CHARTA LEARNING · LESSON NOTES

Alternatives, bonds and suitability

Portfolio Construction

1 A story: the seat belt

- Bonds are the seat belt of a share portfolio
- Cheap, easy to sell, and often rise when shares fall
- Model portfolio: 60% shares, 40% cushion
- Question: does the seat belt always work?

IN THE LESSON

- Think about a seat belt.
- It is cheap, it is always there, and in most crashes it does its job.
- For decades, government bonds have been the seat belt of the share portfolio.
- When shares fall in a scare about growth, central banks cut interest rates, bond prices rise, and the bonds soften the blow.
- Tobias Reyes starts from this idea.
- Before touching Fernhill's real plan, he tests a simple model portfolio: sixty per cent in shares and forty per cent in a cushion, which is the part meant to reduce risk.
- The question for the trustees is whether the seat belt works in every kind of crash.

2 Where bonds work, and where they fail

- Bonds: low link to shares, easy to sell, cheap
- They work through falling yields
- Inflation sell-off: yields rise, bonds fall too
- Low starting yields leave little room to gain

IN THE LESSON

- Here is why bonds became the default.
- They usually move little with shares, or even against them, so they rise when shares fall.
- They are liquid, so Reyes can sell them to rebalance in almost any market.
- And they cost very little.
- But two weaknesses matter.
- Bonds earn their cushion mostly through falling yields.
- If the sell off is caused by inflation, central banks raise rates, yields rise, and bond prices fall along with shares.
- Also, when yields start low, bonds have little room to gain.
- So the cushion depends on the kind of storm.
- That opens the door to alternatives, such as macro hedge funds, commodities and real assets, which can do better when inflation is the cause.

3 The two cushions side by side

Bonds against alternatives as a cushion

Feature	Bonds | Alternatives
Cost	Low | Higher
Selling it	Easy | Slower
Growth scare	Usually help | Vary
Inflation shock	Can fall | May gain

IN THE LESSON

- Now the two cushions side by side.
- Bonds cost little and can be sold almost anywhere.
- Alternatives cost more, because hedge funds charge management and performance fees, and real assets are slower to sell.
- In a growth scare, bonds usually help, while alternatives vary with the manager.
- In an inflation shock, bonds can fall with shares, while some alternatives, such as macro funds and commodities, may gain.
- One more difference is easy to miss.
- Many alternatives report smoothed returns, which make them look steadier than they really are, so a comparison based on reported risk flatters them.
- Reyes therefore compares the two on how they behave in each kind of sell off, not on the label.

4 Example 1: two storms, two cushions

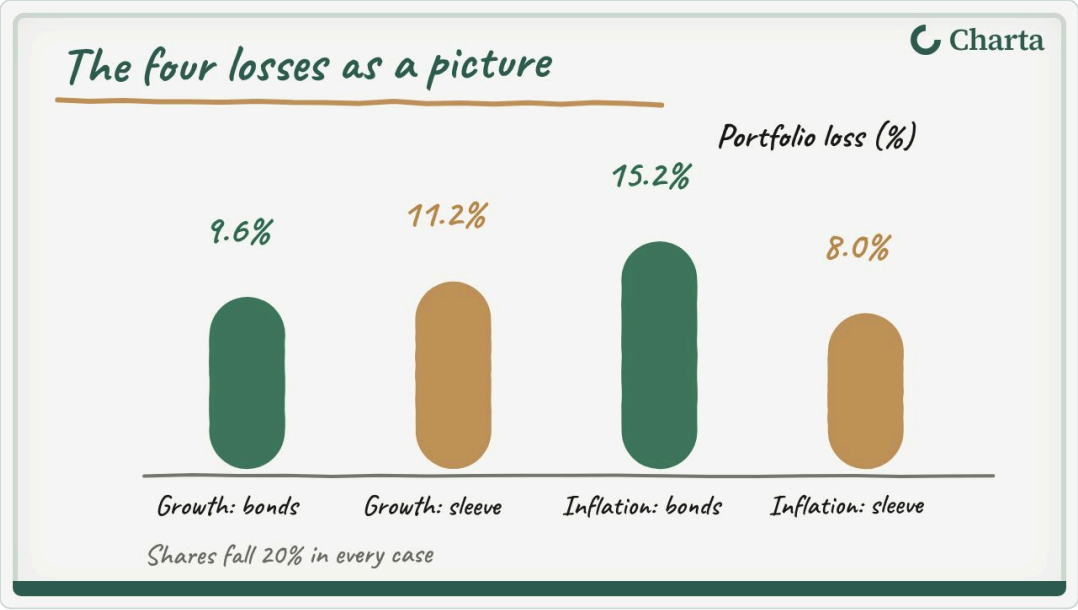
Shares 60% fall 20%; cushion 40%

Growth scare, bonds	0.6×(−20) + 0.4×6	**−9.6%**
Growth scare, sleeve	−12 + 0.4×2	**−11.2%**
Inflation shock, bonds	−12 + 0.4×(−8)	**−15.2%**
Inflation shock, sleeve	−12 + 0.4×10	**−8.0%**

