CHARTA LEARNING · LESSON NOTES

# Selecting and monitoring managers

Performance Measurement

## 1 A story: hiring a builder

- Photos of finished jobs are not enough
- Ask who holds the deposit and who is insured
- A track record is the photograph album
- Selection is a funnel: cheap tests first, deep checks last

IN THE LESSON

- Imagine you want a builder for your house.
- You could simply pick the one with the best photographs of finished jobs.
- But a careful person also asks who holds your deposit, who pays the workers, and whether the builder is insured.
- A manager's track record is the photograph album.
- Tara Quill has to look behind it.
- She also knows that far too many managers exist for her to meet them all.
- So selection works as a funnel.
- Cheap tests come first, to thin out the crowd.
- Slow and expensive checks come last, on the few who remain.
- And a manager can pass every number and still fail at the very end.

## 2 The stages of manager selection

*Narrow the field with data*

Define the universe → Quantitative screen → Short list

*Check the people and the firm*

Investment diligence → Operational diligence → Terms, hire, monitor

IN THE LESSON

- Here are the stages in the order Tara Quill meets them.
- Look at the top row first.
- She begins by defining the universe, which means every manager that could run this mandate, given the asset class and the trust's rules.
- Next comes the quantitative screen, using performance appraisal, attribution, style analysis, capture ratios and drawdowns.
- The aim is a short list of managers who seem to add value consistently, not in one lucky spell.
- The bottom row is where judgement takes over.
- Investment due diligence studies the philosophy, process and people.
- Operational due diligence studies the firm itself.
- Last come the terms of the vehicle, the hiring, and the ongoing monitoring that follows.

## 3 Example 1: the funnel in numbers

*Brackenridge: 20m for a global equity manager*

| | | |
|---|---|---|
| **Manager universe** | everyone we know of | **60** |
| **Fit the mandate** | global equity, fee limit | **40 (67%)** |
| **Quantitative screen** | best, most consistent records | **6 (10%)** |
| **Investment diligence** | philosophy, process, people | **3 (5%)** |
| **Operational diligence** | custody, valuation, controls | **2 (3%)** |

IN THE LESSON

- Let us put numbers on the funnel.
- Tara Quill's search starts with sixty global equity managers.
- Forty of them fit the mandate and the fee limit, which is about sixty seven per cent.
- The quantitative screen keeps the six with the best, most consistent records, ten per cent of the original sixty.
- Investment due diligence, the meetings and the study of philosophy and process, leaves three, five per cent.
- Operational due diligence then removes one more, so two survive, about three per cent.
- Notice what happened.
- Almost all of the work in the early stages was done by numbers.
- Almost all of the risk in the last stage is about things the numbers cannot show.

## 4 Two strands of due diligence

*What Tara checks, strand by strand*

| Strand | Question asked |
|---|---|
| Investment: philosophy | Why should the edge last? |
| Investment: process, people | Same steps, stable team? |
| Operational: trading, custody | Who trades, who holds assets? |
| Operational: valuation, audit | Who prices, who checks? |

IN THE LESSON

- Due diligence has two strands, and they ask different questions.
- Investment due diligence asks whether the manager's way of making money is believable and likely to last.
- Tara Quill listens to the philosophy, which is the reason the manager thinks an edge exists.
- She studies the process that turns that idea into trades, the people who run it, and whether the portfolio actually looks like what the manager says it is.
- Operational due diligence asks something else: can the firm be trusted with the money?
- Who executes the trades, who holds the assets, who puts a price on each holding, and who checks the work?
- The table sets them side by side.

## 5 Operational due diligence: the firm behind the fund

- Trading and custody
- Valuation and compliance
- Technology, audits, business continuity
- Ownership and stability of the firm

IN THE LESSON

- Operational due diligence covers a longer list than most beginners expect.
- First, trading and custody: how orders are placed and settled, and whether an independent custodian holds the assets.
- Second, valuation and compliance: who values the holdings, especially anything that does not trade every day, and whether rules are followed and breaches recorded.
- Third, technology, audits and business continuity: are the systems sound, do independent auditors sign off the accounts, and what happens if the office burns down?
- Fourth, the ownership and stability of the firm itself, because a manager that loses its staff or its owner may stop being the manager that was hired.
- Operational failings can end a mandate, however attractive the returns.

