Yield curve positioning

Portfolio Management

1 A story: the forecast on the radio

- The radio already forecasts rain
- Forward rates are the market's forecast
- A view counts only if it differs from forwards
- Rates rise, compared with what?

IN THE LESSON

- Suppose the radio already says it will rain tomorrow, and everyone has packed an umbrella.
- If you also say it will rain, you have told nobody anything, and you earn nothing by carrying yours.
- Bond markets work the same way.
- The yield curve carries a forecast inside it, called the forward rates.
- A forward rate is the rate for a future period that you can lock in today.
- So when Imogen Hale says she expects rates to rise, the first question is, rise compared with what?
- Only a view that differs from the forwards is an active view.
- That is the test every position in this lesson must pass.

2 Finding the forward rate

$$f = (1 + s2)^2 \div (1 + s1) - 1$$

One year rate	Rate for the first year
Two year rate	Annual rate for two years
Forward rate	Break-even rate in a year

IN THE LESSON

- First, how to find a forward rate.
- Take a one year rate and a two year rate.
- Investing for two years must give the same result as investing for one year and then rolling into the one year rate that will apply a year from now.
- That future one year rate is the forward rate.
- So one plus the two year rate, squared, equals one plus the one year rate, times one plus the forward rate.
- Rearrange it, and the forward rate equals one plus the two year rate, squared, divided by one plus the one year rate, minus one.
- It is the break even.
- If the actual rate a year from now ends up above it, staying short wins.
- If it ends up below it, the longer bond wins.

3 Example 1: the hurdle

1-year 2.0%, 2-year 2.6%; Hale expects 2.9% in a year

Forward one-year rate	$1.026^2 \div 1.02 - 1$	**3.20%**
Hale's forecast	a rise from 2.0%	**2.90%**
Roll two one-year bonds	$1.02 \times 1.029 = 1.0496$	**2.45% a year**
Buy the two-year bond	$1.026^2 = 1.0527$	**2.60% a year**
Decision	forecast below forward	**Lengthen**

IN THE LESSON

- Here is Imogen Hale's case.
- The one year rate is two per cent and the two year rate is two point six per cent.
- She expects the one year rate to be two point nine per cent a year from now.
- First the forward.
- One point zero two six squared, divided by one point zero two, minus one, is three point two per cent.
- That is the hurdle.
- Rolling two one year bonds at her forecast grows to one point zero four nine six, about two point four five per cent a year.
- Buying the two year bond grows to one point zero five two seven, two point six per cent a year.
- Her forecast is below the forward, so she lengthens duration, even though she expects rates to rise.

4 The forecast against the forward

One-year rate in a year (%)

Today	**2.0%**
Forwards imply	**3.2%**
Hale expects	**2.9%**

Forecast is below the forward

IN THE LESSON

- Here are three bars.
- The vertical axis is the one year rate a year ahead, in per cent.
- The first bar is today's rate, two per cent.
- The second bar is what the forwards imply for a year from now, three point two per cent.
- The market already expects a rise.
- The third bar is Hale's forecast, two point nine.
- It stands above today's rate, so it sounds bearish.
- But it stands below the middle bar, and measured against what is priced, it is a bullish view.
- Had her bar stood above the middle one, she would have shortened duration instead.
- The exam trap is to compare a forecast with today's rate, when the right comparison is with the forward rate.

5 Level and slope: the rules

Each view is measured against the forwards

Your view	Position
Rates rise more than forwards	Shorten duration
Rise less, or fall	Lengthen duration
Curve steepens more	Duration-neutral steepener
Curve flattens more	Duration-neutral flattener

IN THE LESSON

- Now the rules for the kinds of view.
- Level first.
- If you expect rates to rise by more than the forwards imply, shorten the portfolio's duration below the benchmark's.
- If you expect them to rise by less, or to fall, lengthen it.
- Slope next.
- A steepener profits when long rates rise relative to short rates, so you buy short maturity bonds and sell long maturity bonds.
- A flattener is the reverse.
- The words duration neutral matter here, and we will see why in a moment.
- The third kind of view is about shape, the middle of the curve against its two ends, and we will meet it right after the steepener example.

