CHARTA LEARNING · LESSON NOTES

Introduction to equity valuation

Equity Investments

1 A story: the price tag on the desk

- Tag says $200: the price, a visible fact
- You think it is worth $300: your estimate
- The seller thinks $150: a different estimate
- Price is seen. Worth is judged.

IN THE LESSON

- Imagine you are walking through a street market and you spot an old wooden desk.
- The tag says two hundred dollars.
- That number is a fact.
- You can read it, and anyone can.
- Now you start to think.
- The wood is solid, the drawers still slide, and a shop in town sells similar desks for three hundred.
- In your mind the desk is worth about three hundred.
- The seller, though, might privately think it is worth only one hundred and fifty.
- Notice there are now two kinds of number: the price you can see, and opinions about worth that nobody can read off a tag.
- Investing in shares is exactly this puzzle.

2 Market value and intrinsic value

- Market value: the price it trades at now
- Intrinsic value: worth given a full understanding
- Mispricing = intrinsic value − market value
- Price below value: undervalued. Above: overvalued

IN THE LESSON

- Let us give those two numbers their proper names.
- Market value is the price at which an asset currently trades.
- For a share, it is the latest price at which buyers and sellers agreed.
- It is observable.
- Intrinsic value is what the asset is really worth, assuming someone had a complete understanding of everything about it: its cash flows, its risks, its future.
- Nobody has that complete understanding, so intrinsic value can never be seen, only estimated.
- The difference between the two is called mispricing.
- It equals intrinsic value minus market value.
- If the price is below intrinsic value, the share is undervalued.
- If it is above, the share is overvalued.
- If they match, it is fairly valued.

3 Efficient markets and active managers

- Efficient market: price always equals value
- Then searching for bargains adds nothing
- Active claim: gaps exist and can be found
- But value is only an estimate, so models err too

IN THE LESSON

- Why does this gap matter so much?
- Think about a perfectly efficient market, one where prices instantly reflect all available information.
- There, the price always equals intrinsic value, so no share is ever a bargain, and nobody can earn extra return by searching.
- An active manager makes a different claim.
- She says prices can differ from intrinsic value, and that careful research can find where.
- That claim is her whole reason for being paid.
- But there is a catch that questions love.
- Intrinsic value is unobservable, so every estimate of it is uncertain.
- When a model disagrees with the market, either the market is wrong, or the model is.

4 Example 1: is Marlow Mills a bargain?

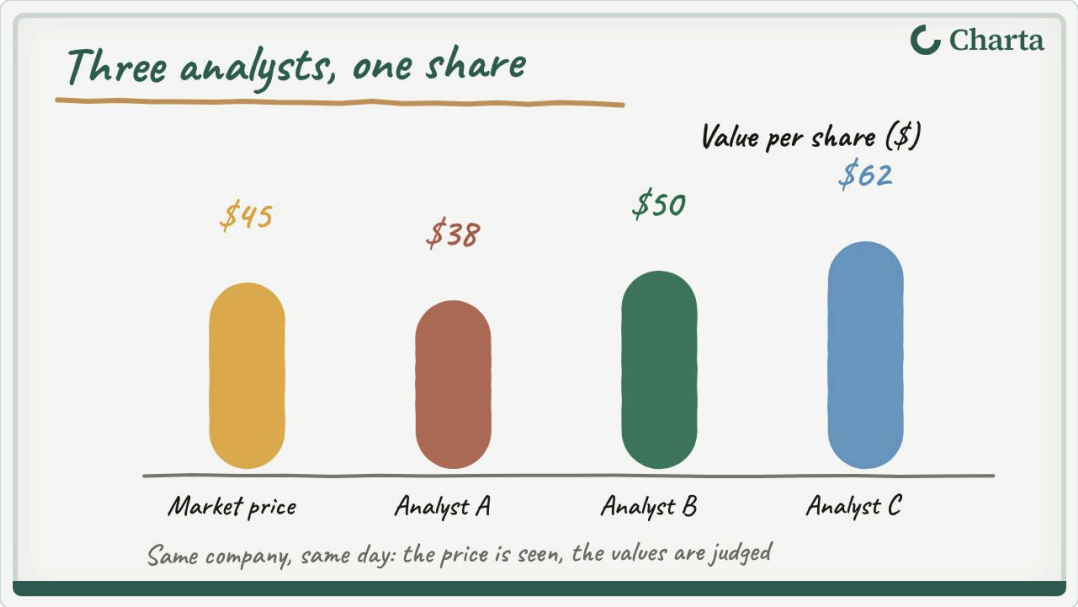
Marlow Mills shares trade at $45; analyst's estimate is $56

Market value	price today	**$45**
Estimated intrinsic value	from her model	**$56**
Mispricing	56 − 45	**+$11**
Gain if price meets value	11 ÷ 45	**24.4%**
Verdict	price below value	**Undervalued**

IN THE LESSON

- Example one.
- We will follow a made-up company called Marlow Mills, a maker of packaged foods, through the whole lesson.
- All figures are teaching numbers, not real data.
- Marlow shares trade at forty-five dollars.
- That is the market value.
- Suppose an analyst builds a model and estimates the intrinsic value at fifty-six dollars.
- The mispricing is fifty-six minus forty-five, which is eleven dollars.
- The market price is below the estimated value, so the analyst calls the share undervalued.
- If the price rose to meet her estimate, the gain would be eleven divided by the price we actually pay, forty-five.
- That is twenty-four point four per cent.
- Notice the base: the return is measured on the price paid.

