Four ways to be an active equity manager

Portfolio Management

1 A story: the tide and the boats

- Corbel Macro: first of four candidates
- Start with the tide, not each boat
- Views: growth, inflation, rates, currencies, policy
- Exposures: country, currency, sector, style, theme
- Big forces explain much of stock returns

IN THE LESSON

- Picture a harbour.
- When the tide comes in, every boat rises, big or small.
- A sailor who can forecast the tide does not need to judge each boat.
- That is the idea behind a top-down manager.
- Corbel Macro, the first of Imogen Reyes's four candidates, starts with the economy: growth, inflation, interest rates, currencies and government policy.
- It turns each view into exposures to countries, currencies, sectors and styles, such as value against growth, or large companies against small.
- Sometimes it follows a theme, like an ageing population.
- The reasoning is that broad forces explain much of why stocks move, so getting the big exposure right can matter more than choosing each stock.

2 From a view to a position

The top-down chain

Macro view → Exposures → Relative value

Then

Position size → Risk check

IN THE LESSON

- Here is the chain, read along the top row and then the bottom row.
- First comes the macro view, a forecast of growth, inflation or rates.
- Second, the exposures that view favours.
- Faster growth, for example, might favour cyclical sectors and smaller companies.
- Third, relative value: how attractive is each exposure once we allow for what the market already expects?
- A forecast everyone shares is already in the price.
- On the bottom row comes position size, how big to make each bet.
- Last is a risk check, to see whether several bets are really the same bet.
- That final step is where top-down managers most often come unstuck, as we will see.

3 Views and the exposures they favour

Each view becomes a tilt away from the benchmark

View	Exposure it favours
Growth speeds up	Cyclical sectors, small companies
Interest rates fall	Long-duration growth stocks
Inflation stays high	Energy and value, not growth
Ageing population (theme)	Healthcare, held for years

IN THE LESSON

- Let us make the chain concrete with four of Corbel's views.
- If growth speeds up, it favours cyclical sectors and smaller companies.
- If interest rates fall, long duration growth stocks look better, because their cash flows lie far in the future.
- If inflation stays high, it leans towards energy and value stocks and away from long duration growth.
- And a theme, such as an ageing population, points to healthcare for many years.
- Notice that each exposure is a bet on a forecast.
- The skill lies in the forecast and in knowing what is already priced, not in the arithmetic that follows.

4 Breadth and skill

IR = IC × √BR

Information ratio	Return per unit of active risk
Skill per call	Forecast against outcome
Independent calls a year	Independent calls, not positions

IN THE LESSON

- You met this rule in Level Two: the fundamental law of active management.
- The information ratio, which is active return for each unit of active risk, equals the information coefficient times the square root of breadth.
- The information coefficient is the skill in each call, the correlation between what the manager forecast and what happened.
- Breadth is the number of independent decisions in a year.
- The word independent matters.
- Two bets that rest on the same view count once, not twice.
- Skill matters, but so does the number of separate chances to use it.
- A top-down manager makes few big calls, so it needs a great deal of skill in each one to keep up.

5 Example 1: sizing one macro call

Corbel: +5 points industrials, −5 points utilities; the gap is 8 points

Active weight each side	industrials up, utilities down	**5 points**
If the call is right	0.05 × 8%	**+0.40%**
If the call is wrong	0.05 × (−8%)	**−0.40%**
Swing, best to worst	0.40 − (−0.40)	**0.80%**

IN THE LESSON

- Let us size one of Corbel's calls.
- It expects growth to speed up, so it holds five percentage points more industrials than the benchmark, paid for by five points fewer utilities.
- Suppose industrials end up beating utilities by eight points.
- The active return is five per cent times eight per cent, which is plus point four zero per cent for the whole portfolio.
- If the call is wrong, and utilities win by eight points, the loss is the same size, minus point four zero per cent.
- So one call swings the portfolio by point eight zero per cent from best to worst.
- That is modest on its own.
- The danger comes when several positions rest on the same view, because they then win together and lose together.