## 6 Example 2: first on the numbers, out on the checks

*Dunmore Partners: top of the short list*

| Dunmore Partners | Finding |
|---|---|
| Information ratio 0.8 | Best on the short list |
| One person, three roles | No separation of duties |
| Staff value unlisted holdings | Self-marked prices |
| Custodian owned by parent | Assets not independent |

IN THE LESSON

- Here is the picture in practice.
- Dunmore Partners ranks first on the quantitative screen, with an information ratio of point eight, the best on the short list.
- During the operational review, Tara Quill's team finds three things.
- One person is chief investment officer, chief operating officer and chief compliance officer at once, so nobody checks the work.
- The portfolio managers value the fund's unlisted holdings themselves, so the prices are self marked.
- And the custodian is owned by Dunmore's parent company, so the assets are not truly independent.
- Any one of these is serious.
- Together they decide it.
- She drops Dunmore, because a strong track record is no substitute for an operational review.

## 7 Terms, vehicle and monitoring

- Vehicle: separate account or pooled fund
- Terms: fees, liquidity, reporting
- After hiring, monitor with the same tests
- Never postpone the operational review

IN THE LESSON

- Two more steps remain once a manager passes both strands.
- The first is the vehicle and its terms.
- Tara Quill can invest through a separate account, which is built just for the trust, or through a pooled fund shared with other investors.
- She compares the fees, how quickly she can get her money out, and what reporting she will receive.
- The second step comes after the hire.
- Monitoring applies the same tests again and again: performance, style, drawdowns, and operations.
- It should not wait for a bad year.
- A review of custody and valuation put off until the manager has proved itself is a review done too late.

## 8 A story: the lucky coin flipper

- Start by assuming the manager has no skill
- That assumption is the null hypothesis
- Hire only if the record is too good to be luck
- A test of luck can be wrong in two ways

IN THE LESSON

- Suppose a friend flips a coin ten times and calls most of them correctly.
- Is that a gift, or luck?
- Statisticians begin by assuming luck.
- That assumption is called the null hypothesis, and it is only dropped if the evidence is strong enough.
- Hiring a manager is the same kind of test.
- The null hypothesis is that the manager has no skill.
- The record is the evidence.
- The committee rejects the null, and hires, when the record looks too good to be luck.
- But a test can go wrong in two ways, and each has a name.
- Type one and type two errors are what this section is about.

## 9 Two ways to be wrong

*Null hypothesis: the manager has no skill*

| Decision and the truth | Outcome |
|---|---|
| Hire, manager has no skill | Type I error: paid for luck |
| Pass, manager is skilled | Type II error: missed edge |
| Hire, manager is skilled | Correct: skill rewarded |
| Pass, manager has no skill | Correct: fee saved |

IN THE LESSON

- Here are the four things that can happen.
- Work down the table.
- If the committee hires a manager who really has no skill, it has rejected a true null hypothesis.
- That is a Type one error: paying fees for luck.
- If the committee passes over, or fires, a manager who really is skilled, it has failed to reject a false null.
- That is a Type two error: a missed edge.
- The other two rows are the right answers.
- Hiring a skilled manager rewards skill, and passing on an unskilled manager saves the fee.
- The exam trap is to swap the labels.
- Type one is the mistake of hiring, or keeping, a manager without skill.

## 10 The statistic behind the hiring decision

**Expected t = information ratio × √years**
**Hire if t > hurdle**

| | |
|---|---|
| **Information ratio** | Active return per unit of risk |
| **Years of record** | Length of the record |
| **t-statistic** | Strength of the evidence |
| **Hurdle** | The committee's cut-off |

IN THE LESSON

- To make the test concrete, we need a number.
- The test statistic is the t-statistic of the manager's active return.
- For a manager whose true information ratio is known, the expected t-statistic is the information ratio times the square root of the years of record.
- The information ratio is the active return per unit of active risk.
- The committee sets a hurdle, and hires when the t-statistic is above it.
- Notice that years sit under a square root.
- Doubling the length of the record does not double the evidence, which is why short records tell us so little.