6 Example 2: a duration neutral steepener

Buy 100m 2-year (duration 1.9); sell 10-year (duration 8.2)

Money duration, 2-year leg	100m × 1.9	**190**
Size of 10-year short	190 ÷ 8.2	**23.2m**
All yields rise 50 bp	−0.95m + 0.95m	**0.00m**
2y −5 bp, 10y +15 bp	+0.095m + 0.285m	**+0.38m**
What paid	only the slope	**Slope bet**

IN THE LESSON

- Hale expects the curve to steepen by more than the forwards imply, with no view on the level.
- She buys a hundred million of the two year bond, which has a duration of one point nine, and sells the ten year bond, which has a duration of eight point two.
- Money duration is the position size times the duration, so the two year leg has one hundred and ninety.
- She sells enough ten year bonds to match it, one hundred and ninety divided by eight point two, about twenty three point two million.
- Test it.
- A parallel rise of fifty basis points costs the long leg nought point nine five million and earns the short leg the same, so the net is nothing.
- If the two year yield falls five basis points and the ten year rises fifteen, she makes nought point three eight million.
- Only the slope pays.

7 The trap: an accidental duration bet

Same trade, but 100m in each leg

Money duration, long 2-year	100m × 1.9	**190**
Money duration, short 10-year	100m × 8.2	**820**
Net position	190 − 820	**−630**
All yields rise 50 bp	−0.95m + 4.10m	**+3.15m**
All yields fall 50 bp	+0.95m − 4.10m	**−3.15m**

IN THE LESSON

- Now the trap.
- Suppose Hale had sold a hundred million of the ten year bond as well, equal sums in each leg.
- The long leg has a money duration of one hundred and ninety.
- The short leg has eight hundred and twenty.
- The net is minus six hundred and thirty, a large short duration position.
- If all yields rise fifty basis points, she loses nought point nine five million on the long leg and gains four point one million on the short leg, a profit of three point one five million.
- But if all yields fall fifty basis points, she loses three point one five million.
- She meant to trade the slope, and instead bet on the level.
- Legs must match in money duration, never merely in size.

8 Shape: bullet or barbell

Middle expected to outperform

Belly yields fall → against both wings → Hold the bullet

Middle expected to lag

Belly yields rise → against both wings → Hold the barbell

IN THE LESSON

- Shape is the third kind of view.
- The middle of the curve is called the belly, and the short and long ends are the wings.
- A bullet portfolio holds its bonds mostly in the belly.
- A barbell holds them at the two ends instead, with the same duration overall.
- Look at the top row.
- If Hale expects belly yields to fall compared with both wings, belly prices rise by more, so she holds the bullet.
- Now the bottom row.
- If she expects belly yields to rise compared with the wings, she holds the barbell.
- Managers often build the position as a butterfly, the belly on one side and the two wings on the other, sized so that the net money duration is zero.
- Again, no accidental bet on the level.

9 Example 3: a duration neutral butterfly

Buy 50m 7-year (D 6.1); sell 3-year (D 2.8) and 15-year (D 11.2)

Money duration, 7-year belly	50m × 6.1	**305**
Each wing offsets half	305 ÷ 2	**152.5**
Sell 3-year	152.5 ÷ 2.8	**54.5m**
Sell 15-year	152.5 ÷ 11.2	**13.6m**
Belly yield alone falls 20 bp	50m × 6.1 × 0.20%	**+0.61m**

IN THE LESSON

- Here is a butterfly.
- Hale expects seven year yields to fall relative to three and fifteen year yields.
- She buys fifty million of the seven year bond, which has a duration of six point one, a money duration of three hundred and five.
- Each wing offsets half, one hundred and fifty two point five.
- She sells the three year bond, with a duration of two point eight, in size one hundred and fifty two point five divided by two point eight, about fifty four point five million.
- And she sells the fifteen year bond, with a duration of eleven point two, about thirteen point six million.
- If the seven year yield alone falls twenty basis points, the position gains fifty million times six point one times nought point two per cent, which is nought point six one million.