IN THE LESSON

- Let us put numbers on the two storms.
- The model portfolio holds sixty per cent shares and forty per cent cushion, and shares fall twenty per cent in both storms.
- In a growth scare, bonds return plus six per cent, and an alternatives sleeve, a mix of macro funds, commodities and real assets, returns plus two.
- In an inflation shock, bonds return minus eight, and the sleeve plus ten.
- With bonds in the growth scare, the portfolio loses nine point six per cent.
- With the sleeve it loses eleven point two.
- In the inflation shock, bonds leave a loss of fifteen point two, the worst of the four, while the sleeve holds the loss to eight.
- So neither cushion wins every time.

5 The four losses as a picture



IN THE LESSON

- Here are those four results as bars.
- The vertical axis is the loss on the portfolio, in per cent, so a shorter bar is better.
- The first two bars are the growth scare.
- Bonds lose nine point six, the sleeve eleven point two, so bonds win.
- The next two bars are the inflation shock.
- Bonds lose fifteen point two, the tallest bar of all, because shares and bonds fall together.
- The sleeve loses only eight.
- The picture shows that the choice depends on which storm worries the client most.
- It also hides two costs.
- The sleeve is dearer, and it is harder to sell if Reyes needs to rebalance after the fall.

6 Example 2: how likely must the storm be?

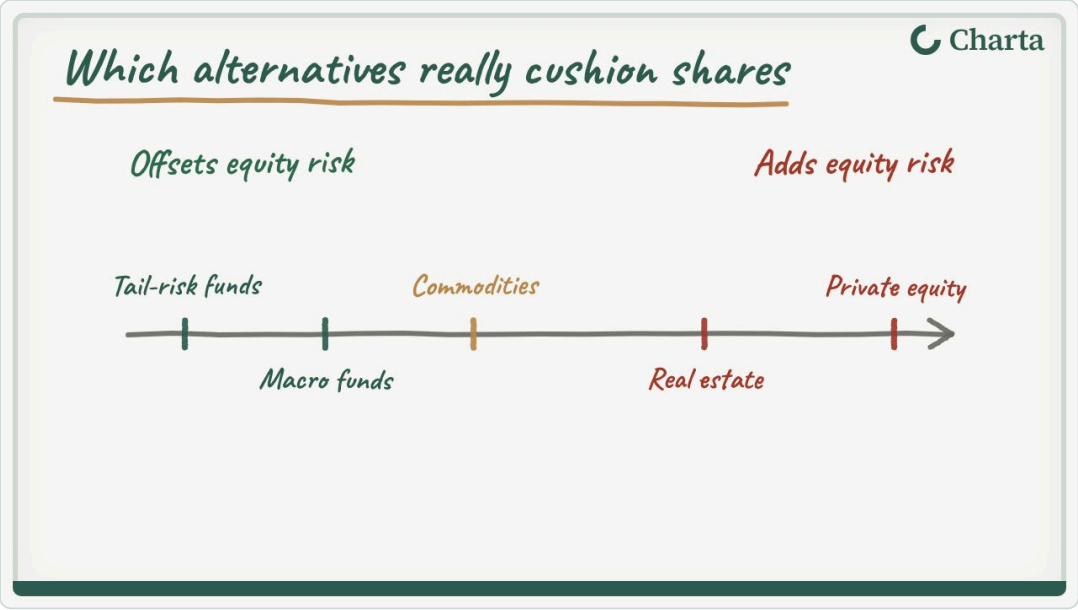
p = chance of inflation shock; sleeve costs 0.4 × 1.5

Bonds: expected loss	9.6(1−p) + 15.2p	**9.6 + 5.6p**
Sleeve: loss plus cost	11.2(1−p) + 8.0p + 0.6	**11.8 − 3.2p**
Break-even chance	2.2 ÷ 8.8	**25%**
At 30%: bonds	9.6 + 5.6×0.3	**11.28%**
At 30%: sleeve	11.8 − 3.2×0.3	**10.84%**

IN THE LESSON

- How should Reyes decide?
- He puts a chance on the inflation shock, and the board marks that chance with a small letter.
- The sleeve costs one and a half points more than bonds, and on forty per cent of the portfolio that is point six points.
- The expected loss with bonds is nine point six, plus five point six times the chance.
- With the sleeve, including its extra cost, it is eleven point eight, minus three point two times the chance.
- The two are equal when the chance is two point two over eight point eight, which is twenty five per cent.
- So if the trustees think an inflation shock is likelier than one in four, the sleeve earns its place.
- At thirty per cent, bonds lose eleven point two eight, and the sleeve ten point eight four.