## 11 Two crowds that overlap

*Chart: Managers vs t-statistic of the record*

- No skill: 80, centre 0
- Skilled: 20, centre 0.87
- Hurdle 1
- Hurdle 2

IN THE LESSON

- Now we draw why the test is so hard.
- The horizontal axis is the t-statistic of a manager's record.
- The vertical axis is how many managers land there.
- Tara Quill's consultant has screened a group of managers with short records.
- The red crowd on the left is the eighty managers with no skill.
- Their t-statistics centre on zero.
- The green crowd is the twenty skilled managers.
- Their t-statistics centre on only point eight seven, so the two crowds sit almost on top of each other.
- The two vertical lines are possible hurdles, one and two.
- Whatever hurdle she picks, some lucky managers sit above it and some skilled managers below.

## 12 Example 3: raise the hurdle

*100 managers: 20 skilled (information ratio 0.5), 3 years*

| | | |
|---|---|---|
| **Skilled manager's expected t** | 0.5 × √3 | **0.87** |
| **Hurdle t > 1: Type I** | 80 × 15.9% get hired | **12.7** |
| **Hurdle t > 1: Type II** | 20 − 8.9 skilled hired | **11.1** |
| **Hurdle t > 2: Type I** | 80 × 2.3% get hired | **1.8** |
| **Hurdle t > 2: Type II** | 20 − 2.6 skilled hired | **17.4** |

IN THE LESSON

- Now the arithmetic, with three years of data.
- A skilled manager's expected t-statistic is point five times the square root of three, which is point eight seven.
- First hurdle: hire when t is above one.
- Of the eighty unskilled managers, about fifteen point nine per cent clear it, which is twelve point seven Type one errors.
- Of the twenty skilled, eight point nine are hired, so eleven point one are turned away: Type two errors.
- Now raise the hurdle to two.
- Only two point three per cent of the unskilled pass, one point eight Type one errors.
- But only two point six skilled managers pass, so seventeen point four are turned away.
- These are illustrative figures from a normal distribution.

## 13 Trading one error for the other

*Managers (out of 100)*

| | |
|---|---|
| **Type I, hurdle 1** | **12.7** |
| **Type II, hurdle 1** | **11.1** |
| **Type I, hurdle 2** | **1.8** |
| **Type II, hurdle 2** | **17.4** |

*Hurdle on the t-statistic: 1, then 2*

IN THE LESSON

- Here is that result as bars.
- The vertical axis is the number of managers out of one hundred.
- Look at the first pair, for a hurdle of one.
- The red bar is Type one errors, twelve point seven, and the amber bar is Type two errors, eleven point one.
- Now the second pair, for a hurdle of two.
- Type one errors collapse to one point eight, which looks wonderful.
- But Type two errors climb to seventeen point four.
- The mix of mistakes changes: far fewer lucky hires, but many more skilled managers sent away.
- With records this short, no hurdle reduces both at once.
- Only more evidence can do that.

## 14 Which error do committees fear?

- Type I is visible: fees paid, results poor
- Type II is unseen: the manager never hired
- Raising the hurdle only swaps one error for the other
- Firing after a short bad spell locks in Type II
- Longer records and qualitative evidence reduce both

IN THE LESSON

- Committees fear the wrong one.
- A Type one error is visible.
- The fees are paid, the results disappoint, and somebody has to explain the hire.
- A Type two error is invisible.
- Nobody reports the returns of the manager who was never hired, so the cost is an unseen opportunity.
- That is why committees guard against the first and quietly accept the second.
- There is also a trap in firing.
- Dropping a manager after a short bad spell acts on the noisiest evidence there is.
- It adds transition costs, and if the manager was skilled, it locks in a Type two error.
- Longer records and better qualitative evidence are the only ways to cut both errors.