10 A story: paying for a storm shelter

- A shelter costs money every year
- Convexity gains from big moves, either way
- A volatility view: how far, not which way
- The price: lower yield or an option premium

IN THE LESSON

- Think of a storm shelter.
- Building one costs money every year, whether or not a storm comes.
- If the storms are fierce, you are glad you paid.
- If the weather stays calm, the money is simply gone.
- Convexity is that shelter for a bond portfolio.
- A convex position gains more when yields fall than it loses when yields rise, and the bigger the move in either direction, the more it helps.
- So a view on interest rate volatility is a view on how far rates will move, not on which way.
- The insurance premium is paid in lower yield, or in an option premium.
- The only question that matters is whether the storms will be fiercer than the price already assumes.

11 Who is long and who is short volatility

Positions in order of convexity

Holding	Volatility exposure
Calls on bond futures	Long: adds convexity
Swaptions bought	Long: adds convexity
Barbell against bullet	More convex
Callables and MBS	Short: negative convexity

IN THE LESSON

- Which holdings give you convexity, and which take it away?
- Buying options does it directly.
- A call option on a bond futures contract, or a swaption, which is an option to enter an interest rate swap, gains from big moves and costs a premium.
- Among ordinary bonds, a barbell has more convexity than a bullet of the same duration, but the bullet yields more.
- At the other end sit callable bonds and mortgage backed securities.
- The issuer or the homeowner holds an option against the investor, so the investor is short volatility and has negative convexity.
- That is why such bonds pay extra yield.
- The investor is being paid to sell the option.

12 What convexity earns

Price change ≈ −D × Δy + ½ × C × Δy²

Duration	Direction term uses it
Yield change	Squared in the gain
Convexity	Paid for in yield
Price change	Approximate, in per cent

IN THE LESSON

- Here is the formula behind the storm shelter.
- The approximate change in a bond's price equals minus duration times the change in yield, plus one half times convexity times the change in yield squared.
- The first term is the direction bet.
- The second term is the convexity gain.
- Because the yield change is squared, it is always positive, whether yields rise or fall, and it grows fast as the move gets bigger.
- A move twice as big gives four times the gain.
- Now compare two portfolios with the same duration.
- Their first terms match, so the difference between them lies entirely in the second term.
- That is why convexity expresses a volatility view and not a direction view.

13 Example 4: pricing the barbell's edge

Same duration 7; barbell yields 0.12% a year less

Extra convexity	85 − 55	**30**
Yield given up	bullet minus barbell	**0.12%**
Break-even move	½ × 30 × Δy² = 0.12%	**0.89%**
Move of 1.5%: gain less cost	0.34% − 0.12%	**+0.22%**
Move of 0.25%: gain less cost	0.01% − 0.12%	**−0.11%**

IN THE LESSON

- Hale compares a barbell with a bullet, both with duration seven.
- The barbell has convexity of eighty five, the bullet fifty five, so the extra convexity is thirty.
- The barbell yields nought point one two per cent a year less.
- That is the price.
- The break even move comes from one half times thirty times the yield change squared, equal to nought point one two per cent, which gives about nought point eight nine per cent.
- If yields move one and a half per cent, the convexity gain is nought point three four, and after the cost she is ahead by nought point two two.
- If yields move only a quarter of one per cent, the gain is about nought point nought one, and she is behind by nought point one one.

14 Net gain against size of move

Chart: Net gain after cost (%) vs Size of yield move (%, 0 to 2)

- Cost: 0.12%
- Break-even: 0.89%
- 1.5% move: net +0.22%

IN THE LESSON

- Here is the example drawn.
- Along the bottom is the size of the yield move, in per cent, from nought to two.
- Up the side is the net gain after paying for the convexity.
- Start at the left.
- With no move at all, the barbell is behind by the whole nought point one two per cent it gave up, so the curve starts below the grey zero line.
- As the move grows, the curve bends upward, because the gain depends on the square of the move.
- It crosses zero at the break even, about nought point nine per cent.
- Past that, a one and a half per cent move nets nought point two two.
- The shelter pays only when the storm is bigger than the break even.