7 Which alternatives really cushion shares



IN THE LESSON

- Not every alternative cushions equity risk, and this line shows why.
- On the far left are the ones that offset it.
- Tail risk funds are built to pay out in a crash, but they lose a little in most years.
- Next come macro hedge funds, which can profit either way if the manager is right, and commodities, which can rise when inflation drives the fall.
- In the middle to the right, real estate follows the economic cycle, so it gives little protection.
- On the far right is private equity, the clearest case of an asset that adds to equity risk, because it is mostly company shares with borrowed money on top, so it falls with the market and often further.
- The word alternatives tells Reyes nothing about the hedge.
- The position on this line does.

8 A story: the menu with one ingredient

- A menu can hide one shared ingredient
- Asset classes: grouped by legal form and liquidity
- Risk factors: equity, rates, inflation, credit, illiquidity
- Opportunity set: what the portfolio may hold

IN THE LESSON

- Imagine a menu that lists soup, salad, a pasta dish and a sauce.
- Four dishes, so plenty of variety, you might think.
- Then you notice that every one of them is made with the same tomato base.
- The names differ, but the ingredient is shared.
- A portfolio table can do the same.
- Fernhill's committee sees four asset classes: listed equity, private equity, high yield bonds and government bonds.
- Grouping by asset class means grouping by legal form and by how easily something is sold.
- Grouping by risk factor means listing the ingredients instead.
- Both are ways to define the opportunity set, the list of things the portfolio may hold.

9 Asset classes against risk factors

Two ways to define the opportunity set

Approach	Strength | Weakness
Asset classes	Simple | hides overlaps
Risk factors	Shows overlaps | harder to explain
Sensitivities	Estimates that drift
Buying a factor	Only through managers

IN THE LESSON

- Here is the contrast.
- The asset class approach is easy to explain, it matches how managers are hired, and committees understand it.
- But it can hide overlaps, because private equity, high yield bonds and listed equity all lean on the same growth factor, to different degrees.
- The risk factor approach shows the real diversification and guards against concentration by accident.
- Its weaknesses are practical.
- It is harder to explain to trustees.
- The sensitivities to each factor are estimates, and they drift over time.
- And you cannot buy a pure factor.
- Reyes can only reach one by hiring managers in asset classes.
- So a good answer weighs simple governance against better insight into risk.

10 Adding up a factor exposure

Factor exposure = Σ (weight × sensitivity)

Weight	Share of the portfolio
Sensitivity	Factor risk per unit held
Factor exposure	Add up across holdings

IN THE LESSON

- To see the factor view, we need one simple formula.
- Pick a factor, for example the equity market.
- For each holding, multiply its weight in the portfolio by its sensitivity to that factor.
- The sensitivity says how many units of equity market risk one unit of the holding carries.
- Listed equity has a sensitivity of one, by definition.
- Assets that use borrowed money, such as private equity, can have more than one, because the borrowing magnifies the exposure.
- Safe government bonds have a sensitivity near zero.
- Add up the products across all the holdings and you have the portfolio's total exposure to that factor.
- The sensitivities are estimates, so the total is an estimate too.

11 Example 3: Fernhill's hidden equity risk

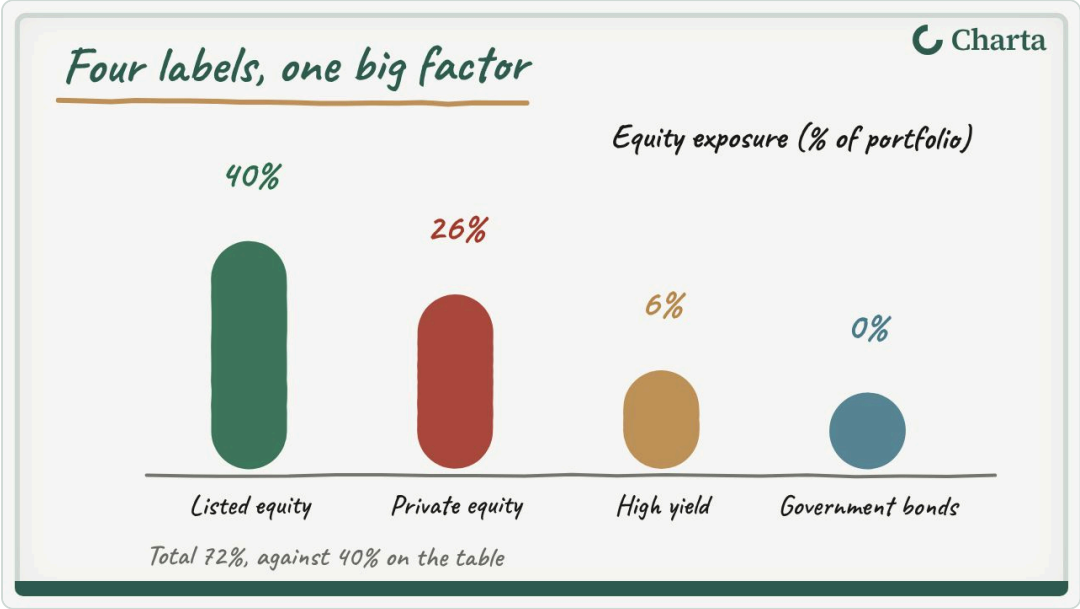
40% listed, 20% private equity, 15% high yield, 25% bonds