5 Three analysts, one share



IN THE LESSON

- Now see how shaky that estimate really is.
- Here are bars for Marlow Mills.
- The first bar is the market price, forty-five dollars, a single fact.
- The other three are estimates of intrinsic value from three analysts who all studied the same company.
- Analyst A says thirty-eight dollars.
- Analyst B says fifty.
- Analyst C says sixty-two.
- They are twenty-four dollars apart.
- According to A, the share is overvalued.
- According to C, it is badly undervalued.
- Only one price exists, but three views of worth.
- Intrinsic value is always an estimate, and a model's answer is never a fact.

6 Example 2: is the gap bigger than the noise?

Marlow trades at $45; Analyst B estimates $50, usually off by $8

Gap: estimate minus price	50 − 45	**$5**
Typical model error	from past forecasts	**±$8**
Range for value	50 ± 8	**$42 to $58**
Is $45 inside the range?	42 ≤ 45 ≤ 58	**Yes**
Verdict	gap smaller than error	**No signal**

IN THE LESSON

- Example two, the trap.
- Take Analyst B, who says fifty dollars against the market price of forty-five.
- The gap is five dollars.
- Is that a mispricing?
- Suppose B's past forecasts have typically been wrong by about eight dollars either way.
- That is a made-up figure for teaching.
- Then a fair way to express her view is fifty plus or minus eight, a range from forty-two to fifty-eight.
- The market price of forty-five sits comfortably inside that range.
- So the five dollar gap is smaller than the model's usual error and gives no real signal.
- The share may be cheap, but the evidence does not show it.
- A gap only means something when it is larger than the uncertainty in the estimate.

7 A story: three ways to price a flat

- Work back from the rent it earns
- Compare with similar flats that sold
- Add up the land and bricks, less the mortgage
- Three habits: cash flows, comparables, assets

IN THE LESSON

- Suppose a friend asks you what a flat is worth, and you want to answer sensibly.
- You could think about the rent it earns.
- If it brings in twelve thousand a year, and you would want a certain return on that money, you can work backwards to a price.
- That uses the income the flat will produce.
- Or you could look at what similar flats nearby sold for, and adjust.
- That uses the prices of comparable things.
- Or you could add up what the bricks, land and fittings would cost, and take off any mortgage.
- That uses what the flat is made of.
- These three habits are exactly the three families of equity valuation model, and each has strengths and blind spots.

8 The three families of model

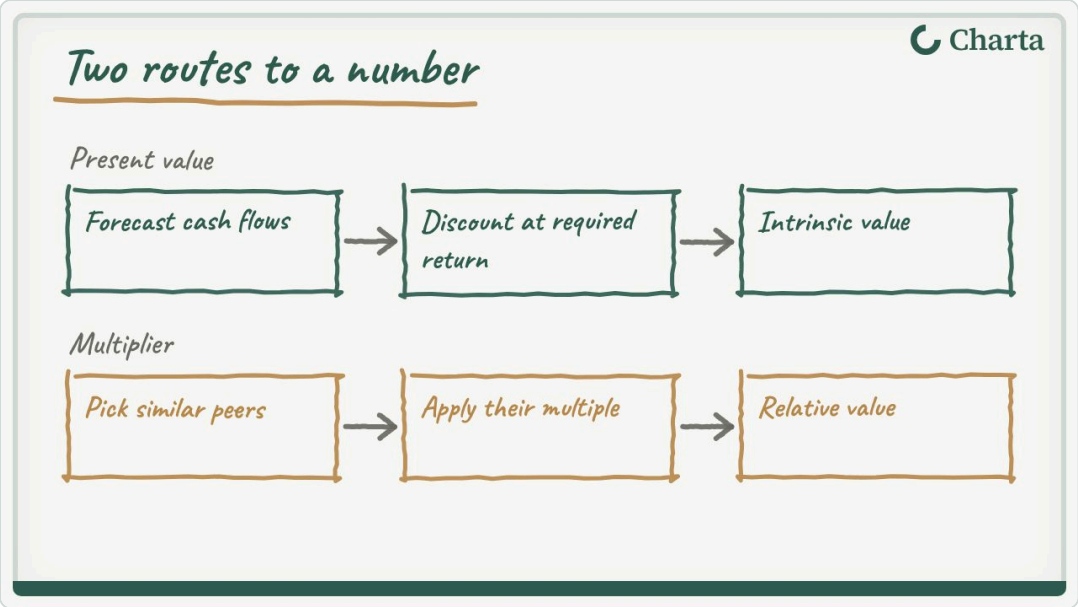
Each family starts from different evidence

Family	Starts from
Present value	Cash flows
Multiplier	Peer prices
Asset-based	Net assets

IN THE LESSON

- Here are the three families, in the usual words.
- Present value models estimate intrinsic value by forecasting the cash flows a share will give its owner, such as dividends or free cash flow, and discounting them at a required return.
- Discounting means shrinking future money to what it is worth today.
- These are called absolute valuation, because they try to find worth on their own terms.
- Multiplier models, also called relative valuation, take a ratio such as the price to earnings ratio from similar companies and apply it to this company.
- And asset-based models take the fair value of what the company owns and subtract what it owes.
- Each family starts from different evidence, so each fails in different places.

