# Attribution, risk and responsibility

Performance Measurement

## 1 A story: the report card

- A good total mark hides the cause
- Attribution splits the extra return into causes
- Sector weights, stock choice, and the two together
- Each cause points to a decision someone made

IN THE LESSON

- Think of a school report card.
- A student scores well overall, but the overall mark does not say whether she is good at maths or just lucky in the exams she sat.
- Attribution is the report card for a portfolio.
- The portfolio beat its benchmark by a little.
- Attribution splits that margin into causes.
- Did the manager put more money in the sectors that did well?
- Did it pick better companies inside each sector?
- Or did the two choices work together, one amplifying the other?
- Ruth Okafor needs all three answers before the trustees decide anything.
- And she reads each one as a clue to a decision, not just a number.

## 2 The Brinson-Fachler model

**Allocation = (wp − wb) × (Rb,sector − Rb,total)**
**Selection = wb × (Rp,sector − Rb,sector)**
**Interaction = (wp − wb) × (Rp,sector − Rb,sector)**

| | |
|---|---|
| **Portfolio weight in sector** | Weight the manager held |
| **Benchmark weight in sector** | Weight the benchmark held |
| **Portfolio return in sector** | What its holdings returned |
| **Benchmark return in sector** | What the sector index returned |
| **Whole benchmark return** | Used to judge the sector bet |

IN THE LESSON

- The curriculum's model works sector by sector.
- Allocation asks whether the manager held a different weight in a sector from the benchmark, and whether that sector beat the whole benchmark.
- The key is the sector's return minus the whole benchmark's return, not the sector's return alone.
- Selection asks whether its holdings in the sector beat the sector's own index, and it is paid at the benchmark's weight.
- Interaction is the leftover cross term: the weight difference times the return difference.
- Allocation, selection and interaction, added across all sectors, equal the portfolio's excess return exactly.
- That exact adding up is the check you always make.

## 3 Example 1: Tern Equity's year

*Benchmark: industrials 50% at 9%, retail 50% at 3%. Tern: 60% at 10%, 40% at 2%*

| | | |
|---|---|---|
| **Benchmark return** | 0.5 × 9% + 0.5 × 3% | **6.0%** |
| **Tern's return** | 0.6 × 10% + 0.4 × 2% | **6.8%** |
| **Excess return** | 6.8% − 6.0% | **0.8%** |

IN THE LESSON

- Marlow's equity manager is Tern Equity.
- The benchmark has two sectors.
- Industrials are half the benchmark and return nine per cent.
- Retail is the other half and returns three per cent.
- So the benchmark returns six per cent.
- Tern holds sixty per cent in industrials, earning ten per cent, and forty per cent in retail, earning two per cent.
- Its return is six point eight per cent.
- The excess return, the number the trustees noticed, is zero point eight.
- Our job is to split that zero point eight into its causes.
- Notice that Tern overweighted the sector that did well and picked better stocks in industrials, but worse ones in retail.

## 4 Example 1: the three effects

*Weights differ by 10 points: +10 in industrials, −10 in retail*

| | | |
|---|---|---|
| **Allocation, industrials** | +0.10 × (9% − 6%) | **+0.30%** |
| **Allocation, retail** | −0.10 × (3% − 6%) | **+0.30%** |
| **Selection, both sectors** | 0.5 × 1% + 0.5 × (−1%) | **0.00%** |
| **Interaction, both sectors** | 0.1 × 1% + (−0.1) × (−1%) | **+0.20%** |
| **Total of the three** | 0.60 + 0.00 + 0.20 | **0.80%** |

IN THE LESSON

- Now the effects.
- Allocation in industrials: Tern was ten points overweight, and industrials beat the benchmark's six per cent by three points, so point three.
- In retail Tern was ten points underweight, and retail missed six per cent by three points, so being light helped by another point three.
- Allocation is point six.
- Selection in industrials: half the benchmark times one point of outperformance is point five.
- In retail, half times minus one is minus point five.
- They cancel, so selection is zero.
- Interaction in industrials is point one and in retail also point one, total point two.
- Add them up: point six plus zero plus point two is point eight, which matches the excess exactly.