Listed equity	40% × 1.0	**40%**
Private equity	20% × 1.3	**26%**
High yield	15% × 0.4	**6%**
Government bonds	25% × 0	**0%**
Total equity exposure	40 + 26 + 6 + 0	**72%**

IN THE LESSON

- Now Fernhill's table.
- It shows forty per cent in listed equity, twenty per cent in private equity, fifteen per cent in high yield bonds and twenty five per cent in government bonds.
- Reyes uses these illustrative equity sensitivities: one for listed equity, one point three for private equity, point four for high yield, and zero for government bonds.
- Listed equity contributes forty times one, which is forty.
- Private equity contributes twenty times one point three, which is twenty six.
- High yield contributes fifteen times point four, which is six.
- Government bonds contribute nothing.
- The total is seventy two per cent.
- The table showed forty per cent in equities, yet the portfolio behaves as if seventy two per cent were in the equity market.

12 Four labels, one big factor



IN THE LESSON

- Here is the same result as a picture.
- The vertical axis is equity market exposure, in per cent of the portfolio.
- Listed equity is the first bar, at forty.
- Private equity comes next, at twenty six, from only twenty per cent of the money, because the companies it owns are borrowing.
- High yield adds six.
- Government bonds add nothing, so the last bar is as short as it can be.
- Stack these bars on top of one another and they reach seventy two, nearly double the forty the table shows.
- The asset class view tells you what Fernhill owns.
- The factor view tells you what will make it rise or fall.
- A good report shows both.

13 Example 4: what the hidden risk costs

Equity market falls 20%; private equity sensitivity uncertain

Loss the table suggests	40% × 20%	**8.0%**
Loss the factor view shows	72% × 20%	**14.4%**
If private equity is 1.0	66% × 20%	**13.2%**
If private equity is 1.6	78% × 20%	**15.6%**
Loss the table hides	14.4 − 8.0	**6.4 pts**

IN THE LESSON

- Exposure becomes loss.
- Suppose the equity market falls twenty per cent.
- If Reyes believed the table, the loss from equity would be forty times twenty per cent, which is eight.
- Using the factor view, it is seventy two times twenty per cent, which is fourteen point four.
- But the sensitivity of private equity is itself uncertain, because its reported returns are smoothed.
- If it were only one, total exposure would be sixty six, and the loss thirteen point two.
- If it were one point six, exposure would be seventy eight, and the loss fifteen point six.
- So the table hides a loss of about six points.
- The trap is to read the table as the risk.
- A good recommendation keeps asset classes for governance and shows factors beside them.

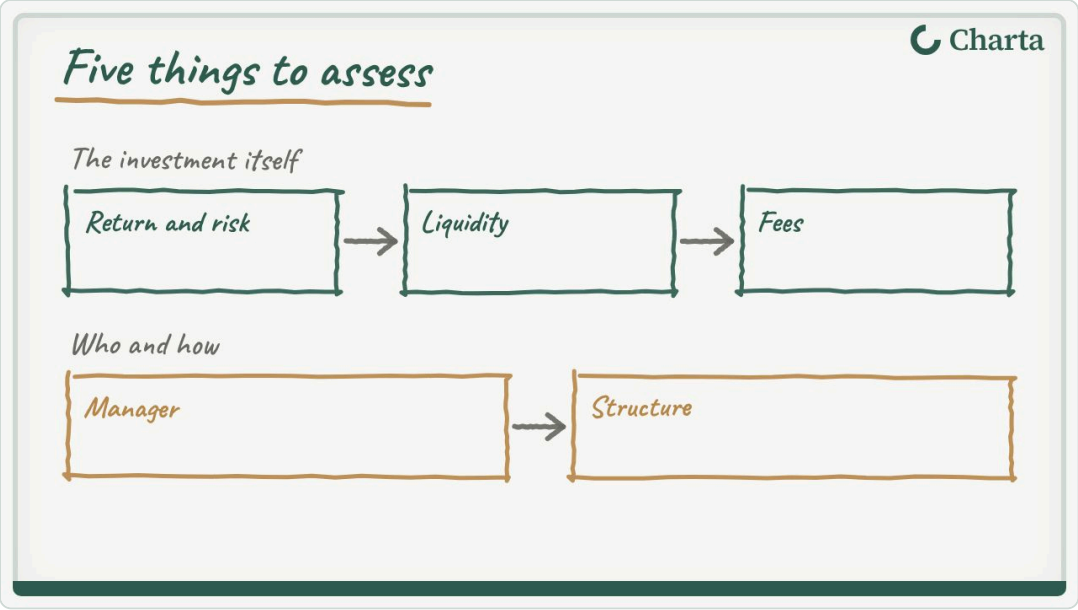
14 A story: the survey before the purchase

- A brochure return is not an inspection
- Listed funds show a price daily; alternatives do not
- Five themes recur for every type of alternative
- Same questions, different answers by type

IN THE LESSON

- Before buying a house, you hire a surveyor.
- Nobody sensible relies only on the estate agent's brochure.
- Alternative investments need the same inspection, and more of it, because a listed fund shows a price every day and an alternative does not.
- Fernhill's trustees like the sound of private equity, hedge funds and real estate.
- Reyes tells them that whatever the type, five themes come up each time.
- How risky is it once the smoothing is taken out, and how much borrowing is inside it?
- When can the money come back?
- What do the fees take?
- How good is the manager, and how wide is the gap between good and poor ones?
- And what is the legal and operational wrapper around it?

