it: a higher payout, a lower required return, or higher growth, each raise the multiple.

11 Justified trailing P/E: the extra one plus g

Trailing P/E = P0 ÷ E0 = payout × (1 + g) ÷ (r − g)

D1 ÷ E1: payout ratio	Share of earnings paid out
1 + g: growth factor	Converts E1 basis to E0 basis
g: growth rate	r − g is the spread below
Trailing P/E	On last year's earnings

IN THE LESSON

- The trailing multiple divides the same price by last year's earnings, E zero.
- Next year's earnings are last year's grown by g, so E one equals E zero times one plus g.
- That means E zero is smaller than E one, and the same price over a smaller number gives a bigger ratio.
- Exactly bigger by the factor one plus g.
- So the justified trailing multiple equals the leading multiple times one plus g, which is the payout ratio times one plus g, divided by r minus g.
- Here is a handy check.
- If a growth rate of five per cent is in play, the trailing multiple is always five per cent above the leading one.
- Candidates who forget the factor lose easy marks.

12 Example: Brindle Packaging

E0 = $3.00, payout 50%, ROE 10%, r = 11%, market price $28

Growth	0.50 × 10%	**5.0%**
Leading P/E	0.50 ÷ (0.11 − 0.05)	**8.33**
Trailing P/E	8.33 × 1.05	**8.75**
Justified value	8.75 × 3.00	**$26.25**
Market trailing P/E	28 ÷ 3.00	**9.33**

Like with like: market trailing 9.33 against justified trailing 8.75

IN THE LESSON

- Now Maya values Brindle Packaging, a made-up firm.
- Last year's earnings were three dollars a share.
- Brindle pays out half, earns ten per cent on equity, and investors require eleven per cent.
- Growth comes from what is kept: half of ten per cent, five per cent.
- Next year's earnings are three times one point zero five, three dollars fifteen cents.
- The justified leading multiple is point five divided by eleven minus five per cent, which is point five over point zero six, eight point three three.
- The trailing multiple is that times one point zero five, eight point seven five.
- Value is eight point seven five times three, twenty six dollars twenty five cents.
- The market price is twenty eight, a trailing multiple of nine point three three, above justified.

13 Payout, growth and the multiple

Justified leading P/E

Payout 30%	**7.50**
Payout 50%	**8.33**
Payout 70%	**8.75**

Brindle: ROE 10% is below r = 11%, so keeping money lowers the multiple

IN THE LESSON

- It is tempting to think a higher payout always means a higher multiple, because payout sits on top of the formula.
- But payout and growth are linked, since growth is funded by earnings that are kept.
- Look at the bars.
- Brindle earns ten per cent on equity, below the eleven per cent investors require.
- Paying out thirty per cent keeps seventy, so growth is seven per cent and the multiple is seven point five.
- Paying out half gives eight point three three.
- Paying out seventy per cent gives eight point seven five.
- Here the multiple rises with payout, because retained money earns less than investors could demand.
- If return on equity equalled required return, payout would not matter at all.
- The multiple would be one over r, nine point zero nine, every time.

14 Four mistakes to avoid so far

- 1. Capitalising E0 instead of E1 in PVGO
- 2. Thinking any earnings growth adds value
- 3. Leaving out 1 + g in the trailing P/E
- 4. Trailing market P/E against leading justified P/E

IN THE LESSON

- Let us pause on the common slips.
- One.
- Capitalising last year's earnings in the no-growth value.
- Use next year's.
- Two.
- Believing that any positive earnings growth creates value.
- It does so only when the return on reinvested money beats the required return.
- At the break-even point, growth is real but worth nothing extra.
- Three.
- Leaving out the factor one plus g when you compute the trailing multiple, so your justified ratio is too low.
- Four.
- Comparing unlike things: a market multiple on last year's earnings against a justified multiple on next year's.
- The two differ by exactly one plus g, and that gap can flip the verdict.
- Match leading with leading and trailing with trailing.