## 5 Where the 0.8 came from

*Effect (percentage points)*

| | |
|---|---|
| **Allocation** | **0.6** |
| **Selection** | **0.0** |
| **Interaction** | **0.2** |
| **Excess return** | **0.8** |

*Effects add up to the excess return*

IN THE LESSON

- Here is the same result as a picture.
- The vertical axis is the effect on the return, in percentage points, and each bar is one effect.
- Allocation is the tall bar at point six: most of the excess came from where Tern put its weight.
- Selection is a bar of zero.
- Tern's stock picking, taken across both sectors, added nothing at all.
- Interaction is point two.
- That is a small bonus from having the most weight in the sector where its picks did best.
- The excess return bar is point eight, the sum of the other three.
- So Tern's margin was won by sector weights, and not by choosing stocks.

## 6 Fachler against Hood-Beebower

*Retail: 10 points light, 3% v 6%. Both total 0.60*

| Sector and method | Allocation |
|---|---|
| Industrials, Fachler | +0.30 |
| Industrials, Hood-Beebower | +0.90 |
| Retail, Fachler | +0.30 |
| Retail, Hood-Beebower | −0.30 |

**IN THE LESSON**

- There is an older version, Brinson Hood Beebower.
- Its allocation uses the sector's own return, not its gap to the whole benchmark.
- Look at retail.
- Tern held ten points less retail, and retail earned a positive three per cent.
- Under Hood Beebower that underweight is multiplied by plus three and shows as a cost of point three.
- Under Fachler it is multiplied by retail's shortfall of three points against the benchmark, and shows as a gain of point three.
- Industrials show point nine under the older rule, but only point three under Fachler.
- The totals agree, but the sector story does not.
- A sector with a positive but below-benchmark return is where the older method misleads.

## 7 Example 2: the same point, through factors

*Active exposures against the benchmark, in factor units*

| | | |
|---|---|---|
| **Small-company tilt** | 0.50 × 2.0% | **+1.00%** |
| **Value tilt** | 0.20 × 1.0% | **+0.20%** |
| **Stock-specific residual** | 0.80 − 1.00 − 0.20 | **−0.40%** |
| **Total active return** | 1.00 + 0.20 − 0.40 | **0.80%** |

**IN THE LESSON**

- Attribution can also run on factors instead of sectors.
- Here the return is split into exposure times factor return, plus a residual.
- Ruth Okafor runs it for Tern, and finds the same zero point eight looks quite different.
- Tern held a half unit more of the small company factor than the benchmark, and small companies beat large ones by two per cent: that is one point zero.
- It held a fifth of a unit more of the value factor, which earned one per cent: point two.
- Together those factor bets give one point two.
- The stock specific residual is therefore minus point four.
- Same total, but a different story: the sector bets and the factor bets are not the same thing.

## 8 Reading it: who gets the credit

- Beating the index is not proof of skill
- Allocation 0.6, selection 0, interaction 0.2
- Factor view: a small-company tilt, stock picks minus 0.4
- Ask which decision actually produced the margin

**IN THE LESSON**

- So what does Ruth Okafor tell the trustees?
- One trustee says Tern beat the index, so it is skilled, so double the mandate.
- The report does not say that.
- Tern calls itself a bottom up stock picker, yet its margin came from sector weights it says it never forecasts, and from a small company tilt.
- Stock selection added nothing in the sector view, and was negative in the factor view.
- The result may be luck, or an accidental tilt that will reverse.
- The method also matters: the same margin gets a different story from each model.
- So she asks for the method to match how Tern really decides, and she warns against crediting skill for a tilt.

## 9 A story: a bond is a recipe

- Income: the coupon earned as time passes
- Roll-down: a bond slides down the curve
- Curve and spread changes move the price
- Only the leftover is security selection

**IN THE LESSON**

- A bond return is like a recipe with a few clear ingredients.
- The first is income: the coupon the bond pays as time passes.
- The second is roll-down.
- As a bond ages it slides down an upward sloping yield curve, its yield falls, and its price rises.
- The third is the change in the whole curve.
- When government yields fall, bond prices rise by roughly duration times the fall.
- The fourth is the change in credit spreads.
- The fifth is currency, if the bonds are foreign.
- What remains after these systematic ingredients is the part the manager picked.
- Fixed income attribution measures each ingredient and tests it against the benchmark's.