15 Realised against implied

The comparison that decides the position

Your forecast	Position
Realised above implied	Add convexity
Realised below implied	Sell convexity
Add convexity by	Options, barbell, no callables
Sell convexity by	Callables, MBS, write options

IN THE LESSON

- The decision rule has two inputs.
- Implied volatility is the volatility priced into option prices today.
- Realised volatility is how much yields actually move.
- Hale compares her forecast of realised volatility with the implied figure.
- If she expects realised to be above implied, she adds convexity, by buying options such as calls on bond futures or swaptions, or by choosing option free bonds and barbells over callable bonds.
- If she expects realised to be below implied, she sells convexity, by holding callable bonds and mortgage backed securities for their extra yield, or by writing options to collect the premium.
- Notice that she is never asked which way rates will go.
- The comparison is only between two measures of volatility.

16 Example 5: Hale's volatility call

Yield volatility, basis points a year

Implied by swaption prices	the market's price	**85 bp**
Hale's forecast of realised	her own estimate	**110 bp**
Gap	110 − 85	**+25 bp**
View	realised above implied	**Buy convexity**
Callable holdings	short volatility	**Trim them**

IN THE LESSON

- Now her call.
- Swaption prices imply yield volatility of eighty five basis points a year.
- After studying the central bank's signals and the strain in funding markets, Hale forecasts realised volatility of one hundred and ten.
- The gap is twenty five basis points, with realised above implied.
- So the view is to buy convexity.
- She buys swaptions and trims the callable bonds in the fund, because they are short volatility and would lose if her forecast is right.
- But notice the risk.
- If the year turns out calm, with realised volatility well below eighty five, the options expire worthless and the barbell sits on a lower yield.
- Convexity is never free.
- She has paid for her view, and she loses that payment if she is wrong.

17 Mistakes to avoid so far

- Forecast compared with today's rate, not the forward
- Legs sized by notional, not by money duration
- Duration neutral is not the same as riskless
- Treating convexity as free
- Mixing up realised and implied volatility

IN THE LESSON

- Let us collect the common mistakes from the first two topics.
- First, comparing a rate forecast with today's rate, when the test is against the forward rate.
- Second, sizing a steepener or a butterfly by notional instead of money duration, which smuggles in a bet on the level.
- Third, calling a duration neutral trade riskless, when it still carries the risk that the slope or the shape moves the wrong way.
- Fourth, treating convexity as free, when it is paid for in yield or premium and bleeds in a calm year.
- Fifth, mixing up realised and implied volatility, so that a view on how far rates move is not compared with the price of options.

18 A story: two houses, one average

- Duration is an average across the curve
- A key rate duration: one maturity point at a time
- They sum to about the effective duration
- Compare the profile with the benchmark's

IN THE LESSON

- Two houses can have the same average temperature.
- In one, every room is mild.
- In the other, the kitchen is boiling and the bedroom is freezing.
- The average hides where the heat is.
- Duration is that average.
- It tells you how much a portfolio loses if every yield rises by the same amount.
- But the curve does not always move in parallel.
- Short rates may fall while long rates rise.
- A key rate duration measures the sensitivity to a shift at one maturity point on the curve, holding the others fixed.
- Add up the key rate durations of a portfolio and you get, approximately, its effective duration.
- So the set of them gives you the temperature in every room.

19 Where the fund's duration sits

Key rate durations: fund versus benchmark, both total 6.2

2-year	0.5 versus 0.9	**−0.4**
5-year	1.2 versus 1.5	**−0.3**
10-year	2.9 versus 1.9	**+1.0**
30-year	1.6 versus 1.9	**−0.3**
Total	6.2 versus 6.2	**0.0**

IN THE LESSON

- Here are the key rate durations for Hale's fund against its benchmark, at four points on the curve.
- At two years the fund has nought point five, against nought point nine, a gap of minus nought point four.
- At five years, one point two against one point five, a gap of minus nought point three.
- At ten years, two point nine against one point nine, a gap of plus one.
- At thirty years, one point six against one point nine, minus nought point three.
- Each side adds to six point two, so a report showing only duration would call the fund matched, and the gaps add to zero.
- But the fund is heavily overweight the ten year point and underweight the others.
- Each gap is a separate bet on the curve.