15 A story: reading the price as a clue

- Price known: solve for the discount rate
- Implied return: rate that makes value = price
- Like a bond's yield to maturity
- Compare it with the return you require

IN THE LESSON

- So far we started with a required return and worked out a value.
- Now run the machine backwards.
- When you buy a bond for a given price, you can calculate its yield to maturity, the return you earn if you hold it.
- Shares work the same way.
- The market has put a price on the dividends, and there is one discount rate that makes the model's value exactly equal to that price.
- That rate is the return the price implies.
- It is the expected return if the dividend forecasts come true.
- Maya will then compare the implied return with the return she requires.
- This works for any dividend model, simple or complicated, and we will see three.

16 Implied return from the Gordon model

r = D1 ÷ P0 + g

D1 ÷ P0: forward yield	Next year's dividend over price
g: growth rate	Constant growth for ever
r: implied return	Return the price offers

IN THE LESSON

- For the Gordon growth model the answer is direct.
- Start with price equals D one over r minus g.
- Rearrange to get r minus g equals D one over price, and so r equals D one divided by P zero, plus g.
- The first term is the forward dividend yield, next year's dividend divided by today's price.
- The second is the growth rate.
- Put simply, the return you expect is the cash yield you collect plus the growth in the price.
- The trap is to use the trailing yield, D zero over P zero, which is the dividend just paid, and then add growth.
- That understates the answer, because the model's dividend runs ahead by one year of growth.

17 Example: implied return on Brindle

Price $28, D1 = $1.575, g = 5%, required return 11%

Forward yield	1.575 ÷ 28	**5.625%**
Implied return	5.625% + 5%	**10.625%**
Against required 11%	implied is lower	**Overvalued**
Slip: trailing yield	1.50 ÷ 28 + 5%	**10.36%**

IN THE LESSON

- Let us find what Brindle's price of twenty eight dollars offers.
- Next year's dividend is half of three fifteen, one dollar fifty seven and a half cents, and growth is five per cent.
- The forward yield is one point five seven five divided by twenty eight, five point six two five per cent.
- Add growth of five per cent and the implied return is ten point six two five per cent.
- Investors require eleven per cent, so the price offers less than the required return.
- That agrees with the earlier result: the share looks overvalued.
- Now the slip.
- Using last year's dividend of one fifty over twenty eight gives five point three six per cent, and ten point three six per cent in all.
- That is wrong, and it understates the return.

18 Implied return from the H model

r = (D0 ÷ P0) × [(1 + gL) + H × (gS − gL)] + gL

D0 ÷ P0: trailing yield	Dividend just paid over price
gL: long-run growth	Growth after the fade
gS: starting growth	Growth right now
H: half the fade years	Half the length of the fade
r: implied return	Return the price offers

IN THE LESSON

- Many companies do not grow at one steady rate.
- The H model handles a company whose growth starts high and fades in a straight line to a lower, long-run rate.
- Call the starting growth g S and the long-run growth g L.
- The fade takes two H years, so H is half the length of the fade.
- The implied return is the trailing yield, D zero over P zero, times a bracket, plus long-run growth.
- Inside the bracket sit one plus long-run growth, and H times the gap between starting and long-run growth.
- That second piece is the bonus for a period of above-normal growth.
- Notice that the yield here is the trailing one, because the formula already builds in growth.

19 The H model's straight-line fade

Chart: Dividend growth rate vs Years from now

- Starts at gS = 12%
- Straight-line fade
- Settles at gL = 5%
- 2H = 10 years

IN THE LESSON

- Here is the idea as a picture.
- Along the bottom is time, in years from now.
- Up the side is the dividend growth rate.
- The solid line starts high on the left, at twelve per cent, which is the starting growth rate.
- It then falls in a straight line, which is the fade.
- The dashed vertical line marks the end of the fade, at ten years.
- That length, ten years, is two H, so H is five.
- After that the line flattens at the long-run rate of five per cent and stays there for ever.
- Because the line falls steadily, the average growth during the fade is the midpoint of the two rates.
- That is why the formula uses half the fade length.