9 Two routes to a number



IN THE LESSON

- Look at the picture.
- The top row is the present value route.
- First you forecast the cash flows the owner will receive, such as dividends.
- Second you discount them at the required return, the return investors demand for taking the risk.
- The result is an estimate of intrinsic value.
- The bottom row is the multiplier route.
- First you pick peers, similar companies whose prices you can see.
- Second you apply their multiple, such as the price to earnings ratio, to this company's earnings.
- The result is a relative value: whether the share is cheap or dear next to those peers.
- The third family, asset-based, we will draw later.
- Notice the middle box in each row.
- That is where the judgement, and the risk of error, sits.

10 The dividend discount model

Value today = D1 ÷ (r − g)

Next dividend, D1	Dividend expected next year
Required return, r	Return investors require
Growth, g	Steady growth of the dividend

IN THE LESSON

- The simplest present value model values a share by the dividends it will pay.
- Suppose a company will pay a dividend next year, call it D one, and that dividend will then grow at a steady rate forever, called g.
- An investor demands a required return on the share, called r.
- This is also called the cost of equity: the return shareholders expect for bearing the risk.
- The value today equals next year's dividend divided by r minus g.
- Two things to remember.
- The formula only works when r is bigger than g.
- And it is very sensitive: because you divide by the small gap between r and g, a tiny change in either one can swing the answer a long way.

11 Example 3: Marlow by dividends

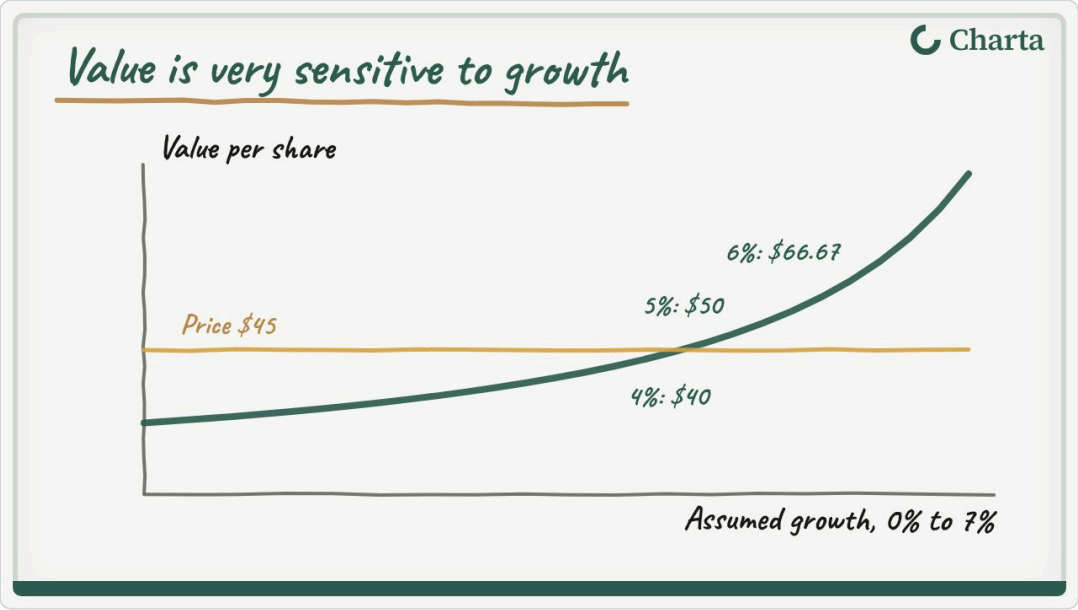
D1 = $2.00, required return 9%, growth 4%, price $45

Required return minus growth	9% − 4%	**5%**
Intrinsic value	2.00 ÷ 0.05	**$40**
Market price		**$45**
Price minus value	45 − 40	**$5**
Verdict	price above value	**Overvalued**

IN THE LESSON

- Example three.
- Marlow Mills is expected to pay a dividend of two dollars next year.
- We assume the dividend grows by four per cent a year, and shareholders require nine per cent.
- First, r minus g is nine per cent minus four per cent, which is five per cent.
- Then the value is two dollars divided by zero point zero five, which is forty dollars.
- Compare this with the market price of forty-five.
- The price is five dollars above the estimated value, so on this model Marlow looks overvalued.
- But remember example two.
- Before drawing any conclusion, we should ask how sure we are about that four per cent growth rate.
- The next picture shows how much it matters.