15 Five things to assess



IN THE LESSON

- Here are the five themes as boxes, in the order Reyes works through them.
- The first row is about the investment itself.
- Return and risk asks what it truly earns and how much it can lose, once smoothed returns are corrected and borrowing is counted.
- Liquidity asks when money can come back, which means lock ups, capital calls and gates.
- Fees asks how much of the gross return the manager keeps.
- The second row is about who and how.
- Manager asks how good this particular manager is, and that matters more for alternatives than for listed funds, because the gap between good and poor managers is wide.
- Structure covers the legal vehicle, tax, transparency and operational checks.

16 Undoing the smoothing

Unsmoothed return = (Reported − ρ × Previous) ÷ (1 − ρ)

Reported return	This year, as reported
Previous reported	Last year, as reported
Autocorrelation	How much returns echo the past
Unsmoothed return	Closer to the true return

IN THE LESSON

- Start with return and risk.
- Appraisal based assets, like private real estate, report returns that blend the new value with the old one.
- That makes the reported figures too calm.
- If reported returns are related to their own past, with a first order autocorrelation called rho, then the unsmoothed return takes this year's reported return, subtracts rho times last year's reported return, and divides by one minus rho.
- The higher the rho, the heavier the smoothing and the bigger the correction.
- The same correction makes the risk figure larger and often raises the link with equities.
- An allocation based on the reported numbers will therefore be too large.

17 Example 5: the real estate return

Real estate; autocorrelation ρ = 0.5

Reported, last year		**5.0%**
Reported, year before		**8.0%**
Unsmoothed, last year	(5.0 − 4.0) ÷ 0.5	**2.0%**
Overstated by	5.0 − 2.0	**3.0 pts**

IN THE LESSON

- Fernhill's real estate holding reported five per cent last year and eight per cent the year before, and Reyes estimates rho at point five.
- The unsmoothed return is five, minus point five times eight, all over one minus point five.
- Five minus four is one, divided by point five, which is two per cent.
- So the reported five hid a true return of about two.
- The reported figure was too high by three points, because the much better appraisal from the year before was still being carried into this year.
- Had the market been falling, the smoothing would have flattered the loss instead.
- Either way, the committee was not seeing the real risk, so Reyes works with the unsmoothed numbers.

18 Example 6: borrowed money

Leverage 2×: borrows 1× at 3%; assets +6% or −10%

Levered fund, good year	2×6 − 1×3	**+9%**
Levered fund, bad year	2×(−10) − 1×3	**−23%**
Range of the assets	6 − (−10)	**16 pts**
Range of the levered fund	9 − (−23)	**32 pts**

IN THE LESSON

- Leverage is the other half of return and risk.
- Suppose a hedge fund holds assets worth twice its own capital, so it borrows once its capital, and pays three per cent on the borrowing.
- If its assets return plus six per cent, the fund earns two times six, minus one times three, which is nine per cent.
- If its assets fall ten per cent, the fund loses two times ten, plus the three per cent cost of borrowing, which is twenty three per cent.
- The assets themselves had a range of sixteen points from a good year to a bad one.
- The borrowing fund has a range of thirty two.
- So Reyes asks how much of a fund's return comes from skill and how much from borrowed money.

19 When can the money come back?

Liquidity differs by type

Type	When money comes back
Private equity	Locked for years; calls
Hedge funds	Monthly or quarterly; gates
Private real estate	Months to sell
Infrastructure	Locked for years

IN THE LESSON

- Now liquidity, which differs a great deal by type.
- Private equity funds lock your money up for many years.
- They also call the committed money in stages, so Fernhill must keep cash ready to meet each call, and may be paid back only slowly.
- Hedge funds usually deal monthly or quarterly, but they can impose gates, which limit withdrawals when many investors want out at once.
- Private real estate takes months to sell and is valued by appraisal.
- Infrastructure funds are locked up for long periods too.
- Listed assets, meanwhile, can be sold in a day.
- A foundation must therefore ask whether it can meet its spending, and any capital calls, without being forced to sell at a bad time.