## 15 A story: the label on the tin

- A manager's style is its label on the tin
- Check the claim: is it really large value?
- Returns-based: taste the soup, infer the mix
- Holdings-based: read the ingredient list

**IN THE LESSON**

- When you buy a tin of soup, you read the label.
- But a careful shopper knows the label is only a claim, and may check the ingredients.
- A manager's style is its label.
- Heron Capital sells itself to Tara Quill as a large company value manager.
- Style analysis is how she checks what is really in the tin.
- There are two ways to look.
- One infers the style from the fund's returns, as if tasting the soup and guessing the ingredients.
- The other reads the style from the holdings, as if reading the ingredient list itself.
- They have different strengths, so a careful investor uses both.

## 16 Returns-based style analysis

**Fund return = $w_1 \times R_1 + w_2 \times R_2 + w_3 \times R_3$ + left over**
**each $w \geq 0$, total of $w = 1$**

| | |
|---|---|
| **Fund return** | What the manager earned |
| **Style weight** | Never negative, add to one |
| **Style index return** | One index for each style |
| **Left over** | Stock picking and noise |

**IN THE LESSON**

- Returns-based style analysis is a regression.
- We take the fund's returns and ask which mix of style indexes best reproduces them.
- Each index stands for a style, such as large company value or large company growth.
- The weights have two rules: none can be negative, since a manager cannot own a negative amount of a style, and together they must add to one.
- What the regression cannot explain is left over, and that is the part that comes from the manager's own security selection.
- The result is called the effective style mix.
- It needs only the fund's returns, which are hard to manipulate, so comparing managers is easy.

## 17 Example 4: Heron's style benchmark

*Heron 9.2%. Mix: value 50, growth 30, small 20. Indexes: 7, 15, 5*

| | | |
|---|---|---|
| **Style benchmark** | 0.50×7 + 0.30×15 + 0.20×5 | **9.0%** |
| **Versus style benchmark** | 9.2 − 9.0 | **+0.2%** |
| **Versus large value index** | 9.2 − 7.0 | **+2.2%** |
| **Explained by the style tilt** | 2.2 − 0.2 | **2.0%** |

**IN THE LESSON**

- Now Heron Capital.
- It returned nine point two per cent over the year.
- The regression finds an effective mix of fifty per cent large company value, thirty per cent large company growth and twenty per cent small company value.
- Those indexes returned seven, fifteen and five per cent.
- Weighting them gives the style benchmark: point five times seven is three point five, point three times fifteen is four point five, and point two times five is one.
- The total is nine point zero per cent.
- Against this fair comparison, Heron added nine point two minus nine, plus point two.
- Against the large value index it added two point two.
- So two point zero of that lead is just the tilt toward growth, net of the small company tilt.

## 18 Claimed style, measured style

*Share of the fund (%)*

| | |
|---|---|
| **Claimed: large value** | **100%** |
| **Large value** | **50%** |
| **Large growth** | **30%** |
| **Small value** | **20%** |

*Returns-based mix of Heron*

IN THE LESSON

- Here is the same result as a picture.
- The vertical axis is the share of the fund, in per cent.
- The grey bar is the claim: Heron says it is one hundred per cent large company value.
- The next three bars are what the regression found.
- Only fifty per cent of the effective mix behaves like large company value.
- Thirty per cent behaves like large company growth, and twenty per cent like small company value.
- That gap is either style drift or a wrong label, and either way it changes which benchmark Heron should be judged against.
- It also changes how Heron fits beside the trust's other managers, who may already hold a lot of growth.

## 19 Two methods, side by side

*What each method gives, and what it can miss*

| Method | Strengths and weaknesses |
|---|---|
| Returns-based: strengths | Little data, hard to fake |
| Returns-based: weaknesses | Index choice, lag, concentration |
| Holdings-based: strengths | Precise, sees drift sooner |
| Holdings-based: weaknesses | Needs data, window dressing |

IN THE LESSON

- Neither method is perfect, so Tara Quill learns what each one can miss.
- Returns-based analysis needs very little data and is hard to manipulate, since the returns are published.
- But it depends on the set of style indexes chosen, it lags behind real changes in style, and it can mislead for concentrated portfolios or for managers who change their mix often.
- Holdings-based analysis classifies every position by size, value or growth, and sector.
- It is more precise, and it spots drift sooner.
- But it needs the holdings data, it depends on how the positions are classified, and it can be distorted by window dressing, where a manager tidies the portfolio just before it is reported.