## 10 Layers of a bond return

*Systematic layers, first to last*

Yield income → Roll-down → Curve: shift, twist, curvature

*Then the rest*

Spread change → Currency → Selection residual

**IN THE LESSON**

- Here is the recipe as a flow, in the order the layers are peeled off.
- Along the top row, income comes first because it is the most certain.
- Roll-down comes next, then the change in the benchmark curve.
- The curve effect can be a parallel shift, a twist where short and long yields move differently, or a change in curvature in the middle.
- On the bottom row, the spread change follows, which is the move in the extra yield that credit bonds pay over governments.
- Then comes currency, where it applies.
- Last is the selection residual, whatever is left.
- Because the residual comes last, any mistake or omission earlier in the chain ends up inside it.

## 11 The rate and spread effects

**Rate effect ≈ −duration × change in yield**
**Spread effect ≈ −spread duration × change in spread**
**Selection = what is left**

| | |
|---|---|
| **Duration** | Price sensitivity to yields |
| **Change in yield** | Move in government yields |
| **Spread duration** | Price sensitivity to spreads |
| **Change in spread** | Move in credit spreads |
| **Selection residual** | Left after systematic effects |

**IN THE LESSON**

- Two short rules carry most of the work.
- The rate effect is minus duration times the change in yield.
- Duration measures how much a price moves for each point of yield change, so when yields fall, a longer duration gains more.
- The spread effect is the same idea applied to credit spreads: minus spread duration times the change in spread.
- In attribution you compare the portfolio's duration with the benchmark's, because only the difference is an active bet.
- Whatever is left after all the systematic effects, the selection residual, is the part that can be credited to the manager's choice of individual bonds.
- A residual that is large relative to its inputs is a sign of problems.

## 12 Example 3: Brightwater Bonds

*Duration 6.5 v 5.0; spread duration 3.0 v 2.0; yields −0.60, spreads +0.25*

| | | |
|---|---|---|
| **Income tilt** | 3.6% − 3.3% | **+0.30%** |
| **Duration bet** | (6.5 − 5.0) × 0.60% | **+0.90%** |
| **Credit spread effect** | −(3.0 − 2.0) × 0.25% | **−0.25%** |
| **Selection residual** | left after the rest | **+0.15%** |
| **Excess return** | 0.30 + 0.90 − 0.25 + 0.15 | **1.10%** |

IN THE LESSON

- Marlow's bond manager is Brightwater Bonds.
- It runs a duration of six point five against five for the benchmark, and a spread duration of three against two.
- Its income is three point six per cent against three point three.
- Over the year government yields fell by point six, and credit spreads widened by point two five.
- Income gives an extra point three.
- The duration position gives six point five minus five, times point six, which is point nine.
- The extra credit exposure loses one times point two five, so minus point two five.
- The attribution system reports a residual of point one five.
- Adding up: point three plus point nine minus point two five plus point one five gives one point one in total excess return.

## 13 Brightwater's excess, by layer

*Effect (percentage points)*

| | |
|---|---|
| **Duration bet** | **+0.90** |
| **Income tilt** | **+0.30** |
| **Spread cost** | **−0.25** |
| **Selection** | **+0.15** |

*Total excess return 1.10*

IN THE LESSON

- This picture shows Brightwater's one point one of excess return, layer by layer.
- The vertical axis is the effect, in percentage points.
- The duration bet is by far the tallest bar, at point nine.
- It is a deliberate call that rates would fall, and it worked.
- The income tilt adds point three, which is the reward for owning more credit.
- The spread effect is a cost, so its bar of point two five is shown in red and is taken off.
- Selection is the shortest bar, only point one five.
- A report that dropped all one point one into a bar called security selection would overstate the manager's bond picking many times over.
- The honest reading is mostly an interest rate view.

## 14 Three ways to measure a bond fund

*Match the method to the securities and the process*

| Method | Best suited to |
|---|---|
| Yield-curve decomposition | Plain government and credit |
| Exposure decomposition | Top-down duration and sectors |
| Full repricing | Bonds with embedded options |

IN THE LESSON

- There is more than one way to produce these numbers.
- The yield curve decomposition, which we just used, builds the return from income, roll-down, curve changes, spreads and a residual.
- It fits ordinary government and corporate bonds.
- Exposure decomposition works top down.
- It looks at the portfolio's weights in duration and sector buckets compared with the benchmark, and suits managers who decide by buckets.
- Full repricing revalues each bond from its own cash flows after the market moves.
- It is the most accurate, and the one to use when bonds contain options, like callable or mortgage securities, where duration alone gives the wrong answer.
- The choice of method should match the securities and the way the manager decides.