20 Example 7: what the fees take

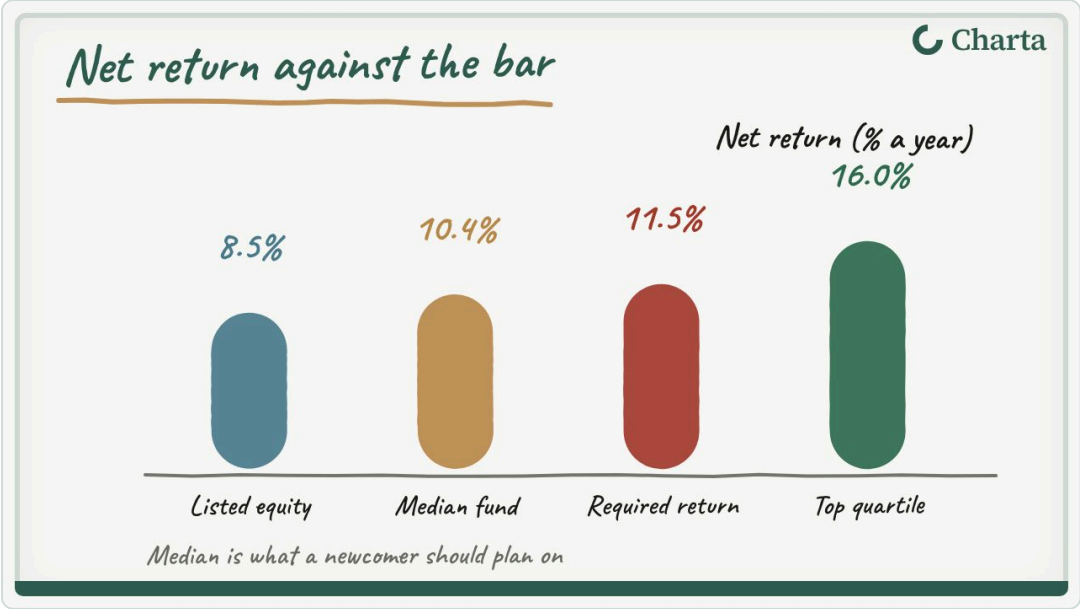
Fee 2%, carry 20%, no hurdle; median 15%, top quartile 22%

Median, net of fee and carry	13 × 0.8, after 15 − 2	**10.4%**
Fees as share of gross	4.6 ÷ 15	**31%**
Required return	8.5 + 3.0	**11.5%**
Top quartile, net	(22 − 2) × 0.8	**16.0%**
Does the median clear the bar?	10.4 < 11.5	**No**

IN THE LESSON

- Now fees.
- Fernhill is considering a private equity fund with a two per cent management fee and twenty per cent carried interest, which is the manager's share of the profit.
- To keep it simple we ignore any hurdle.
- A median fund earns fifteen per cent gross.
- After the fee that is thirteen, and the carry takes a fifth of it, so thirteen times point eight leaves ten point four per cent, net to Fernhill.
- The fees took four point six points out of fifteen, about thirty one per cent of the gross return, far more than a listed fund charges.
- Reyes requires listed equity's eight and a half per cent plus three points for illiquidity, which is eleven and a half.
- The median fund falls short.
- A top quartile fund, at twenty two gross, nets sixteen, and clears it.

21 Net return against the bar



IN THE LESSON

- Here are the key numbers as bars.
- The vertical axis is the net return in per cent a year.
- The first bar is listed equity at eight and a half, the simple alternative.
- The second bar is the median private equity fund, at ten point four, a little above listed equity but below the required return.
- The third bar is that required return, eleven and a half, which is listed equity plus a premium for locking the money up.
- The fourth is the top quartile fund at sixteen.
- The trap lives in the gap between the second and fourth bars.
- Marketing material quotes the best managers, and the best funds are often closed to newcomers like Fernhill.
- If the median does not justify the lock up, the case has not been made.

22 Mistakes to avoid so far

- Assuming every alternative cushions shares
- Judging bonds in only one kind of sell-off
- Reading the asset-class table as the risk
- Trusting smoothed returns and ignoring leverage
- Judging a fund by its top-quartile managers

IN THE LESSON

- Let us collect the common mistakes from the first three topics.
- One: assuming every alternative cushions shares, when private equity mostly adds to equity risk.
- Two: judging bonds by their record in only one kind of sell off, when inflation can make bonds fall along with shares.
- Three: reading the asset class table as the risk, and missing that several classes share one factor.
- Four: trusting smoothed returns and ignoring the borrowing inside a fund.
- Five: judging a fund by its top quartile managers, when the investor can usually reach only the average ones.
- Keep these five in mind as we turn from the investment to the investor.

23 A story: the recipe and the kitchen

- Copying the menu is easy; copying the kitchen is not
- Suitability depends on the investor, not the asset
- Fernhill: 500m, perpetual, a staffed investment office
- Ostrander Family Trust: 5m, no staff, wants the same 20%

IN THE LESSON

- A recipe from a huge restaurant kitchen may not work in your kitchen at home.
- The big university endowments are famous for holding lots of private funds and hedge funds, and some trustees want to copy them.
- Copying the menu is easy.
- Copying the kitchen is not.
- Those endowments last for ever, have large teams, hold money across many funds, and can wait a decade for results.
- So Reyes does not ask whether private equity is good.
- He asks whether it suits this investor, and that depends on the investor, not the asset.
- He tests two: Fernhill itself, and a small family trust that has asked to copy it.