20 Example: the H model at fifty dollars

Price $50, D0 = $2.00, gS = 12%, gL = 5%, fade over 10 years

H	10 ÷ 2	**5**
Bracket	1.05 + 5 × 0.07	**1.40**
Yield part	(2.00 ÷ 50) × 1.40	**5.6%**
Implied return	5.6% + 5%	**10.6%**
Gordon at 5% only	2.10 ÷ 50 + 5%	**9.2%**

IN THE LESSON

- Maya now tries a company whose growth is fading.
- The share costs fifty dollars, the dividend just paid was two dollars, growth is twelve per cent now, and it falls in a straight line to five per cent over ten years.
- Ten divided by two gives H equal to five.
- The bracket is one point zero five, plus five times the seven point gap, point zero seven, which is one point four zero.
- The yield part is two over fifty, point zero four, times one point four, five point six per cent.
- Add long-run growth, and the implied return is ten point six per cent.
- A plain Gordon model at five per cent, ignoring the fade, gives nine point two per cent, a very different answer.

21 Models with no direct formula: trial and error

D1 = $2.00, D2 = $2.16, then growth 4% for ever. Price $34.55

Try r = 9%	value of all dividends	**$41.47**
Try r = 11%	value of all dividends	**$29.60**
Try r = 10%	value of all dividends	**$34.55**
Implied return	value matches the price	**10%**

Value falls as r rises, so adjust until value equals price

IN THE LESSON

- What about a model with no neat rearrangement?
- A two-stage or three-stage model has dividends that grow at one rate, then another, so the discount rate sits inside a long sum and cannot be isolated.
- The method is trial and error: guess a rate, value the dividends, compare with the price, and adjust.
- A spreadsheet's internal rate of return function does this for you.
- Here is a small case.
- A share pays two dollars next year and two sixteen the year after, then grows four per cent for ever.
- The price is thirty four fifty five.
- At nine per cent the value is forty one forty seven, too high, so the rate must be higher.
- At eleven it is twenty nine sixty, too low.
- At ten it is thirty four fifty five, a match.

22 A story: the price tag and the appraisal

- Value above price: appears undervalued
- Value below price: appears overvalued
- Close together: appears fairly valued
- Always test how fragile the estimate is

IN THE LESSON

- Now the payoff.
- Picture a house with a price tag of three hundred thousand, and a surveyor who values it at three hundred and twenty.
- If you trust the survey, the house is cheap.
- But surveyors are not perfect, and a small gap could easily sit inside their margin of error.
- A share is the same.
- A dividend discount value is an estimate, and the market price is a fact.
- If intrinsic value is above the price, the share looks undervalued.
- If it is below, overvalued.
- If the two are close, call it fairly valued.
- There is a second, equivalent test: compare the implied return with the required return.
- And always ask how sensitive the answer is to the inputs.

23 Example: Tern Water Works

D1 = $1.80, g = 4%, r = 8.5%, price $37

Model value	1.80 ÷ (0.085 − 0.04)	**$40.00**
Implied return	1.80 ÷ 37 + 4%	**8.86%**
Value against price	(40 − 37) ÷ 37	**+8.1%**
If g is 3.5%	1.80 ÷ 0.050	**$36.00**
If g is 4.5%	1.80 ÷ 0.040	**$45.00**

IN THE LESSON

- Maya values Tern Water Works, a made-up utility.
- Next year's dividend is one dollar eighty, expected to grow four per cent for ever, and she requires eight and a half per cent.
- The model value is one eighty divided by point zero four five, forty dollars.
- The share trades at thirty seven, so value is above price by eight point one per cent.
- The second test agrees.
- Implied return is one eighty over thirty seven, four point eight six per cent, plus four, eight point eight six per cent, above her eight and a half.
- Both say undervalued.
- Now stress it.
- If growth is three and a half per cent, value drops to thirty six, below the price.
- If growth is four and a half, value jumps to forty five.

24 Half a point of growth changes the verdict

Value per share ($)

g = 3.5%	**36**
g = 4.0%	**40**
g = 4.5%	**45**
Price	**37**

IN THE LESSON

- Here is that sensitivity as a picture.
- Each bar is a value per share, in dollars.
- The middle bar is Maya's base case, growth of four per cent, a value of forty dollars.
- The left bar is growth of three and a half per cent, thirty six dollars.
- The right bar is four and a half per cent, forty five.
- The price, thirty seven dollars, sits just above the left bar and well below the other two.
- Half a percentage point on growth, a difference two careful analysts could easily have, moves the value from below the price to far above it.
- The cause is the small spread between required return and growth, only four and a half points, which magnifies every change.