## 15 Example 4: does the total reconcile?

*Month-end holdings against the actual trades*

| | | |
|---|---|---|
| **Rebuilt from month-end holdings** | from the attribution system | **7.20%** |
| **Custodian's time-weighted return** | uses the actual trades | **6.85%** |
| **Unexplained gap** | 7.20% − 6.85% | **0.35%** |
| **Claimed selection residual** | from Example 3 | **0.15%** |
| **Verdict** | gap is larger than selection | **No skill claim** |

IN THE LESSON

- Before reading any of this, Ruth Okafor checks that the attribution adds up to the real return.
- Brightwater turns its portfolio over very fast, with many trades inside the month.
- The attribution system rebuilds the return from month end holdings and gets seven point two per cent.
- The custodian's time weighted return, which uses the actual trades, is six point eight five.
- The gap is point three five and the system cannot explain it.
- Now compare that gap with the claimed selection of point one five.
- The gap is more than twice as big.
- So the selection figure sits inside the noise, and she should not credit security skill until the gap is closed.

## 16 Mistakes to avoid so far

- Beating the index is not proof of skill
- Mixing up Fachler and Hood-Beebower allocation
- Effects that do not add to the excess return
- Crediting selection for a duration or spread bet
- Trusting a residual smaller than the unexplained gap

IN THE LESSON

- Let us stop and collect the traps from the first two outcomes.
- The first is to treat beating the benchmark as proof of skill, without asking which effect produced it.
- The second is to read Hood Beebower allocation as if it were Fachler, and misjudge a sector with a positive return that still lagged the benchmark.
- The third is to forget that the effects must add to the excess return, so a total that does not reconcile means something is wrong.
- The fourth is crediting selection skill for what was a duration or spread bet.
- And the fifth is trusting a bond residual smaller than the unexplained gap in the return.

## 17 A story: the right gauge

- Many correct ways to split the risk
- Only some match how the manager decides
- Question one: relative or absolute mandate?
- Question two: how does the manager decide?

IN THE LESSON

- A mechanic does not use the same gauge on every part of a car.
- A tyre gauge is the right tool for the tyres and useless for the engine.
- Risk attribution is a gauge too.
- It splits a portfolio's risk among its sources, but there are many ways to cut the pie, and only some of them help a particular manager.
- Two features of the mandate decide the cut.
- First, is the manager judged against a benchmark, or on its own absolute return?
- Second, how does the manager actually make decisions?
- Get those two right and the committee can act on the report.
- Get them wrong, and the numbers are accurate but nobody can use them.

## 18 Two questions, then the cut

*Question one: how is the mandate judged?*

Relative mandate → Break down tracking error →
Absolute: break down volatility

*Question two: how does the manager decide?*

Stock by stock → Position contributions →
Top-down or factors: decisions

IN THE LESSON

- Here are the two questions as a flow.
- On the top row, we first ask whether the mandate is relative.
- If it is, the risk that matters is active risk, so we break down tracking error, the volatility of the gap to the benchmark.
- If the mandate is absolute, there is no benchmark to deviate from, so we break down total volatility.
- On the bottom row, we then ask how the manager decides.
- A manager who works stock by stock needs risk traced to positions.
- A top down allocator, or one who works from factors, needs risk traced to allocation decisions or factor exposures.
- The answer to both questions together gives the rows of the report.

## 19 Matching the cut to the process

*Mirror the process*

| Manager's process | Risk report rows |
|---|---|
| Bottom-up stock picker | Each position's contribution |
| Top-down allocator | Allocation and selection decisions |
| Factor-based process | Factor exposures plus specific |

IN THE LESSON

- This table lists the common managers and the breakdown that suits each.
- A bottom up stock picker is best served by each position's contribution to risk, because positions are what the manager chooses.
- A top down allocator makes allocation and selection decisions, so the risk should be traced to those decisions against the benchmark.
- A factor based process decides on exposures to factors like size or value, so the report should show the risk explained by each factor exposure, plus the specific risk left over.
- A report that does not mirror the process will produce numbers that nobody can act on, and may hide the true source of risk behind rows the manager never chose.