12 Value is very sensitive to growth



IN THE LESSON

- Here is the dividend model as a picture.
- The bottom axis is the growth rate we assume, from zero to seven per cent.
- The side axis is the value of one share.
- The curve is the model's answer, and it climbs faster and faster to the right.
- At four per cent growth the value is forty dollars.
- Raise growth by one point, to five per cent, and the value jumps to fifty dollars, a quarter higher, with no new information about the company at all.
- At six per cent it is sixty-six dollars and sixty-seven cents.
- The flat line is the market price of forty-five.
- The curve crosses it at about four and a half per cent growth.
- So the model calls Marlow cheap or dear depending on a guess.

13 The multiplier model

P/E = price ÷ EPS
Value = peer P/E × EPS

Share price	What the share trades at
Earnings per share	Profit per share, expected
P/E ratio	Price paid per $1 of earnings

IN THE LESSON

- Now the second family.
- The price to earnings ratio, often written P E, is the share price divided by earnings per share.
- Earnings per share is the company's profit divided by its number of shares.
- A P E of fifteen means investors pay fifteen dollars for each dollar of yearly earnings.
- A multiplier model flips that around.
- Take the P E that similar companies trade at, the peer multiple, and multiply it by this company's earnings per share.
- The answer is the price the share would have if it were valued like its peers.
- The method is quick and uses real market prices, but it has a hidden assumption, as we are about to see.

14 Example 4: Marlow by its peers

EPS $3.20; Marlow P/E vs peers' median P/E of 15

Marlow's own P/E	45 ÷ 3.20	**14.1**
Peer median P/E	similar companies	**15**
Value at peer P/E	15 × 3.20	**$48**
If the peers' fair P/E is 12	12 × 3.20	**$38.40**
Marlow against peers	14.1 against 15	**Cheaper**

IN THE LESSON

- Example four.
- Marlow Mills is expected to earn three dollars and twenty cents a share.
- At forty-five dollars, its own P E is forty-five divided by three twenty, which is about fourteen point one.
- Similar food companies trade at a median P E of fifteen.
- Apply that to Marlow's earnings: fifteen times three twenty is forty-eight dollars.
- Against the price of forty-five, Marlow looks a little cheap compared with its peers.
- Now the hidden assumption.
- This only says Marlow is cheap relative to peers.
- If those peers are all overpriced, and their fair multiple is really twelve, then Marlow's value is twelve times three twenty, thirty-eight dollars and forty cents, and it is expensive after all.

15 What each family gains and gives up

- Present value: sound basis, very sensitive to inputs
- Multiplier: quick, market-based, only relative
- Asset-based: concrete, blind to brands and staff
- Use several. Study where they disagree.

IN THE LESSON

- So what does each family gain, and what does it give up?
- Present value models rest on the fundamentals, the cash a business will really produce.
- But they are highly sensitive to the growth and discount rate you assume, and they need forecasts that are hard to make.
- Multiplier models are quick and market based, and they let you compare many companies at once.
- But they only tell you whether a share is cheap relative to something else, and that something may itself be mispriced.
- Asset-based models are concrete, because they start from what a company owns.
- But they miss value that is not on a balance sheet, such as brands and skilled staff.
- Careful analysts use several methods and investigate where the answers disagree.

16 Mistakes to avoid so far

- 1. Intrinsic value is an estimate, never observed
- 2. A gap below the model's error is not a signal
- 3. Cheap against peers is relative, not absolute
- 4. Dividend model: r must beat g; inputs swing value

IN THE LESSON

- Before we go on, four mistakes that cost marks.
- One.
- Treating intrinsic value as a number you can observe.
- It is always an estimate, and a gap between estimate and price is as likely to be the model's error as the market's.
- Two.
- Calling a share a bargain when the gap is smaller than the model's typical error.
- Three.
- Reading a multiplier valuation as absolute.
- A cheap P E next to peers only says relative cheapness.
- Four.
- Forgetting the dividend model needs the required return to exceed growth, and that a small change in either moves the value a lot.
- Also remember the base for a return: it is measured on the price paid.

17 A story: the farm and the app

- Farm: land, barn and tractors hold the value
- App: laptops on the books, value in the users
- Asset sums suit the farm and fail the app
- The question: where does the value really sit?

IN THE LESSON

- Imagine two businesses you might buy.
- The first is a farm.
- It has two hundred acres of land, a barn and some tractors.
- If the farm earns little in a given year, you still own the land, and anyone can see roughly what land sells for.
- Adding up the assets tells you most of what the farm is worth.
- The second is a small phone app that millions of people use.
- It owns a few laptops and a rented office.
- Add up its assets and you get almost nothing, yet people would pay a fortune for it, because of the users, the code and the team.
- Valuing a company by its assets works wonderfully for the first and badly for the second.

18 Asset-based valuation

Net asset value = FV of assets − FV of liabilities
Per share = NAV ÷ shares

Assets at fair value	What the assets could sell for
Liabilities at fair value	What the debts are worth
Net asset value	Equity value from the assets
Shares outstanding	Number of shares

IN THE LESSON

- Asset-based valuation values the equity as everything the company owns minus everything it owes, with both sides measured at fair value.
- Fair value is what the item could be sold for, or what the debt could be settled for, in an ordinary deal between willing parties.
- That is not the number in the accounts, which usually records cost less wear and tear.
- So the first job is to adjust the balance sheet from book figures to fair values.
- The result is called net asset value.
- Divide it by the number of shares and you have net asset value per share, which you can compare with the market price.
- The hard part is not the sum.
- It is finding trustworthy fair values.