6 Example 2: how many calls?

Corbel: skill 0.10, 4 calls. Stock picker: skill 0.05, 100 calls

Corbel's information ratio	0.10 × √4	**0.20**
Stock picker's ratio	0.05 × √100	**0.50**
Skill Corbel needs with 4 calls	0.50 ÷ √4	**0.25**
Against the 0.10 it claims	0.25 ÷ 0.10	**2.5 times**

IN THE LESSON

- Now compare Corbel with a stock picking firm, using the fundamental law.
- Corbel claims an information coefficient of point one zero and four independent macro calls a year.
- Its information ratio is point one zero times the square root of four, which is point two zero.
- The stock picker has less skill in each call, point zero five, but makes one hundred independent calls.
- Its ratio is point zero five times the square root of one hundred, which is point five zero.
- To match that with only four calls, Corbel would need skill of point five zero divided by the square root of four, which is point two five.
- That is two and a half times the skill it claims.
- Breadth is a powerful substitute for brilliance.

7 Breadth in one picture

Information ratio

Corbel as claimed	**0.20**
Corbel, one theme	**0.10**
Stock picker	**0.50**

Six positions, one theme: breadth is 1, not 6

IN THE LESSON

- Here are three information ratios side by side, with the information ratio on the vertical axis.
- The first bar is Corbel as it describes itself, with four independent calls: point two zero.
- The third bar is the stock picker with one hundred calls: point five zero.
- The middle bar is the one Imogen Reyes cares about.
- She asked Corbel's head how independent the calls really are, and learned that six large positions all rest on one theme, rising interest rates.
- With breadth of one, the ratio falls to point one zero.
- Her recommendation is to treat Corbel as a small, deliberate satellite, sized so that one wrong rate call cannot dominate Hartwell's results.
- The trap is mistaking many positions for many bets.

8 A story: the recipe

- Tarn Factor Partners: second of four
- Factors: traits of stocks that were rewarded
- Value, size, momentum, quality, low volatility
- Hold chosen exposures and vary them over time
- Question: a cheap recipe, or real skill?

IN THE LESSON

- Think of a favourite recipe.
- The cook did not invent flour or sugar; the cook chose how much of each to use.
- Factor investing works the same way.
- Over long periods, some shared traits of stocks have been rewarded.
- Value means cheap relative to fundamentals.
- Size means smaller companies.
- Momentum means recent winners.
- Quality means profitable, steady firms.
- Low volatility means calmer stocks.
- Tarn Factor Partners, the second candidate, holds deliberate exposures to these and changes the mix over time.
- The process is systematic, so it is repeatable and cheaper than stock by stock research.
- The question for Hartwell is how much of what Tarn earns is a cheap recipe anyone can buy, and how much is real skill.

9 Building a factor strategy

The factor process

Define → Test → Combine

Ways to combine

Fixed weights → Risk parity → Timing

IN THE LESSON

- There are three steps, and the top row shows them.
- First, define the factor.
- A manager ranks stocks on a trait, then forms a hedged portfolio that is long the top ranked and short the bottom ranked.
- Second, test it: did the factor really earn a premium over a long history, and in many different markets?
- Third, combine factors.
- The bottom row shows three ways.
- Fixed weights simply choose the mix and keep it.
- Risk parity sets the weights so each factor contributes equal risk.
- Timing changes the weights over time, using valuation or regime signals.
- Each step has a way to go wrong, and the later examples show where.

10 Example 3: defining a factor

100 stocks ranked on cheapness; long the cheapest fifth, short the dearest

Cheapest fifth (20 stocks)	long position	**11%**
Dearest fifth (20 stocks)	short position	**5%**
Value factor return	11% − 5%	**6%**
Test: years the factor paid	7 of 10 years	**70%**

IN THE LESSON

- Let us define a value factor.
- Rank one hundred stocks from cheapest to dearest.
- The cheapest fifth, twenty stocks, returned eleven per cent.
- The dearest fifth returned five per cent.
- The factor portfolio buys the first group and sells the second short, so its return is eleven minus five, which is six per cent.
- Because it is long and short, the ups and downs of the whole market largely cancel, leaving only the difference between cheap and dear.
- Then comes the test.
- Tarn checks how often the factor paid.
- In seven years out of ten it did, which is seventy per cent.
- That is encouraging, but a premium that vanishes in the other three years can still hurt, and that is a risk we meet shortly.