24 Four tests of suitability

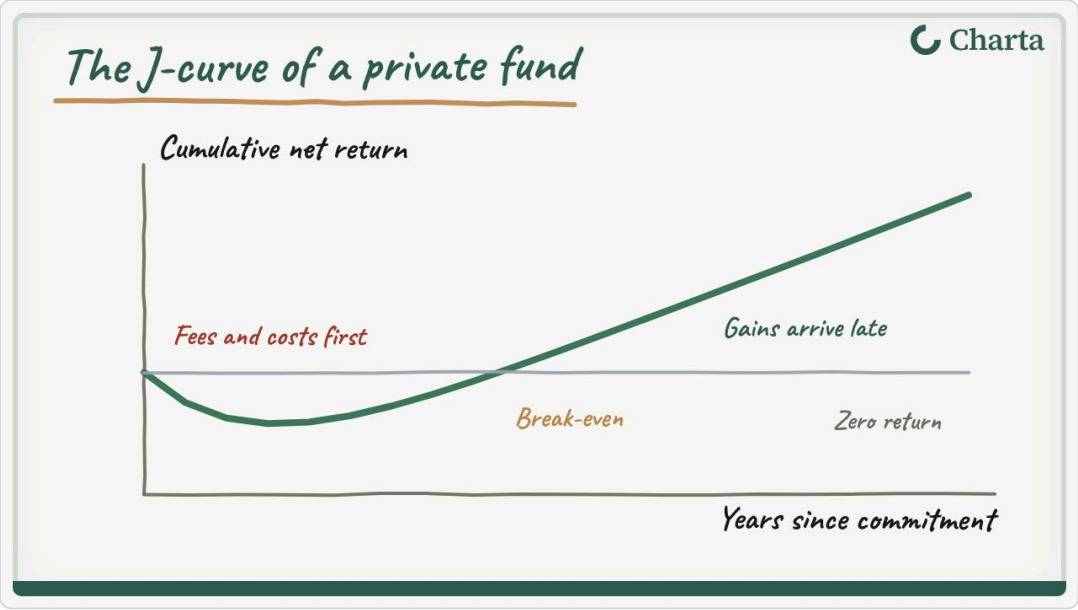
Each test is a question about the investor

Test	The question
Horizon	Can it outwait lock-ups?
Scale	Can it spread over funds?
Expertise	Can it pick and watch managers?
Liquidity and eligibility	Can it live with locked money?

IN THE LESSON

- Here are four tests of suitability.
- Each is a question about the investor, not the investment.
- Horizon: private funds take years to call money and more years to return it, and their early results are usually negative.
- Can the investor wait?
- Scale: spreading across managers and start years needs enough money to meet every fund's minimum.
- Expertise: manager choice drives results, so the investor needs people who can select and monitor managers, or must pay a consultant or a fund of funds.
- Liquidity and eligibility: can the investor live with locked money and limited reporting, and do the rules allow the investment at all?
- Failing even one test can rule alternatives out, however attractive the expected return.

25 The J-curve of a private fund



IN THE LESSON

- Horizon deserves a picture, the J curve.
- The horizontal axis is time, in years since the first commitment.
- The vertical axis is the investor's cumulative net return.
- The flat grey line is zero, which means getting back exactly what you put in.
- Follow the curve from the left.
- It starts by falling below zero.
- Fees are charged from the start, and the first investments have not had time to grow.
- That dip is the bottom of the letter J.
- Then the companies mature and are sold, the curve rises, crosses zero and ends well above it.
- The lesson is that the investor needs a horizon long enough to reach the right hand side, and must never be forced to sell during the dip.

26 Example 8: can each investor spread out?

20 commitments (4 managers × 5 years); minimum 250,000

Fernhill, per commitment	500m × 20% ÷ 20	**5m**
Family target	5m × 20%	**1,000,000**
Full programme at minimums	20 × 250,000	**5m**
Family can afford	1,000,000 ÷ 250,000	**4 funds**
Programme against family wealth	5m ÷ 5m	**100%**

IN THE LESSON

- Now scale.
- Fernhill wants twenty per cent in private equity, spread over twenty commitments: four managers in each of five start years.
- Fund minimums are two hundred and fifty thousand.
- Fernhill has five hundred million, so twenty per cent, split over twenty commitments, is five million each.
- That is far above the minimum, and diversifying is easy.
- The Ostrander Family Trust has five million.
- Twenty per cent of that is one million.
- A full programme at the minimums would need twenty times two hundred and fifty thousand, which is five million, all of the family's wealth.
- With one million, the family can afford four funds, in one start year, a concentrated bet on a few managers.
- The same target suits one investor and not the other.