19 Example 5: restating Marlow's assets

Marlow Mills, book assets $1,000m, book liabilities $400m

Assets in the accounts	book value	**1,000**
Goodwill, no sale value	taken off	**− 120**
Plant worth less than cost	taken off	**− 110**
Land worth more	added	**+ 30**
Assets at fair value	1,000 − 120 − 110 + 30	**800**

IN THE LESSON

- Example five.
- Marlow Mills has a balance sheet showing assets of one thousand million dollars and liabilities of four hundred million, so book equity is six hundred.
- Now we restate the assets to fair value.
- First, Marlow carries one hundred and twenty million of goodwill from an old purchase.
- Goodwill cannot be sold on its own, so it comes off.
- Second, the factory machinery would sell for one hundred and ten million less than its books show.
- Third, the land was bought long ago, and today it would sell for thirty million more than the books show.
- Net of these, fair value of assets is one thousand minus one hundred and twenty minus one hundred and ten plus thirty.
- That is eight hundred million.

20 Example 6: net asset value per share

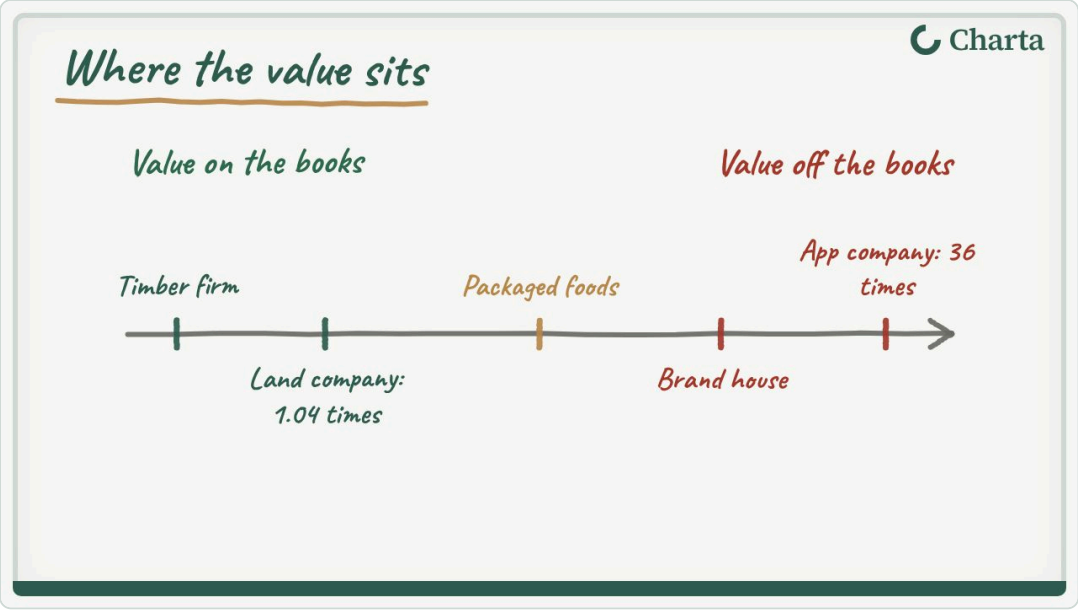
Marlow has 20 million shares; amounts in $ millions

Assets at fair value	from the last slide	**800**
Liabilities at fair value	close to book	**400**
Net asset value	800 − 400	**$400m**
Shares outstanding	millions	**20**
Net asset value per share	400 ÷ 20	**$20**

IN THE LESSON

- Step two.
- We also check the liabilities.
- Marlow's debts are at ordinary market rates, so their fair value matches the books at four hundred million.
- Net asset value is eight hundred minus four hundred, which is four hundred million dollars.
- Marlow has twenty million shares.
- Divide four hundred by twenty and net asset value is twenty dollars a share.
- Now compare it with the market price of forty-five.
- The asset-based figure is less than half the price.
- That does not mean the market is wrong.
- It tells us the market is paying for something that is not on the balance sheet at fair value: Marlow's brands, its supplier relationships and its skilled people.
- For an operating food company, that is normal.

21 Where the value sits



IN THE LESSON

- This picture shows when the method works and when it fails.
- The line runs from companies whose value is on the books at the left, to companies whose value is not on the books at the right.
- Each label shows how many times net assets the market value is, in made-up examples.
- At the far left, a timber firm owns forests that can be valued.
- Next, a land company with net assets of five hundred million and a market value of five hundred and twenty million, only one point oh four times.
- Asset-based valuation does well there.
- In the middle sit packaged food makers like Marlow.
- At the far right, an app company has net assets of fifty million and a market value of eighteen hundred million, thirty-six times.
- Its users, code and team were built in house, so they never reached the books.