11 Weights from risk

$w_i = (1 \div \sigma_i) \div \Sigma(1 \div \sigma_j)$

Weight of factor i	Share of capital
Volatility of a factor	Wilder means a smaller weight
Sum over all factors	Makes weights add to 100%

IN THE LESSON

- Now the combining step.
- Suppose Tarn holds three factors with different volatilities.
- Equal weights are not equal risk, because the wild factor dominates.
- One fix is inverse volatility weighting.
- Each factor's weight is its one over volatility, divided by the sum of one over volatility across all the factors.
- Calmer factors get bigger weights and wilder ones get smaller weights.
- If the factors are uncorrelated, each then contributes the same risk, which is the aim of risk parity.
- If they are correlated, which is common, a full risk parity method must use the correlations as well, so inverse volatility is only an approximation.
- Keep that distinction in mind for the exam.

12 Example 4: Tarn's three factors

Volatilities: value 8%, momentum 12%, quality 6%

Sum of 1 ÷ volatility	0.125 + 0.083 + 0.167	**0.375**
Inverse-volatility weights	33.3% / 22.2% / 44.4%	**sum 100%**
Risk each: weight × volatility	2.67 / 2.67 / 2.67	**equal**
Equal weights: risk each	2.67 / 4.00 / 2.00	**momentum 46%**

IN THE LESSON

- Tarn's factors have volatilities of eight per cent for value, twelve for momentum and six for quality.
- One over each is point one two five, point zero eight three and point one six seven, and these add to point three seven five.
- Dividing each by the total gives weights of thirty three point three per cent, twenty two point two and forty four point four.
- Multiply each weight by its volatility and every factor contributes two point six seven, the same.
- Now see what equal weights would do.
- The contributions would be two point six seven, four point zero zero and two point zero zero, so momentum alone would account for forty six per cent of the total of those risk figures.
- Equal capital is not equal risk.

13 Is the manager adding anything?

Return beyond factors = Excess − Σ (β × factor return)
Net value = Return beyond factors − extra fee

Excess return	Versus the cap-weighted index
Exposure to a factor	From a regression
Return of that factor	What that factor earned
Return beyond factors	The manager's own addition
Extra fee over smart beta	Active fee minus smart-beta fee

IN THE LESSON

- Here is the question Imogen Reyes must answer.
- A manager that beat the cap weighted index may simply have held rewarded factors, and those are cheap to buy in a smart beta fund.
- So we judge the manager against a benchmark that already holds the factors.
- Regress the manager's returns on the factor returns.
- For each factor, the exposure times that factor's return is what static exposure explains.
- Subtract all of it from the excess return, and what is left is the return beyond the factors.
- Then compare that with the extra fee the manager charges over a smart beta alternative.
- If the leftover does not cover the extra fee, the client pays active prices for passive results.

14 Example 5: Tarn's fee test

Excess 3.2% a year before fees; fees: Tarn 0.85%, smart beta 0.20%

Value contribution	0.6 × 2.5%	**1.5%**
Momentum contribution	0.4 × 3.0%	**1.2%**
Return beyond the factors	3.2 − 1.5 − 1.2	**0.5%**
Extra fee over smart beta	0.85 − 0.20	**0.65%**
Net value of Tarn	0.5 − 0.65	**−0.15%**

IN THE LESSON

- Before fees, Tarn beat the cap weighted index by three point two per cent a year.
- A regression shows an exposure of point six to value, whose factor earned two point five per cent, and point four to momentum, whose factor earned three point zero.
- Value explains point six times two point five, which is one point five per cent.
- Momentum explains point four times three point zero, which is one point two.
- That leaves three point two minus one point five minus one point two, which is point five per cent beyond the factors.
- Tarn charges point eight five per cent, and a smart beta fund with the same exposures charges point two zero, so the extra fee is point six five.
- Net, Tarn is behind by point one five per cent a year.