## 20 Example 5: the holdings show drift sooner

*Share of Heron: five-year window against holdings today*

| | | |
|---|---|---|
| **Large value** | 50% → 35% | **−15 points** |
| **Large growth** | 30% → 45% | **+15 points** |
| **Small value** | 20% → 20% | **no change** |
| **Holdings today add up** | 35 + 45 + 20 | **100%** |

IN THE LESSON

- Tara Quill asks Heron for its current holdings, and classifies each position.
- The returns-based analysis, spread over a five year window, said fifty per cent large company value, thirty per cent large company growth and twenty per cent small company value.
- The holdings today say thirty five, forty five and twenty.
- Large company value has fallen by fifteen points.
- Large company growth has risen by fifteen.
- Small company value is unchanged, and the three figures still add to one hundred.
- The holdings show a manager that has moved further toward growth than the regression, which averages over the window, can see.
- The returns-based picture was already worrying.
- The holdings show it is getting worse.

## 21 What selection uses style analysis for

- Does the actual style match the claim?
- Which benchmark should judge this manager?
- Is the style drifting over time?
- How does it fit beside our other managers?

IN THE LESSON

- So what does Tara Quill actually do with all this?
- Four things.
- First, she confirms that the manager's actual style matches its claims, so she is not sold a growth fund under a value label.
- Second, it helps her pick a suitable benchmark.
- A manager should be judged against the index it really behaves like, which here is the style mix, not the large value index.
- Third, it reveals drift, so she will know if the manager is leaving the style she hired it for.
- Fourth, it shows how the manager fits beside her others, because two managers with the same hidden tilt are less diversification than they look.

## 22 Mistakes to avoid so far

- Choosing on the numbers, leaving operations for later
- Swapping Type I and II, or thinking a hurdle fixes both
- Firing after a short bad spell
- Accepting a style label without checking it
- Relying on one style method alone

IN THE LESSON

- Let us collect the common mistakes from the first three sections.
- One: choosing a manager on the numbers alone and leaving operational due diligence for later.
- Two: swapping the Type one and Type two labels, or believing that a higher hurdle reduces both errors.
- Three: firing a manager after a short bad spell, which acts on the noisiest evidence and adds a Type two error.
- Four: accepting a manager's style label without checking it against returns or holdings.
- Five: trusting one style method on its own, when the returns version lags and the holdings version can be dressed up.
- Use both, and keep asking what each one can miss.

## 23 A story: two roller coasters

- Same finishing height, very different rides
- An average return hides the bumps
- Brackenridge spends 4.5% a year
- Its board once sold a fund near the bottom

IN THE LESSON

- Picture two roller coasters that finish at exactly the same height.
- On one, the carriage drops sharply, stays at the bottom for a long time and climbs back slowly.
- On the other, the falls are shorter and the carriage is back up quickly.
- Both rides end at the same point, but you would not put a nervous passenger on the first.
- An average return hides the ride.
- Brackenridge spends four and a half per cent of its assets each year, and its board once sold a fund near the bottom of a market fall.
- Tara Quill therefore asks how deep the falls were, how long they lasted, and how the manager behaves when markets rise and when they fall.

## 24 Capture ratios

**Up capture = manager ÷ benchmark in up periods**
**Down capture = manager ÷ benchmark in down periods**
**Ratio = up ÷ down**

| | |
|---|---|
| **Upside capture** | Share of the gains kept |
| **Downside capture** | Share of the losses taken |
| **Up/down capture ratio** | Above 1 favours the investor |

IN THE LESSON

- Capture ratios compare a manager with the benchmark in two kinds of market.
- Take only the periods when the benchmark rose.
- The upside capture ratio is the manager's average return in those periods divided by the benchmark's average return in the same periods.
- Now take only the periods when the benchmark fell.
- The downside capture ratio is the manager's average return in those periods divided by the benchmark's average.
- Both are written as percentages.
- A manager that rises less than the market and falls even less has a low downside capture, and that is good.
- Divide the upside figure by the downside figure and you get the up and down capture ratio.