22 When asset-based valuation suits

- Suits: resource, property and holding companies
- Suits: financial firms with fair-valued books
- Suits: liquidation, as a floor under the value
- Fails: brands, research, networks, people

IN THE LESSON

- So when is the asset-based approach the right tool?
- First, for companies whose value genuinely sits in identifiable assets with observable fair values.
- Examples are natural resource holders, such as forestry or mining firms, property companies and investment holding companies.
- Second, for financial firms whose balance sheets are mostly marked to market.
- Third, for companies whose earnings are too uncertain or negative for other methods.
- And fourth, for a liquidation, where the company is being wound up and the only thing that matters is what the assets fetch.
- It is weakest for companies whose value lies in internally built brands, research capability, networks and staff.
- Here the answer is reliably far below any sensible value, and that is information about the method, not the company.

23 Example 7: Marlow in liquidation

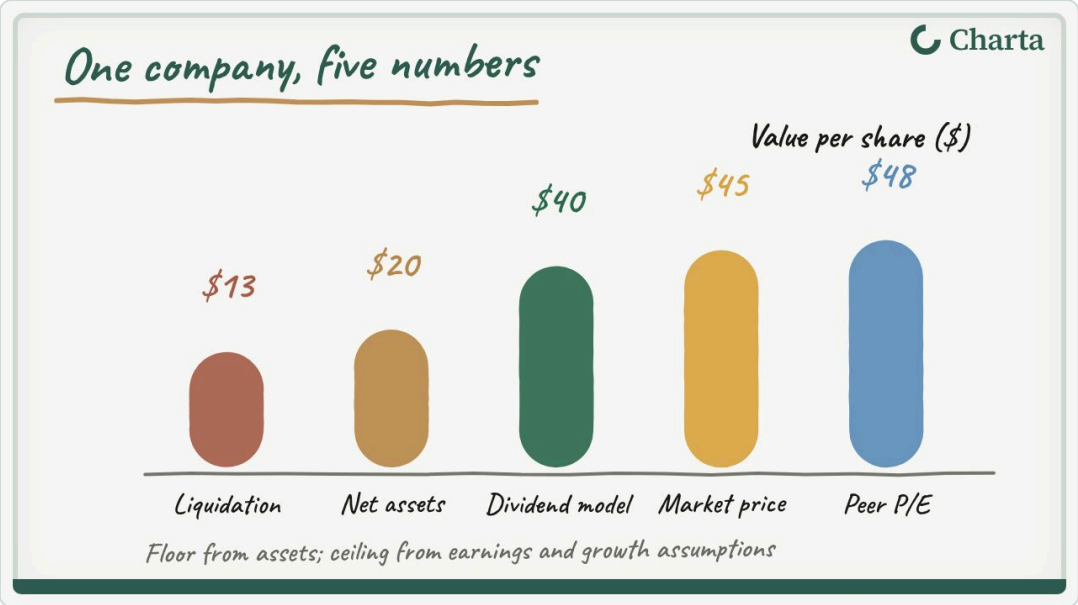
Forced sale at 85% of fair value, wind-up costs $20m

Assets at fair value	from before	**800**
Sold in a hurry	800 × 85%	**680**
After wind-up costs	680 − 20	**660**
After paying the debts	660 − 400	**$260m**
Per share	260 ÷ 20	**$13**

IN THE LESSON

- Example seven, a liquidation.
- Suppose Marlow were closed down, and its assets had to be sold quickly.
- Forced sales fetch less than fair value in an ordinary deal.
- Say buyers pay eighty-five per cent of the fair values.
- Eighty-five per cent of eight hundred is six hundred and eighty million.
- Then the wind-up itself costs twenty million in fees, leaving six hundred and sixty.
- Creditors come first, so we subtract the four hundred million of liabilities.
- That leaves two hundred and sixty million for the shareholders, which is thirteen dollars a share.
- Thirteen is the floor in this example: even a failed Marlow should be worth about that.
- It is lower than the twenty dollar net asset value, because speed costs money.

24 One company, five numbers



IN THE LESSON

- Let us put everything we know about Marlow Mills side by side.
- The shortest bar is the liquidation floor, thirteen dollars.
- Next is net asset value, twenty dollars.
- Then the dividend model, forty dollars.
- Then the market price, forty-five.
- And the tallest is the peer multiple value, forty-eight dollars.
- Notice the pattern.
- The asset-based numbers sit at the bottom, because they cannot see the brands and people.
- The two models that look at earnings and cash flow sit near the price.
- No method is the winner.
- Each gap points at an assumption worth checking.
- For example, the distance between forty and forty-eight may come down to whether four per cent growth is too cautious, or the peers too generous.

25 A story: the shop and its books

- Owner puts in $100,000: a fact about the past
- A buyer pays for the profits still to come
- Strong profits: buyer pays more than $100,000
- Weak profits: buyer pays less. That gap is the story.