15 The risks in factor investing

Four things that can go wrong

Risk	What it means
Crowding	Many hold it; exits hurt
Sharp reversals	A factor can lose for years
Hidden exposures	Correlated factors overlap
Data mining	A backtest can be luck

IN THE LESSON

- Before Hartwell decides, here are the risks.
- Crowding: when many investors hold the same factor trade, prices are pushed up, and a rush to exit hurts everyone.
- Sharp reversals: a factor can lose money for years, and a premium found in history is no promise.
- Hidden exposures: factors are often correlated, so a portfolio built to hold one may carry another by accident.
- Data mining: if enough factors are tested, some will look good by luck.
- Beside these risks sits the trap of this outcome, paying active fees for premia a low cost product delivers.
- Imogen Reyes's advice is to hold the factors cheaply, and to keep Tarn only for the part that survives the fee test.

16 A story: the neighbour who stays

- Wexcombe Activist Fund: third of four
- Buy a big minority stake, then press for change
- Cause: poor strategy, governance or capital use
- Return: closing the gap between price and value

IN THE LESSON

- Most people who dislike how a neighbouring house is kept simply move away.
- An activist does the opposite.
- It buys the run down house next door, and then pushes for it to be fixed.
- Wexcombe Activist Fund, the third candidate, buys a meaningful minority stake in a company it thinks is worth more than its price, because of poor strategy, weak governance or inefficient use of capital.
- Then it presses for change to release that value.
- It does not need control, only enough shares and enough persuasion.
- The return comes from closing the gap between price and value.
- That takes time and money, and the campaign can fail, so the sums matter a great deal.

17 How a campaign escalates

Climbing the ladder

Private letters → Public campaign → Shareholder resolution

Last resorts

Proxy contest → Litigation

IN THE LESSON

- Campaigns usually climb a ladder.
- On the top row, the first rung is private: letters and meetings with management and the board.
- If that fails, the activist goes public, setting out its case in an open letter or presentation to other shareholders.
- The third rung is a shareholder resolution, a formal vote on a proposal.
- On the bottom row comes the proxy contest, where the activist nominates its own candidates for board seats and asks other shareholders for their votes.
- Last, and rarest, is litigation.
- Each rung costs more and risks more, and each also raises the pressure on the board.
- Most activists would rather settle early than fight to the end.

18 What a target looks like

Features that attract an activist, and what it asks for

Feature	What it looks like
Cheap and lagging	Below peers; years behind
Dispersed owners	No big holder to resist
Idle cash or weak unit	Capital allocated poorly
Typical demands	Sell, buy back, cut costs

IN THE LESSON

- Activists do not pick companies at random.
- A typical target is cheap and lagging.
- It trades at a low valuation, below peers or below the value of its parts, and it has lagged in performance for years.
- Its shareholders are dispersed, so no large holder is ready to resist change.
- And it often has idle cash or a weak business unit, which is capital allocated poorly.
- The typical demands follow: sell a unit, return cash through buybacks or dividends, cut costs, or change the management.
- Notice that every demand aims at the gap between price and value.
- Notice, too, that none of it is quick, which is why the horizon matters, and why the stake is concentrated and hard to sell in a hurry.

19 Is the campaign worth it?

Expected = p × gain − (1 − p) × loss − costs
Break-even p = (loss + costs) ÷ (gain + loss)

Chance of success	Honest estimate
Gain if it works	Shares × rise in price
Loss if it fails	Shares × fall in price
Campaign costs	Paid win or lose

IN THE LESSON

- Here is the decision rule, as Imogen Reyes would apply it.
- The expected result is the chance of success times the gain, minus the chance of failure times the loss, minus the campaign costs.
- The costs are paid whichever way it ends.
- We can also turn the rule around and ask what chance of success breaks even.
- Set the expected result to zero and the break even chance is the loss plus the costs, divided by the gain plus the loss.
- If the activist's honest estimate of success is below that figure, the campaign should not be fought.
- If it is above, there is a case, though the answer is only as good as the estimates behind it.