25 Reading the verdict, and its limits

Two equivalent tests, one warning

Test	Reading
Value above price, or implied above r	Undervalued
Value below price, or implied below r	Overvalued
Value close to price	Fair
Gap inside the model's error	Not clear

IN THE LESSON

- Let us gather the decision rules.
- Value above price means undervalued, and value below price means overvalued.
- The second test gives the same answers from the other side: an implied return above the required return means undervalued, and below means overvalued.
- Close to equal means fairly valued.
- Remember Brindle, whose implied return of ten point six two five was below eleven.
- That gap was just over a third of a point, and value was twenty six against a price of twenty eight.
- But the trap is treating a small gap as a clear signal.
- If it lies within the model's likely estimation error, as with Tern's thirty six to forty five range, the honest conclusion is that you cannot be sure.

26 A story: the family bakery that funds itself

- Grow using retained earnings alone
- No new shares; capital structure unchanged
- Set by how much is kept and how well it earns
- A growth rate built from the accounts

IN THE LESSON

- Imagine a family bakery that wants to grow, but will not borrow more and will not bring in new owners.
- The only money it has is the profit it keeps.
- How fast can it grow?
- That is the sustainable growth rate.
- It is the rate at which a company can grow earnings and dividends using retained earnings alone, without issuing new shares, and keeping its mix of debt and equity the same.
- Two things set it: how much of earnings the company keeps, called the retention ratio, and how much it earns on the equity it has, return on equity.
- Every Gordon model needs a growth rate, and this is a way to build one from the company's own accounts.

27 Sustainable growth rate

g = b × ROE = (1 − payout) × ROE

b: retention ratio	One minus the payout ratio
ROE: return on equity	Net income over equity
g: sustainable growth	Growth with no new equity

IN THE LESSON

- The formula is short.
- Sustainable growth equals the retention ratio, b, times return on equity.
- The retention ratio is one minus the payout ratio, the share of earnings the company keeps.
- Return on equity is net income divided by equity.
- The logic is simple.
- Each dollar of equity earns the return on equity.
- If the company keeps a share b of that, equity grows by b times return on equity, and earnings can grow at the same pace without any change in leverage.
- Two assumptions sit underneath: return on equity stays constant, and the capital structure does not change.
- The trap is to multiply return on equity by the payout ratio rather than by the retention ratio.

28 DuPont: what drives return on equity

ROE = margin × turnover × leverage

Net profit margin	Net income ÷ sales
Asset turnover	Sales ÷ assets
Financial leverage	Assets ÷ equity
ROE: return on equity	Net income ÷ equity

IN THE LESSON

- DuPont analysis breaks return on equity into three ratios that multiply together.
- Net profit margin is net income divided by sales: how much profit each dollar of sales leaves.
- Asset turnover is sales divided by assets: how hard the assets work.
- Financial leverage is assets divided by equity: how much of the asset base the owners funded themselves.
- Multiply them and sales cancels, then assets cancel, leaving net income over equity, which is return on equity.
- The benefit is diagnostic.
- Two firms can have the same return on equity, one earned through a fat margin and one through heavy borrowing, and their growth is of very different quality.
- Put it into the growth formula and sustainable growth is retention times margin times turnover times leverage.

29 From margin to growth

Profit per sale, sales per asset, assets per equity

Margin 7.5% → Turnover 1.6 → Leverage 2.0

Their product, the share kept, the growth funded

ROE 24% → Retain 70% → Growth 16.8%

IN THE LESSON

- Here is the chain as a picture.
- Read the top row left to right.
- First, margin.
- Our made-up firm, Kestrel Components, keeps seven and a half per cent of sales as profit.
- Second, turnover.
- It generates one point six dollars of sales for each dollar of assets.
- Third, leverage.
- It has two dollars of assets for each dollar of equity.
- Now the bottom row.
- Multiply those three and you get a return on equity of twenty four per cent.
- Then Kestrel pays out thirty per cent of earnings and keeps seventy.
- Seventy per cent of twenty four per cent is sixteen point eight per cent, the sustainable growth.
- Each box is also a question about whether that driver will hold.