IN THE LESSON

- Think about a small shop.
- On the day the owner opened it, she put in one hundred thousand dollars for fittings and stock.
- That is what the accounts record, and it is a fact about the past.
- Years later, a buyer wants to purchase it.
- How much will the buyer pay?
- If the shop earns a fat profit year after year, the buyer will gladly pay far more than one hundred thousand.
- If it barely breaks even, the buyer may pay less than the fittings cost.
- The money put in is one thing.
- What the shop is worth to someone looking forward is another.
- In equity investing these are called book value and market value, and the gap between them tells a story.

26 Book value versus market value

- Book value: assets − liabilities, as recorded
- Market value: share price × number of shares
- Book looks back; market looks forward
- Self-built brands are mostly off the books

IN THE LESSON

- Here are the careful definitions.
- The book value of equity is assets minus liabilities as recorded in the accounts.
- It is built from past transactions, mostly at original cost.
- Divide it by the number of shares for book value per share.
- The market value of equity, or market capitalisation, is the share price times the number of shares.
- It reflects what investors expect in the future.
- The two differ for two main reasons.
- First, accounting records the past while the market prices expectations.
- Second, most intangibles a company builds itself, such as a brand, never enter the books.
- A company that bought a brand yesterday records it.
- One that built the same brand over thirty years records nothing.

27 ROE and price to book

ROE = net income ÷ book equity
P/B = price ÷ book value per share

Net income	Profit for the year, expected
Book equity	Assets minus liabilities, booked
Book value per share	Book equity ÷ shares
Share price	What the share trades at

IN THE LESSON

- Two ratios link these ideas.
- Return on equity, or R O E, measures how much profit the company makes on the shareholders' money in the business.
- It is net income divided by book equity.
- A higher R O E means each dollar of shareholders' capital works harder.
- In the earlier lessons on financial statements you used average equity.
- Here we use the opening book equity, because the valuation formula we meet next takes next year's profit over today's book value.
- The price to book ratio is the share price divided by book value per share, or equivalently market capitalisation over book equity.
- A ratio of one means the market values the company exactly at its book value.
- Above one means a premium.

28 Example 8: Marlow's book value and ROE

Book equity $600m, 20m shares, price $45, EPS $3.20

Book value per share	600 ÷ 20	**$30**
Price to book	45 ÷ 30	**1.50**
Market cap minus book equity	900 − 600	**$300m**
Net income next year	3.20 × 20	**$64m**
Return on equity	64 ÷ 600	**10.67%**

IN THE LESSON

- Example eight.
- Back to Marlow Mills.
- Book equity is six hundred million dollars, assets of a thousand less liabilities of four hundred.
- With twenty million shares, book value per share is thirty dollars.
- The price is forty-five, so the price to book ratio is forty-five divided by thirty, which is one point five.
- In other words, the market capitalisation of nine hundred million is half as much again as book equity.
- Now the profit.
- Expected earnings per share of three twenty, times twenty million shares, gives net income of sixty-four million dollars.
- Divide by the opening equity of six hundred million, and R O E is ten point six seven per cent.
- Keep that figure, because it is about to explain the premium.

29 Linking ROE to the cost of equity

Justified P/B = (ROE − g) ÷ (r − g)

ROE	Return earned on book equity
Growth, g	Steady growth rate
Required return, r	Cost of equity

IN THE LESSON

- Why should a company trade above or below book value?
- The answer is the link between R O E and the cost of equity.
- The cost of equity is the return shareholders require.
- Imagine a company that reinvests its profit.
- If it earns more on that money than shareholders require, every dollar kept is worth more than a dollar, and the share trades above book.
- If it earns less, each dollar kept shrinks in value and the share trades below book.
- With steady growth, the justified price to book ratio equals R O E minus g, divided by r minus g.
- When R O E equals r, the ratio is exactly one.
- Here g is growth and r is the cost of equity, the same ones as in the dividend model.

30 Example 9: what Marlow's ROE justifies

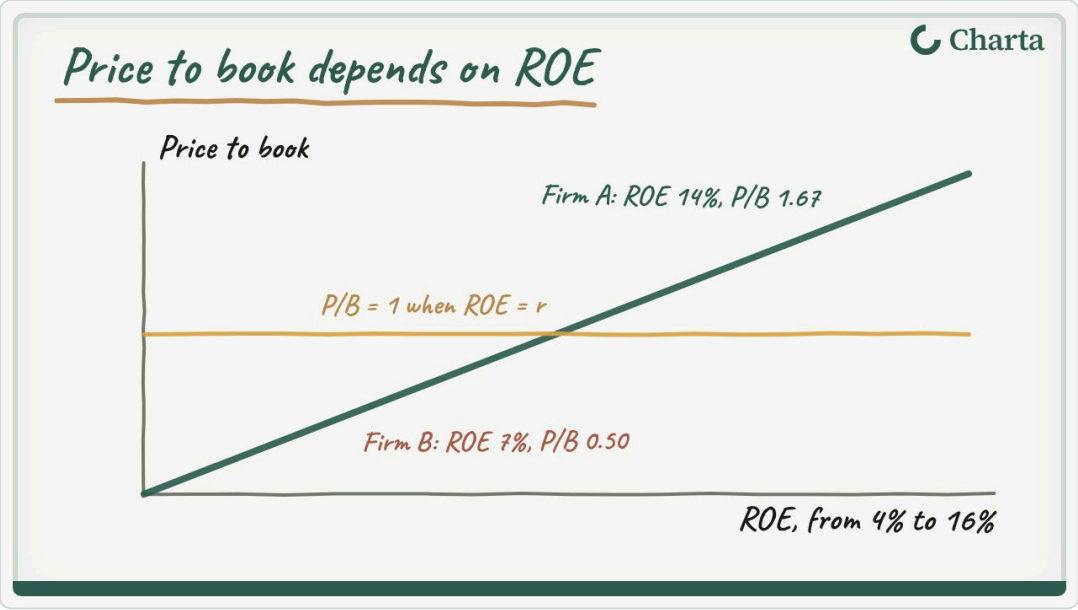
ROE 10.67%, growth 4%, cost of equity 9%, BVPS $30