20 Example 6: Wexcombe's plan

Buy 6m shares at $50; campaign costs $9m

Stake	6m × $50	**$300m**
Gain if it works: shares to $64	6m × $14	**$84m**
Loss if it fails: shares to $46	6m × (−$4)	**−$24m**
Expected, 45% chance of success	0.45 × 84 − 0.55 × 24	**$24.6m**
After campaign costs of $9m	24.6 − 9; 5.2% of stake	**$15.6m**

IN THE LESSON

- Wexcombe plans to buy six million shares at fifty dollars, a stake of three hundred million dollars.
- If the campaign works, the shares reach sixty four, a gain of six million times fourteen, which is eighty four million.
- If it fails, they fall to forty six, a loss of six million times four, which is twenty four million.
- It puts the chance of success at forty five per cent.
- The expected result is point four five times eighty four, minus point five five times twenty four, which is twenty four point six million.
- A campaign through to a proxy contest costs nine million, leaving fifteen point six million, or five point two per cent of the stake.
- On these numbers, it looks worthwhile.

21 Example 7: the disclosure trap

Reporting threshold crossed at 3m shares; price jumps to $54 for the rest

Average cost per share	(3m × $50 + 3m × $54) ÷ 6m	**$52**
Gain if it works	6m × ($64 − $52)	**$72m**
Loss if it fails	6m × ($46 − $52)	**−$36m**
Expected result before costs	0.45 × 72 − 0.55 × 36	**$12.6m**
After $9m of costs	12.6 − 9; 1.2% of stake	**$3.6m**

IN THE LESSON

- Now the trap the exam sets.
- In many markets, crossing a reporting threshold reveals the stake to everyone.
- Suppose Wexcombe has bought three million shares at fifty when it crosses that line.
- The news gets out, and the price jumps to fifty four for the last three million.
- Its average cost rises to fifty two.
- The gain if it works falls to six million times twelve, which is seventy two million.
- The loss if it fails grows to six million times six, which is thirty six million.
- The expected result before costs shrinks to twelve point six million, and after nine million of costs it is only three point six million, one point two per cent of the stake.
- The same campaign has become much thinner.

22 The chance of success decides it

Chart: Expected result after costs, $m vs Chance the campaign succeeds

- Green, plan: break-even 31%
- Plan: 15.6m at 45%
- Red, after disclosure: break-even 42%
- Disclosed: 3.6m at 45%
- Wexcombe's estimate, 45%
- 0%
- 100%

IN THE LESSON

- Now a picture of the same decision.
- The horizontal axis is the chance the campaign succeeds, from nought to one hundred per cent.
- The vertical axis is the expected result after costs, in millions of dollars.
- The grey line is zero.
- The green line is Wexcombe's plan, and it rises steeply, crossing zero at thirty one per cent, the break even chance.
- At Wexcombe's forty five per cent it earns fifteen point six million.
- The red line is the plan after disclosure.
- It starts lower and crosses zero at forty two per cent, so at forty five it earns only three point six million.
- A small error in the odds, or one leaked headline, can turn a good campaign into a bad one.
- Hartwell must also accept a concentrated stake that is hard to sell.

23 Mistakes to avoid so far

- Counting positions, not independent bets
- Paying active fees for cheap factor premia
- Calling inverse volatility full risk parity
- Counting the activist's gain, not costs and odds
- Forgetting that the stake is disclosed

IN THE LESSON

- Let us pause on the slips that cost candidates marks and clients money.
- First, counting positions instead of bets.
- Six holdings that rest on one theme are one bet, and the information ratio shows it.
- Second, forgetting that factor returns are cheap.
- If a regression explains the excess return, the manager has not earned active fees for it.
- Third, treating inverse volatility as full risk parity, when it works only if the factors are uncorrelated.
- Fourth, counting the activist's gain without the costs and the odds.
- Fifth, ignoring disclosure, because the stake shows before it is complete and the price moves against the buyer.
- Keep these five in mind as we meet the last candidate.

24 A story: two dogs on one lead

- Lumen Quant: fourth of four
- Related prices drift apart, then come back
- Pairs: buy the cheap one, short the rich one
- Microstructure: tiny short-term patterns in trading

IN THE LESSON

- Imagine someone walking two dogs joined by a short lead.
- Each dog wanders, but they never get far apart, because the lead pulls them back.
- Statistical arbitrage is built on that picture.
- Lumen Quant, the fourth candidate, uses quantitative models to find related securities whose prices have drifted apart by more than usual, buys the cheap one, sells the rich one short, and closes when the gap returns to normal.
- The standard case is pairs trading.
- A second family, market microstructure, looks at how orders, venues and liquidity shape very short term prices, and exploits tiny patterns in order flow.
- Both depend on many small bets and low costs.