20 Relative return from a curve move

Relative return ≈ − Σ (KRD portfolio − KRD benchmark) × Δy

Key rate duration gap	Overweight is positive
Change in that yield	In per cent, at that maturity
Relative return	Approximate, before convexity

IN THE LESSON

- The effect on relative return is simple to estimate.
- For each key rate, take the gap between the portfolio's key rate duration and the benchmark's.
- Multiply by the change in that yield, add the results up, and put a minus sign in front, because rising yields cut prices.
- A positive gap, where the portfolio is overweight, loses when that yield rises and gains when it falls.
- A negative gap does the opposite.
- The next slide runs every key rate through it.
- The formula is approximate, because it ignores convexity.

21 Example 6: a steepening scenario

2y −10 bp, 5y unchanged, 10y +20 bp, 30y +20 bp

2-year	−(−0.4 × −0.10%)	**−0.04%**
5-year	−(−0.3 × 0.00%)	**0.00%**
10-year	−(1.0 × 0.20%)	**−0.20%**
30-year	−(−0.3 × 0.20%)	**+0.06%**
Relative return	sum of the four	**−0.18%**

IN THE LESSON

- Now a scenario.
- The curve steepens.
- The two year yield falls ten basis points, the five year is unchanged, and the ten and thirty year yields each rise twenty basis points.
- At two years, the gap of minus nought point four times a fall of nought point one per cent, with the sign flipped, gives minus nought point nought four.
- At five years, nothing moved, so zero.
- At ten years, a gap of one times a rise of nought point two, flipped, is minus nought point two.
- At thirty years, minus nought point three times nought point two, flipped, is plus nought point nought six.
- The total is minus nought point one eight per cent.
- Same duration, yet the fund lags, almost all because of the ten year overweight.

22 Same duration, different outcomes

Fund against benchmark, same profile

Curve move	Fund against benchmark
Parallel rise of 50 bp	0.00%
Only 10-year up 20 bp	−0.20%
Only 2-year down 25 bp	−0.10%
The steepening above	−0.18%

IN THE LESSON

- Let us run several scenarios through the same profile.
- A parallel rise of fifty basis points leaves the fund level with its benchmark, because the gaps add to zero.
- If only the ten year yield rises by twenty basis points, the fund lags by nought point two per cent.
- If only the two year yield falls by twenty five basis points, the fund lags by nought point one per cent, because it holds less short end duration to profit from the rally.
- And the steepening scenario costs it nought point one eight.
- So the profile tells Hale what she is betting on before the curve moves.

23 Reading the profile as a set of views

- Steepener: overweight short key rates, underweight long
- Bullet: overweight the belly, underweight the wings
- No view on level: the gaps add to zero
- One duration number hides the shape of the risk

IN THE LESSON

- This is also how you express a view.
- A steepening view means overweighting the short key rates and underweighting the long ones.
- A view that the belly will outperform means overweighting the middle key rates and underweighting the wings, which is the bullet.
- If Hale has no view on the level of rates, the gaps should add to zero, so that total duration matches the benchmark.
- If the gaps do not add to zero, she has a level bet as well.
- And here is the trap.
- Two funds with the same duration can be very different risks, one matched along the whole curve and one concentrated at ten years, and a single number cannot tell them apart.
- Always ask for the full profile.

24 A story: a bond and a currency in one

- A foreign bond is a bond plus a currency
- Each curve reflects its own policy and growth
- Overweight the market where yields fall most
- Or trade one curve's slope against another's

IN THE LESSON

- Imagine buying a house in another country because the rent there is higher.
- You have bought two things at once: the house, and the foreign money you will be paid in.
- If the foreign money falls, the higher rent can vanish.
- A foreign bond is the same.
- For Hale, whose fund reports in its home currency, a foreign government bond is a bond position plus a currency position.
- And each country has its own yield curve, shaped by its own monetary policy, inflation and growth.
- So the curves do not move together.
- That gives her choices.
- She can overweight the market where yields should fall most, or trade the slope of one curve against the slope of another.
- Either way, she must decide what to do about the currency.