27 Example 9: the fund of funds route

Fund of funds adds a layer costing 1% a year

Extra fee layer	1,000,000 × 1%	**10,000 a year**
Median net, direct	from Example 7	**10.4%**
After the extra layer	10.4 − 1.0	**9.4%**
Required return	8.5 + 3.0	**11.5%**
Shortfall	11.5 − 9.4	**2.1 pts**

IN THE LESSON

- Could the family reach the same assets another way?
- It could invest through a fund of funds, which pools many investors and spreads the money across managers.
- Its minimums are low, but it adds a second layer of fees.
- Suppose that layer costs one per cent a year.
- On the family's one million target, that is ten thousand a year.
- To keep the arithmetic simple, we take that one point off the median net return of ten point four that we found earlier, which leaves nine point four.
- The family needs eleven and a half.
- That is a shortfall of two point one points.
- So for the family, even the fund of funds route fails the test.
- The honest recommendation may be a much smaller stake, or none at all.

28 Example 10: scoring both investors

Four tests, two investors

Horizon	Fernhill yes · Trust yes	**Both pass**
Scale	Fernhill yes · Trust no	**Trust fails**
Expertise	Fernhill yes · Trust no	**Trust fails**
Liquidity and eligibility	Fernhill yes · Trust yes	**Both pass**
Tests passed	Fernhill 4 · Trust 2	**Verdicts differ**

IN THE LESSON

- Let us score both investors on the four tests.
- On horizon, both pass, because both have long horizons.
- On scale, Fernhill passes, since it has five hundred million, and the trust fails, as we just saw.
- On expertise, Fernhill has an investment office and a committee that can select and monitor managers, and the trust has no one.
- On liquidity and eligibility, both pass, because both can cover their spending from liquid holdings.
- So Fernhill passes four tests and the trust passes two.
- The verdict differs, even though the target and the asset are the same.
- A good recommendation links each feature of the asset to a constraint of the client, and does not simply copy another investor's allocation.

29 Reyes writes his recommendation

Proposal, with reasons stated

Question	Reyes proposes
Cushion for shares	Split bonds and sleeve
Reporting	Factor view beside classes
Private equity	Only with above-median access
Family trust	Small pooled stake or none

IN THE LESSON

- Now Reyes writes his recommendation, the way a good exam answer should.
- For the cushion, he proposes splitting it between bonds and an inflation sensitive sleeve, because the trustees fear an inflation shock, and he states that the sleeve costs more and sells more slowly.
- For reporting, he keeps asset classes for governance and shows factor exposures beside them, so the overlaps are seen.
- For private equity, he allows the programme only if Fernhill can reach above median managers, because the median does not beat the bar.
- For the family trust, he advises a small pooled holding or none, not a copy of the foundation.
- The trap is to copy an endowment style allocation without the resources behind it.

30 Recap: the lesson in five lines

- Bonds win a growth scare; some alternatives win inflation
- Asset classes show ownership; factors show what moves it
- Assess risk, leverage, liquidity, fees, manager, structure
- Plan on median managers and net returns
- Suit the investor: horizon, scale, expertise, liquidity

IN THE LESSON

- Let us pull the lesson together.
- First, bonds usually win a growth scare, while some alternatives may win an inflation shock, but they cost more and sell more slowly, and private equity adds equity risk instead of cutting it.
- Second, asset classes tell you what you own, while risk factors tell you what moves it, so show both.
- Third, before investing, assess risk after unsmoothing, leverage, liquidity, fees, the manager and the structure.
- Fourth, count net returns for the median manager, not the top quartile.
- Fifth, suitability rests on horizon, scale, expertise and liquidity fit, and the same allocation can suit one investor and not another.

31 Try three quick questions

1. Shares 70% fall 15%; cushion 30% gains 4%. Portfolio return?
   Answer: 0.7×(−15) + 0.3×4 = −10.5 + 1.2 = −9.3%.
2. Gross 12%, fee 2%, carry 20%. Net? Need 9%.
   Answer: (12 − 2) × 0.8 = 8.0%. It falls short of 9%.
3. 20m, 10% target, minimum 400,000. Funds?
   Answer: 2m ÷ 400,000 = 5 funds, too few to diversify.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A model portfolio holds seventy per cent shares and thirty per cent cushion.
- Shares fall fifteen per cent and the cushion gains four per cent.
- What is the portfolio return?
- Seventy per cent times minus fifteen is minus ten point five, and thirty per cent times four is plus one point two, so the portfolio loses nine point three per cent.
- Question two.
- A fund earns twelve per cent gross, with a two per cent fee and twenty per cent carry.
- What does the investor net?
- Twelve minus two is ten, times point eight is eight per cent, below a nine per cent need.
- Question three.
- An investor with twenty million wants ten per cent in private funds, with a minimum of four hundred thousand.
- How many funds can it buy?
- Ten per cent is two million, and two million over four hundred thousand is five funds, too few for a diversified programme.
- Remember these steps when you practise.