## 25 Example 6: capture ratios from six months

*Down months: benchmark −3%, −6%; manager −1.8%, −3.6%*

| | | |
|---|---|---|
| **Benchmark, 4 up months** | +4, +2, +5, +3 | **avg +3.5%** |
| **Manager, same months** | +3.2, +1.6, +4.0, +2.4 | **avg +2.8%** |
| **Upside capture** | 2.8 ÷ 3.5 | **80%** |
| **Downside capture** | −2.7 ÷ −4.5 | **60%** |
| **Up/down capture ratio** | 80 ÷ 60 | **1.33** |

IN THE LESSON

- Let us compute them.
- Over six months, the benchmark returned plus four, plus two, minus three, plus five, minus six and plus three per cent.
- The manager returned plus three point two, plus one point six, minus one point eight, plus four, minus three point six and plus two point four.
- In the four up months, the benchmark averaged three point five and the manager two point eight.
- Upside capture is two point eight divided by three point five, which is eighty per cent.
- In the two down months, the benchmark averaged minus four point five and the manager minus two point seven.
- Downside capture is sixty per cent.
- The ratio is eighty divided by sixty, one point three three.

## 26 Two managers, two kinds of ride

*Capture (% of benchmark)*

| | |
|---|---|
| **Alder: upside** | **105%** |
| **Birch: upside** | **80%** |
| **Alder: downside** | **100%** |
| **Birch: downside** | **60%** |

*Ten years. Ratios: Alder 1.05, Birch 1.33*

IN THE LESSON

- Now two managers on the short list, measured against the same benchmark over ten years.
- The vertical axis is capture, as a percentage of the benchmark.
- Alder Capital captured one hundred and five per cent of the upside and a full one hundred per cent of the downside.
- Birch Capital captured eighty per cent of the upside and sixty per cent of the downside.
- Alder's up and down ratio is one point zero five, roughly symmetrical.
- Birch's is one point three three.
- A ratio above one means a positively asymmetric pattern, with more gain than pain.
- That suits a loss averse investor willing to give up some of the upside for protection.

## 27 Drawdown and recovery

**Drawdown = trough ÷ peak − 1**
**Gain to recover = 1 ÷ (1 + drawdown) − 1**

| | |
|---|---|
| **Peak value** | Highest value so far |
| **Drawdown** | Worst fall from the peak |
| **Gain to recover** | Gain needed to get back |
| **Drawdown duration** | Time spent below the peak |

IN THE LESSON

- Capture ratios say how a manager behaves in rising and falling markets.
- Drawdown says what the investor would actually have lived through.
- A drawdown is the fall from a peak value to the next trough.
- The maximum drawdown is the worst such fall in the sample.
- It is the loss a client would have felt had they bought at the very top and sold at the very bottom.
- Drawdown duration is how long the fund stayed below its old peak until it recovered.
- The recovery arithmetic is cruel: a loss needs a bigger gain to undo it.
- A fall of twenty per cent needs a gain of twenty five per cent, not twenty.

## 28 A drawdown, drawn

*Chart: Fund value (start 100) vs Quarters*

- Peak 125 (quarter 4)
- Trough 80, quarter 8: down 36%
- 10 quarters = 30 months
- Back above peak, quarter 14

IN THE LESSON

- Here is a drawdown drawn out.
- The horizontal axis is quarters, and the vertical axis is the fund's value, starting at one hundred.
- The line climbs to a peak of one hundred and twenty five at quarter four.
- The grey line marks that peak level.
- Then the fund falls for four quarters to a trough of eighty at quarter eight.
- Eighty divided by one hundred and twenty five, minus one, is a maximum drawdown of thirty six per cent.
- The fund then climbs, and only gets back above the old peak at quarter fourteen.
- From peak to recovery is ten quarters, which is thirty months, the drawdown duration.