## 20 Contribution to risk

**Contribution = weight × Cov(asset, portfolio) ÷ σp**
**Sum of contributions = σp**

| | |
|---|---|
| **Weight** | Share of the money |
| **Covariance with portfolio** | Moves with the whole portfolio |
| **Portfolio volatility** | Total risk of the mix |
| **Contribution to risk** | These add up to the total |

IN THE LESSON

- Whichever cut you choose, the arithmetic for positions is the same.
- A position's contribution to volatility is its weight, times its covariance with the portfolio, divided by the portfolio's standard deviation.
- Covariance with the portfolio shows how much that holding moves with everything else.
- A holding that moves with the portfolio adds more risk than one that is independent.
- The great property is that the contributions add up exactly to the portfolio's total volatility, so you can express each as a share of the total.
- The same idea works with tracking error for a relative mandate, using active weights, and with a factor model, using factor exposures.

## 21 Example 5: an absolute mandate

*Equities 70% (vol 15%), bonds 30% (vol 5%), correlation 0.3*

| | | |
|---|---|---|
| **Portfolio volatility** | √(110.25 + 2.25 + 9.45) | **11.04%** |
| **Cov: equities, portfolio** | 0.7 × 225 + 0.3 × 0.3 × 75 | **164.25** |
| **Equity contribution** | 0.7 × 164.25 ÷ 11.04 | **10.41** |
| **Bond contribution** | 0.3 × 23.25 ÷ 11.04 | **0.63** |
| **Equities' share of the risk** | 10.41 ÷ 11.04 | **94%** |

IN THE LESSON

- Marlow also has an absolute return multi asset fund, run top down.
- It is seventy per cent equities with volatility fifteen per cent, and thirty per cent bonds with volatility five, and a correlation of point three.
- Portfolio volatility is the square root of the three variance terms added together, which is eleven point zero four.
- The covariance of equities with the portfolio is one hundred and sixty four point two five.
- Equities then contribute seventy per cent times one sixty four point two five over eleven point zero four, which is ten point four one.
- Bonds contribute point six three.
- Together they make eleven point zero four, and equities are ninety four per cent of it.

## 22 Money weights against risk weights

*Share of total (%)*

| | |
|---|---|
| **Equities: money** | **70%** |
| **Equities: risk** | **94%** |
| **Bonds: money** | **30%** |
| **Bonds: risk** | **6%** |

*Same fund, two views*

IN THE LESSON

- This picture puts the money next to the risk.
- The vertical axis is the share of the total, in per cent.
- The first pair of bars is equities.
- Seventy per cent of the money, shown in green, is ninety four per cent of the risk, shown in red.
- The second pair is bonds.
- Thirty per cent of the money is only six per cent of the risk.
- So for this absolute fund run top down, the committee should talk about equities as the risk decision, because that is where nearly all the volatility sits.
- A report listing the individual bonds would be accurate, and would tell them nothing they could act on.

## 23 Example 6: a factor-driven picker

*Tracking error 5.0%, so active variance is 25*

| | | |
|---|---|---|
| **Small-company factor** | 12 ÷ 25 | **48%** |
| **Value factor** | 3 ÷ 25 | **12%** |
| **Stock-specific risk** | 10 ÷ 25 | **40%** |
| **Total active variance** | 12 + 3 + 10 | **25** |
| **Verdict** | mostly a size bet | **Use factor view** |

IN THE LESSON

- Now a relative mandate.
- Tern Equity says it picks stocks one at a time, with tracking error of five per cent.
- Ruth Okafor asks for a factor breakdown of active risk.
- Tracking error of five means active variance of twenty five.
- The small company factor explains twelve of it, forty eight per cent.
- The value factor explains three, twelve per cent.
- The stock specific part is ten, forty per cent.
- So less than half of the risk is the stock picking Tern describes, and nearly half is one size bet.
- That matches the return story from earlier.
- A position report would have hidden this.
- The lesson is that the method should fit the process, and when the numbers contradict the manager's own description, that itself is a finding.