30 Example: Kestrel Components

NI $30m, sales $400m, assets $250m, equity $125m, dividends $9m

ROE (DuPont)	7.5% × 1.6 × 2.0	**24%**
Retention	1 − 9 ÷ 30	**0.70**
Sustainable growth	0.70 × 24%	**16.8%**
Slip: payout used	0.30 × 24%	**7.2%**
Leverage cut to 1.6	0.70 × 7.5% × 1.6 × 1.6	**13.44%**

IN THE LESSON

- Now the working.
- Kestrel earns thirty million on sales of four hundred million, with assets of two hundred and fifty million and equity of one hundred and twenty five million.
- It pays dividends of nine million.
- Margin is seven and a half per cent, turnover one point six, leverage two, so return on equity is twenty four per cent, which agrees with thirty over one twenty five.
- Retention is one minus nine over thirty, point seven.
- Sustainable growth is point seven times twenty four, sixteen point eight per cent.
- The classic slip, using the payout of point three, gives seven point two.
- Finally, suppose management cuts leverage to one point six.
- Return on equity falls to nineteen point two, and growth to thirteen point four four per cent.

31 What would lower Kestrel's growth?

Sustainable growth (% a year)

Today	**16.8**
Leverage 1.6	**13.44**
Margin 6%	**13.44**
Payout 50%	**12.0**

IN THE LESSON

- The DuPont breakdown shows which changes would hurt.
- Each bar is Kestrel's sustainable growth, in per cent a year.
- The first bar is today, sixteen point eight.
- The second is leverage cut to one point six, thirteen point four four.
- The third is a margin squeezed from seven and a half to six per cent by competitors, also thirteen point four four, because both are a fall of one fifth in return on equity.
- The fourth is a policy of paying out half of earnings rather than thirty per cent, twelve per cent.
- Notice the point.
- A growth rate resting on leverage, or on a margin that competitors can attack, is less secure than one resting on a durable advantage, and a Gordon model fed with it inherits that fragility.

32 Recap: the whole lesson in five lines

- Price = E1 ÷ r + PVGO; use forward earnings
- Leading P/E = payout ÷ (r − g); trailing is ×(1 + g)
- Implied r: D1 ÷ P0 + g; H model for fading growth
- Value above price, or implied r above r: undervalued
- Sustainable g = retention × ROE (DuPont for drivers)

IN THE LESSON

- Let us pull it together.
- Price equals the no-growth value, E one over r, plus P V G O.
- Growth adds value only when reinvested money earns more than the required return.
- Dividing the Gordon model by earnings gives the justified leading multiple, payout over r minus g, and the trailing multiple is that times one plus g.
- Working backwards, the Gordon implied return is the forward yield plus growth, and the H model adds a bonus for fading high growth.
- A value above price, or an implied return above the required return, says undervalued, but check the sensitivity.
- Sustainable growth is retention times return on equity, and DuPont shows what drives it.

33 Try three quick questions

1. Price $50, E1 = $4, r = 10%. PVGO and its share of the leading P/E?
   Answer: PVGO = 50 − 40 = $10; 2.5 ÷ 12.5 = 20%
2. Price $40, D1 = $2, g = 4%, required 8%. Implied return and verdict?
   Answer: 2 ÷ 40 + 4% = 9%, above 8%: undervalued
3. Margin 5%, turnover 2, leverage 1.5, payout 40%. Sustainable growth?
   Answer: ROE 15%; 0.60 × 15% = 9%

IN THE LESSON

- Now try three questions yourself.
- Pause after each one.
- Question one.
- A share trades at fifty dollars, next year's earnings are four dollars, and the cost of equity is ten per cent.
- What is P V G O, and what share of the leading multiple is growth?
- Four over point one is forty, so P V G O is ten dollars.
- The leading multiple is twelve point five and growth's part is two point five, twenty per cent.
- Question two.
- A share costs forty dollars, next year's dividend is two dollars, growth is four per cent, and you require eight per cent.
- What is the implied return, and the verdict?
- Two over forty is five per cent, plus four, nine per cent, above eight, so undervalued.
- Question three.
- Margin is five per cent, turnover two, leverage one and a half, and the payout is forty per cent.
- What is sustainable growth?
- Return on equity is fifteen per cent, retention point six, so nine per cent.