25 Return in home currency terms

Unhedged ≈ local + currency
Hedged ≈ local + (home short − foreign short)

Local return	Yield plus price change
Currency return	Gain or loss on the money
Home minus foreign short rate	Negative if foreign is higher
Hedged return	Currency risk removed

IN THE LESSON

- In home currency terms, the return on a foreign bond is roughly the local return plus the currency return.
- If Hale leaves the currency unhedged, she keeps both.
- If she hedges with forward contracts, covered interest parity tells her the result.
- Covered interest parity says the forward price of the currency reflects the gap between the two countries' short term interest rates.
- So the hedged return is roughly the local return plus the home short rate minus the foreign short rate.
- When the foreign short rate is higher, that difference is negative, and the hedge costs her.
- Hedging gives up much of a high yield market's extra yield.
- It does not give up the bond's price gain from a fall in the foreign yield.

26 The pickup that hedging removes

Ten-year yield (% a year)

Home bond	**3.50%**
Foreign, unhedged	**5.25%**
Foreign, hedged	**2.75%**

Short rates: home 2.0%, foreign 4.5%; gap −2.5%

IN THE LESSON

- Here are three ten year yields, in per cent a year.
- The home bond yields three point five.
- The foreign bond, unhedged, yields five point two five, and on a screen it looks better.
- Now the third bar.
- The home short rate is two per cent and the foreign short rate is four and a half.
- Hedging pays the gap, two minus four and a half, which is minus two and a half.
- So the hedged foreign yield is five point two five minus two point five, which is two point seven five, below the home bond.
- Once the currency is hedged, the apparent pickup has turned into a shortfall.

27 Example 7: the hedged curve view

Home 10y 3.5%; foreign 10y 5.25%, duration 7.5, expected to fall 40 bp

Hedge adjustment	2.0% − 4.5%	**−2.5%**
Hedged foreign yield	5.25% − 2.5%	**2.75%**
Rate view: yields −40 bp	7.5 × 0.40%	**+3.0%**
Hedged foreign return	2.75% + 3.0%	**5.75%**
Home bond, yield only	no view at home	**3.50%**

IN THE LESSON

- Now the view.
- Hale expects the foreign ten year yield to fall forty basis points over the year, with home yields unchanged.
- The foreign bond has a duration of seven point five.
- First the hedge.
- The home short rate of two per cent minus the foreign short rate of four and a half is minus two and a half.
- The hedged yield is five point two five minus two point five, which is two point seven five.
- Next the rate view.
- Seven point five times forty basis points is a price gain of three per cent.
- So the hedged foreign return is five point seven five per cent, against the home bond at about three and a half.
- The extra comes from the view that foreign yields fall, not from the yield gap.

28 Unhedged: the currency decides

Local return 8.25%; hedged return 5.75%

Foreign currency	Unhedged return
Falls 5.0%	3.25%
Falls 2.5%	5.75%
Unchanged	8.25%
Rises 3.0%	11.25%

IN THE LESSON

- What if Hale leaves the position unhedged?
- The local return is five point two five plus three, which is eight point two five per cent.
- Now add the currency return.
- If the foreign currency falls five per cent, the unhedged return is three point two five, well below the hedged five point seven five.
- If it falls two and a half per cent, exactly the rate gap, unhedged and hedged are equal at five point seven five.
- If it is unchanged, she earns eight point two five, and if it rises three per cent, eleven point two five.
- Uncovered interest parity says that a high yielding currency should fall by about the rate gap, so unhedged would equal hedged on average.
- Staying unhedged is a bet that parity does not hold.

29 A currency carry trade

The trade

Borrow in the low-rate currency → Invest unhedged in the high-rate one → Collect the rate gap

The outcomes

Currency holds: keep the gap →
Falls by the gap: zero profit →
Falls further: a loss

IN THE LESSON

- A carry trade is the unhedged bet in its purest form.
- The top row shows the trade.
- Borrow in a currency with low interest rates, invest the proceeds in a currency with high rates, and do not hedge.
- The investor collects the rate gap as long as the high rate currency does not fall by that much.
- Now the bottom row, the outcomes.
- If the currency holds up, the investor keeps the gap.
- If it falls by exactly the gap, which is what uncovered interest parity predicts, the profit is zero.
- If it falls by more, the trade loses money.
- Carry trades are therefore a bet that uncovered interest parity fails, and they tend to hurt most when markets are under stress.