## 24 A story: whose fault is the loss?

- Owner chooses the menu, benchmarks and managers
- Managers answer only against their own benchmark
- Macro attribution peels the fund return in layers
- Each layer belongs to a different decision-maker

IN THE LESSON

- Picture a restaurant that has a bad month.
- The owner chose the menu, the location and the chefs.
- The chefs only cook what is on the menu.
- If the neighbourhood stops eating the cuisine the owner chose, firing a chef will not fix the month.
- A pension fund is the same.
- The asset owner, here Marlow's investment committee, sets the strategic asset allocation, picks the benchmarks and hires the managers.
- Each manager answers only for performance against its own mandate benchmark.
- Macro attribution peels the fund's return into layers so each party answers for its own choices, and nobody is blamed or paid for results that belong to someone else.

## 25 From policy to fund

*Owner's layers*

Policy benchmark → Tilt from policy weights → Benchmark choices

*Then the managers*

Blended benchmark → Managers' value added → Fund return

IN THE LESSON

- Here are the layers as a flow.
- The top row starts with the policy benchmark: the return of the strategic allocation held passively through index funds.
- Next is the committee's tilt, the effect of running weights that differ from policy.
- Then comes the committee's benchmark choice, because the managers' own benchmarks may differ from the policy indexes.
- After those two, the return of the managers' benchmarks at the actual weights is the blended benchmark.
- On the bottom row, the managers' value added is the fund return above that blend.
- Everything up to the blend belongs to the owner.
- Everything beyond it belongs to the managers.
- The last box is the fund's actual return.

## 26 Splitting the fund's result

**Owner's effect = blended − policy**
**Managers' effect = fund − blended**
**Total = fund − policy**

| | |
|---|---|
| **Policy benchmark** | Passive strategic allocation |
| **Blended manager benchmarks** | Actual weights, own benchmarks |
| **Fund return** | What the fund really earned |
| **Owner's decisions** | Blend minus policy |
| **Managers' value added** | Fund minus blend |

IN THE LESSON

- The arithmetic is short.
- The owner's effect is the blended manager benchmark return minus the policy benchmark return.
- That blend is the return of the managers' own benchmarks at the weights the fund actually held.
- It captures both the tilt away from policy and the choice of benchmarks.
- The managers' value added is the fund's actual return minus that same blended return.
- The two effects add up to the fund's return minus the policy return, which is the total gap the trustees saw.
- The check is that the pieces must add up.
- Both effects can be positive, negative, or one of each, and each should be read on its own.

## 27 Example 7: Marlow's year

*Fund 6.4%; policy 7.0%; actual weights at policy indexes 7.3%; blend 7.1%*

| | | |
|---|---|---|
| **Tilt from policy weights** | 7.3% − 7.0% | **+0.3%** |
| **Benchmark choices** | 7.1% − 7.3% | **−0.2%** |
| **Managers' value added** | 6.4% − 7.1% | **−0.7%** |
| **Fund against policy** | 6.4% − 7.0% | **−0.6%** |
| **Check** | 0.3 − 0.2 − 0.7 | **−0.6%** |

IN THE LESSON

- Marlow's fund returned six point four per cent.
- Its policy benchmark returned seven.
- The committee ran a tilt, and holding the policy indexes at the actual weights would have returned seven point three, a gain of point three from the tilt.
- But the committee also gave its managers benchmarks that differ from the policy indexes, and the managers' own benchmarks at the actual weights returned seven point one, which is point two lower.
- So the owner's total is plus point three minus point two, which is plus point one.
- The managers' value added is six point four minus seven point one, which is minus point seven.
- The fund lagged by point six, and the managers, not the committee, were the cause.

## 28 Marlow's return, step by step

*Return (%)*

| | |
|---|---|
| **Policy** | **7.0** |
| **With tilt** | **7.3** |
| **Blend** | **7.1** |
| **Fund** | **6.4** |

*Each step belongs to a decision-maker*

IN THE LESSON

- This picture walks down the same ladder.
- The vertical axis is the return, in per cent.
- The first bar is the policy benchmark at seven.
- The second is the return with the committee's tilt, seven point three, a little higher.
- The third is the blended manager benchmark, seven point one, which drops back because of the benchmark choices.
- The last is the fund at six point four.
- The step down from the third bar to the fourth is the biggest move in the picture, and it belongs to the managers, not the committee.
- A reader who looked only at the first and last bars would see a shortfall and not know whom to ask about it.