ROE minus growth	10.67% − 4%	**6.67%**
Cost of equity minus growth	9% − 4%	**5%**
Justified price to book	6.67 ÷ 5	**1.33**
Value per share	1.33 × 30	**$40**
Compare: market price to book	45 ÷ 30	**1.50**

IN THE LESSON

- Example nine.
- Use Marlow's numbers: R O E of ten point six seven per cent, growth of four per cent, and a cost of equity of nine per cent.
- The top of the fraction is R O E minus g, six point six seven per cent.
- The bottom is r minus g, five per cent.
- Divide them and the justified price to book ratio is one point three three.
- Multiply by book value per share of thirty dollars and you get forty dollars.
- That is exactly the dividend model value from earlier, because both are the same model seen through different numbers.
- The actual price to book of one point five is higher, so the market expects either higher returns or faster growth than we assumed.

31 Price to book depends on ROE



IN THE LESSON

- Now the picture.
- The bottom axis is return on equity, from four per cent at the left edge to sixteen per cent at the right edge.
- The side axis is the price to book ratio.
- We use a cost of equity of ten per cent and growth of four per cent.
- The solid line is the justified ratio.
- It rises in a straight line.
- The flat line is the level of one times book.
- They cross where R O E equals the cost of equity, at ten per cent.
- Firm B earns seven per cent.
- Its ratio is seven minus four over ten minus four, zero point five, so it trades at half of book.
- Firm A earns fourteen per cent.
- Its ratio is ten over six, one point six seven, well above book.

32 The trap: a low price to book is not a bargain

- P/B above 1: market expects ROE above cost of equity
- P/B below 1: market expects ROE below it
- Low P/B is a verdict on returns, not asset quality
- Book misses self-built brands: P/B misleads there

IN THE LESSON

- Time for the trap.
- Many learners see a low price to book and call the share a bargain.
- But the ratio is not a statement about the quality of the assets.
- It is the market's verdict on expected returns.
- A discount to book usually means investors expect the company to earn less than its cost of equity, so its capital is being used at a loss in value.
- Whether that expectation is wrong is the real investment question.
- Also remember book value leaves out self-built intangibles, so for a software company price to book is huge for that reason alone.
- It is most informative for banks and similar firms, whose assets are mostly financial and carried near fair value.

33 Recap: the formulas to remember

Mispricing = intrinsic − market DDM = D1 ÷ (r − g)
Justified P/B = (ROE − g) ÷ (r − g)

Mispricing	Intrinsic value minus the price
Dividend model	D1 ÷ (r − g)
Multiplier model	Peer P/E × EPS
Net asset value	FV assets − FV liabilities
Justified P/B	Above 1 when ROE > r

IN THE LESSON

- Let us pull the lesson together.
- Market value is the price you can see.
- Intrinsic value is the worth you can only estimate.
- Mispricing is intrinsic value minus market value, and it is only meaningful if it is larger than the error in the estimate.
- The three families of model are present value, multiplier and asset-based.
- The dividend model values a share at next year's dividend divided by r minus g.
- A multiplier model multiplies a peer ratio by the company's earnings per share.
- Net asset value is assets at fair value minus liabilities at fair value, and it sets a floor in a liquidation.
- Finally, the justified price to book ratio is R O E minus g, over r minus g.

34 Try three quick questions

1. Price $60, estimated intrinsic value $72. Verdict and gap as % of price?
   Answer: Undervalued by $12 = 20% of the price.
2. FV assets 500, FV liabilities 300, 10m shares. NAV per share?
   Answer: (500 − 300) ÷ 10 = $20.
3. ROE 12%, cost of equity 10%, growth 4%. Justified P/B?
   Answer: (12 − 4) ÷ (10 − 4) = 1.33, above book.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A share trades at sixty dollars and your model says its intrinsic value is seventy-two.
- Is it under or overvalued, and by what percentage of the price?
- The share is undervalued by twelve dollars, which is twenty per cent of the price.
- Question two.
- A company has assets of five hundred at fair value, liabilities of three hundred at fair value, and ten million shares.
- What is net asset value per share?
- Two hundred divided by ten is twenty dollars.
- Question three.
- R O E is twelve per cent, the cost of equity is ten per cent, and growth is four per cent.
- What is the justified price to book?
- Eight over six is one point three three, so above book.
- Well done.