25 The spread and its mean

Chart: Price ratio, Anvil ÷ Brook vs Time

- Mean 1.80
- Open at 1.92: 2 sd
- Reverts: close at 1.80
- Breaks: 2.10

IN THE LESSON

- Here is a pair, drawn.
- Time runs along the bottom.
- The vertical axis is the price ratio of Anvil Bank to Brook Bank.
- The grey line is the long run mean, one point eight zero.
- The green line wanders around it, and most of that wandering is noise.
- At the orange line, one point nine two, the ratio is two standard deviations above its mean, so Lumen sells Anvil short and buys Brook.
- If the relationship holds, the ratio follows the green line back to the mean, and the trade closes at a profit.
- The red line shows the danger: if something has really changed, such as a merger or a lost contract, the ratio keeps climbing to two point one zero.
- That break in the relationship is the risk.

26 How stretched is the spread?

Stretch = (today's ratio − mean ratio) ÷ standard deviation

Stretch of the spread	Open at 2 or more
Today's price ratio	Price of A ÷ price of B
Long-run mean ratio	Estimated from history
Standard deviation of ratio	Normal wandering of the ratio

IN THE LESSON

- To turn the picture into a rule, measure the stretch.
- Take the price ratio today, subtract its long run mean, and divide by the standard deviation of the ratio.
- The answer says how many standard deviations the pair has moved from normal.
- Lumen's rule is to open a trade when the stretch is at least two, and to close it when the ratio returns to the mean.
- The mean and the standard deviation are estimated from history, so everything rests on the assumption that the old relationship still holds.
- This is mean reversion, the core assumption of the whole approach.
- When the assumption fails, the formula keeps flashing a signal while the losses build up.

27 Example 8: one pairs trade

Anvil $48, Brook $25; mean 1.80, standard deviation 0.06; costs 0.10%

How stretched	(1.92 − 1.80) ÷ 0.06	**2.0**
The trade	short 10,000 A, long 19,200 B	**$480k a side**
Reverts: A 46.80, B 26.00	12,000 + 19,200	**+$31,200**
Net of 0.10% costs	31,200 − 1,927	**+$29,273**
Breaks: A 50.40, B 24.00	−24,000 − 19,200	**−$43,200**

IN THE LESSON

- Anvil trades at forty eight dollars and Brook at twenty five, a ratio of one point nine two.
- With a mean of one point eight zero and a standard deviation of point zero six, the stretch is point one two divided by point zero six, which is two.
- Lumen sells short ten thousand Anvil shares and buys nineteen thousand two hundred Brook shares, four hundred and eighty thousand dollars on each side.
- If the ratio reverts, with Anvil at forty six eighty and Brook at twenty six, the short gains twelve thousand and the long gains nineteen thousand two hundred, thirty one thousand two hundred in all.
- Costs of point one per cent of the value traded take one thousand nine hundred and twenty seven, so the net gain is twenty nine thousand two hundred and seventy three.
- If the relationship breaks, with Anvil at fifty point four zero and Brook at twenty four, the loss is forty three thousand two hundred.
- One bad pair can undo many good ones.

28 Example 9: odds and many pairs

Reverts with chance 85%; breaks otherwise

Break-even chance it reverts	43,200 ÷ (29,273 + 43,200)	**59.6%**
Expected result per pair	0.85 × 29,273 − 0.15 × 43,200	**$18,402**
Spread of one pair's result	standard deviation	**$25,878**
Reward per unit of spread	18,402 ÷ 25,878	**0.71**
25 independent pairs	0.71 × √25	**3.56**

IN THE LESSON

- One pair is a gamble.
- What chance of reverting makes it worthwhile?
- Divide the loss, forty three thousand two hundred, by the net gain plus the loss, which gives a break even chance of fifty nine point six per cent.
- Suppose Lumen's models say that eighty five per cent of such pairs revert.
- The expected result is point eight five times twenty nine thousand two hundred and seventy three, minus point one five times forty three thousand two hundred, which is eighteen thousand four hundred and two dollars.
- The spread of one pair's result is large, twenty five thousand eight hundred and seventy eight, so the reward for each unit of spread is point seven one.
- With twenty five independent pairs, it rises by the square root of twenty five, which is five times, to three point five six.
- Many small independent bets are the point.