30 Example 8: a carry trade in numbers

Borrow at 2.0% at home; invest abroad at 4.5%; no hedge

Rate gap earned	4.5% − 2.0%	**2.5%**
Foreign currency flat	the gap is kept	**+2.5%**
Foreign currency falls 2.5%	the gap is lost	**0.0%**
Foreign currency falls 4.0%	2.5% − 4.0%	**−1.5%**
Verdict	parity must fail to pay	**A bet**

IN THE LESSON

- Here is a carry trade in numbers.
- Hale's colleague, Tomas Reyes, proposes borrowing at home at two per cent and investing abroad at four and a half, unhedged.
- The rate gap is two and a half per cent.
- If the foreign currency is flat over the year, he earns the two and a half.
- If it falls two and a half per cent, he earns nothing.
- If it falls four per cent, he loses one and a half per cent, two and a half minus four.
- The small, steady gain sits beside a loss that can be much larger.
- Hale's answer is that if the fund wants currency exposure, it should take it deliberately and size it separately, and not as a hidden side effect of chasing yield.

31 Positioning across currencies

Each view gets its own position

View	Position
Foreign yields fall most	Overweight, hedged
Relative slope view	Duration matched, hedged
View on the currency	Separate, sized bet
Comparing markets	Hedged yields, not screens

IN THE LESSON

- Let us gather the cross market positions.
- If Hale expects yields to fall most in the foreign market, she overweights its duration, and usually hedges, so that the result comes from the rate view.
- If she has a view on relative slope, say the foreign curve flattening while the home curve steepens, she holds duration matched positions in both markets, hedged, so the result depends on the two slopes and not on the exchange rate.
- If she has a view on the currency itself, that is a separate, deliberate decision with its own size.
- And when comparing markets, she compares hedged yields, never raw screen yields.
- The classic trap is to compare unhedged yields across markets as if currency did not matter.

32 Recap: the lesson in five lines

- View versus the forward, legs matched in money duration
- Volatility: realised against implied, convexity has a price
- Key rate duration gaps times yield changes
- Hedged yield = foreign yield + home − foreign short rate
- Carry trade: a bet that parity fails

IN THE LESSON

- Let us pull the lesson together.
- First, a view is active only against the forwards, so shorten or lengthen duration by comparing your forecast with the forward rate, and trade slope and shape with legs matched in money duration.
- Second, volatility views are convexity views: buy it if you expect realised volatility above implied, sell it if below, and remember that convexity is paid for.
- Third, key rate durations show where the fund is overweight or underweight the curve, and the gaps times the yield changes estimate the relative return.
- Fourth, a foreign bond is a bond plus a currency, and hedging gives up the short rate gap.
- Fifth, a carry trade is a bet that parity fails.

33 Try three quick questions

1. 1y 1.0%, 2y 1.5%; manager expects 2.4% in a year. Action?
   Answer: Forward = $1.015^2 \div 1.01 - 1 = 2.0\%$. Forecast above forward: shorten.
2. 5y KRD 1.8 vs 1.2; 5y yield +15 bp. Relative return?
   Answer: $-(0.6 \times 0.15\%) = -0.09\%$.
3. Local 6.0%; home short 2.0%, foreign 3.5%. Hedged?
   Answer: 6.0 + (2.0 − 3.5) = 4.5%.

IN THE LESSON

- Now try three quick questions yourself.
- Question one.
- The one year rate is one per cent and the two year rate is one and a half per cent.
- A manager expects the one year rate a year from now to be two point four per cent.
- What should she do?
- The forward is two per cent, and her forecast is above it, so she shortens duration.
- Question two.
- The fund's five year key rate duration is one point eight against the benchmark's one point two, and the five year yield rises by fifteen basis points.
- What is the approximate relative return?
- Minus nought point six times nought point one five, minus nought point zero nine per cent.
- Question three.
- A foreign bond returns six per cent locally.
- The home short rate is two per cent and the foreign short rate is three and a half.
- What is the hedged return?
- Six plus two minus three and a half is four and a half per cent, so hedging costs the rate gap.