## 29 Example 7: Alder against Birch

*Ten years against the same benchmark*

| | | |
|---|---|---|
| **Alder: up/down ratio** | 105 ÷ 100 | **1.05** |
| **Birch: up/down ratio** | 80 ÷ 60 | **1.33** |
| **Gain to recover, Alder** | 1 ÷ 0.64 − 1 | **56%** |
| **Gain to recover, Birch** | 1 ÷ 0.78 − 1 | **28%** |
| **Months under water** | Alder 30, Birch 14 | **30 v 14** |

IN THE LESSON

- Now Tara Quill compares the two managers on drawdown.
- Alder's maximum drawdown was thirty six per cent, and it spent thirty months under water.
- Birch's was twenty two per cent, over fourteen months.
- Recovery arithmetic first.
- After a thirty six per cent fall, Alder is at point six four of its peak, and one divided by point six four, minus one, is a gain of fifty six per cent.
- Birch is at point seven eight of its peak, and one divided by point seven eight, minus one, needs only twenty eight per cent.
- Birch is also under water for less than half as long.
- Both figures come from one decade, one sample path, so they complement the risk adjusted measures rather than replace them.

## 30 Defending the choice for Brackenridge

*Board limits: drawdown under 25%, recovery within 24 months*

| Test for Brackenridge | Result |
|---|---|
| Drawdown under 25% | Alder 36% fails, Birch 22% passes |
| Recover within 24 months | Alder 30 fails, Birch 14 passes |
| Up/down ratio above 1 | Both pass; Birch higher |
| Cost of choosing Birch | Upside 80 against 105 |

IN THE LESSON

- Now Tara Quill must defend a choice.
- The trust spends a share of its assets every year, so it cannot afford deep losses while it is drawing money out.
- It sold a fund near the bottom once, so a long slump is dangerous.
- The board's limits are a maximum drawdown of twenty five per cent, and recovery within twenty four months.
- Alder, at thirty six per cent and thirty months, fails both.
- Birch, at twenty two per cent and fourteen months, passes both.
- Both managers have up and down ratios above one, but Birch's is far higher.
- The cost is the upside Birch gives up, eighty against one hundred and five.
- She recommends Birch, and watches whether the pattern holds.

## 31 Recap: the lesson in five lines

- Funnel: screen, diligence, terms, hire, monitor
- Type I hires no skill; Type II rejects skill
- Style: returns infer it, holdings read it
- Capture ratios: gains kept against losses taken
- Drawdown and duration: the worst ride, set against needs

IN THE LESSON

- Let us pull the lesson together.
- First, selection is a funnel: define the universe, screen on numbers, then do investment and operational due diligence, agree the terms, hire, and keep monitoring.
- Second, the null hypothesis is no skill.
- A Type one error hires or keeps a manager without skill, a Type two error turns away a skilled one, and short records mean no hurdle reduces both.
- Third, returns-based style analysis infers style from returns, and holdings-based analysis reads it from positions.
- Use both.
- Fourth, capture ratios show behaviour in rising and falling markets.
- Fifth, maximum drawdown and its duration show the worst ride, and the client's needs decide what is acceptable.

## 32 Try three quick questions

1. Skilled manager fired after two poor years. Which error?
   **Answer:** Type II: failed to reject a false null.
2. Return 6.4%. Style mix 60% of index at 5%, 40% at 8%. Value added?
   **Answer:** 0.6×5 + 0.4×8 = 6.2%, so +0.2%.
3. A fund falls 20% from its peak. Gain needed to recover?
   **Answer:** 1 ÷ 0.8 − 1 = 25%.

**IN THE LESSON**

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A committee fires a skilled manager after two poor years.
- The null hypothesis is that the manager has no skill.
- Which error is that?
- It is a Type two error, because the committee failed to reject a false null and sent away a skilled manager.
- Question two.
- A fund returned six point four per cent.
- Its style mix is sixty per cent of an index returning five and forty per cent of one returning eight.
- How much did it add over its style benchmark?
- The benchmark is six point two, so it added point two.
- Question three.
- A fund falls twenty per cent from its peak.
- What gain is needed to recover?
- One divided by point eight, minus one, is twenty five per cent.
- Take your time with these.