29 Example 10: the thin edge of microstructure

Trade $1m; gross edge 0.05%; cost per side 0.02%

Gross edge	0.05% × $1m	**$500**
Round-trip cost	2 × 0.02% × $1m	**$400**
Net per trade	500 − 400	**$100**
If cost per side is 0.03%	500 − 2 × 0.03% × $1m	**−$100**
Break-even cost per side	0.05% ÷ 2	**0.025%**

IN THE LESSON

- Market microstructure strategies trade on very short term patterns, such as the same share quoted a little differently on two venues for a fraction of a second.
- The edge on each trade is tiny, so costs decide everything.
- Suppose Lumen trades one million dollars at a time and expects to earn point zero five per cent, which is five hundred dollars.
- It pays point zero two per cent on each side, so the round trip costs four hundred dollars.
- The net is only one hundred dollars.
- If the cost on each side rises to point zero three per cent, the round trip costs six hundred and the trade loses one hundred.
- The break even cost is point zero two five per cent on each side.
- Overlooking transaction costs can erase the whole edge.

30 Pairs and microstructure compared

Same family, different edge and different risk

Strategy	Edge and main risk
Pairs trading	Spread off its mean; a break
Microstructure	Order flow, venues; costs
Both need	Technology, many small bets

IN THE LESSON

- Here is the comparison for Imogen Reyes.
- Pairs trading exploits a spread that has moved away from its mean, and its main risk is a structural break that lets the spread keep widening, which is why it needs a stop loss rule as well as a model.
- Microstructure strategies exploit order flow, liquidity and prices across venues, and their main risk is that costs and slow execution wipe out a thin edge.
- Both need heavy investment in technology, tight cost control and many small independent bets.
- Her recommendation is that Lumen can sit in Hartwell's portfolio as a diversifier, but only with limits on how much capital any one pair can take.

31 Recap: the lesson in four lines

- Top-down: macro views, few bets; count real breadth
- Factors: judge against the benchmark with the factors
- Activism: odds, costs and disclosure decide it
- Stat arb: reversion, a thin edge, costs and breaks

IN THE LESSON

- Let us pull the lesson together.
- First, top down managers turn macro views into exposures, and the information ratio rises with skill and with independent breadth, so count bets, not positions.
- Second, factor managers hold rewarded exposures, weighted by risk, and should be judged against a benchmark that already holds those factors, net of the extra fee.
- Third, activists buy a stake and press for change, and the expected gain must beat the costs, the chance of failure and the effect of disclosure.
- Fourth, statistical arbitrage bets on reversion, and its risks are a structural break and the costs that can erase a thin edge.

32 Try three quick questions

1. Skill 0.08, 9 independent calls. Information ratio?
   Answer: 0.08 × √9 = 0.08 × 3 = 0.24.
2. Excess 2.0% before fees; factors explain 1.6%; fees 0.70% vs 0.20%. Net?
   Answer: 0.4 − 0.50 = −0.10%. The fee outweighs it.
3. Gain $20m, loss $10m, costs $5m. Break-even chance?
   Answer: (10 + 5) ÷ (20 + 10) = 50%.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A top down manager has an information coefficient of point zero eight and nine independent calls.
- What is its information ratio?
- The square root of nine is three, so point zero eight times three gives point two four.
- Question two.
- Before fees, an active manager beat the index by two per cent.
- Its factor exposures explain one point six.
- It charges point seven zero and a smart beta fund charges point two zero.
- What is the net value?
- The leftover is point four, the extra fee is point five zero, so the net is minus point one zero per cent.
- Question three.
- An activist could gain twenty million or lose ten million, with five million of costs.
- What chance of success breaks even?
- Fifteen over thirty is fifty per cent.
- Anything lower, and the campaign is a poor bet.