## 29 Who answers for what

*Responsibility follows the decision*

| Decision | Who answers |
|---|---|
| Policy mix, strategic weights | Committee |
| Tilt away from policy | Committee |
| Each manager's benchmark | Committee |
| Security picks in the mandate | Manager |

IN THE LESSON

- This table shows how to assign responsibility.
- The strategic asset allocation, the policy mix between equities and bonds, belongs to the committee, and so does any tilt away from it during the year.
- The benchmark given to each manager belongs to the committee as well, because a poorly chosen benchmark can make a good manager look bad or a poor one look good.
- The choice of individual securities within the mandate belongs to the manager.
- Interpreting each part means asking the right party the right question.
- Ask the committee why it tilted, and ask the manager why it lagged its own benchmark.
- Mixing the two gets the wrong party punished.

## 30 Example 8: a bad year for equities

*Equities −8%, bonds +2%, policy 60/40; blend −4.2%; fund −3.6%*

| | | |
|---|---|---|
| **Policy benchmark** | 0.6 × (−8%) + 0.4 × 2% | **−4.0%** |
| **Owner's effect** | −4.2% − (−4.0%) | **−0.2%** |
| **Managers' value added** | −3.6% − (−4.2%) | **+0.6%** |
| **Check** | −0.2% + 0.6% | **+0.4%** |
| **Verdict** | loss came from policy mix | **Keep managers** |

IN THE LESSON

- Now the trap.
- In a weak year, the policy equity index falls eight per cent and the bond index rises two.
- With sixty per cent in equities and forty in bonds, the policy benchmark is sixty per cent times minus eight plus forty per cent times two, which is minus four.
- The fund returns minus three point six.
- A trustee says the managers lost money and should go.
- But the managers' own benchmarks at the actual weights returned minus four point two, so the committee's choices cost point two, and the managers beat that blend by point six.
- The loss came from the policy mix in a year when equities fell.
- The managers earned part of it back.

## 31 Recap: the lesson in five lines

- Allocation, selection, interaction add to the excess
- Bonds: income and rates first, selection last
- Risk cut: relative or absolute, then the process
- Contribution = weight × covariance ÷ volatility
- Owner's effect and managers' effect add to the gap

IN THE LESSON

- Let us pull the lesson together.
- First, Fachler attribution gives allocation, selection and interaction, which add to the excess return, and a different method can tell a different story.
- Second, in a bond portfolio, income, roll-down, curve and spread effects come first, and selection is only what is left, so do not credit skill for a duration or spread bet.
- Third, choose a risk attribution by two things: whether the mandate is relative or absolute, and how the manager decides.
- Fourth, a position's contribution to risk is weight times covariance over volatility, and it adds to the total.
- Fifth, macro attribution separates the owner's layers from the managers' value added.

## 32 Try three quick questions

1. Weight 35% v 25%; sector 7%, benchmark 5%. Allocation?
   **Answer:** (0.35 − 0.25) × (7% − 5%) = 0.20%.
2. Duration 7 v 5; yields fall 0.30% in parallel. Effect?
   **Answer:** (7 − 5) × 0.30% = +0.60%.
3. Fund 6.0%, policy 5.5%, blend 5.2%. Owner and managers?
   **Answer:** Owner −0.3, managers +0.8; total +0.5.

**IN THE LESSON**

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A manager holds thirty five per cent in a sector that is twenty five per cent of the benchmark.
- The sector returns seven per cent, and the whole benchmark five.
- What is the Fachler allocation effect?
- Ten points overweight times two points is point two per cent.
- Question two.
- A bond portfolio has duration seven against five for the benchmark.
- Yields fall point three per cent in parallel.
- What is the duration effect?
- Two years times point three is point six per cent.
- Question three.
- The fund returns six per cent, the policy benchmark five point five, and the blended manager benchmark five point two.
- What did the owner and the managers contribute?
- The owner lost point three, and the managers added point eight, and together that is point five, the whole gap.