Bond features, covenants, cash flows and structures

Fixed Income

1 A story: an IOU with a schedule

- Issuer: the borrower. Investor: the lender
- Par value: the amount repaid at maturity
- Coupon rate × par = the interest paid each year
- Maturity: the date the loan ends

IN THE LESSON

- Imagine you lend a hundred dollars to a neighbour who runs a small business.
- You write down the deal.
- She will pay you interest twice a year, and give your hundred back on a fixed date in five years.
- That written promise is a bond.
- A bond is a loan that can be bought and sold, and the buyer is the lender.
- The borrower is called the issuer.
- The amount repaid at the end is the par value, also called face value or principal.
- The interest is the coupon.
- The coupon rate is a percentage of par, and it is set when the bond is issued.
- The date the loan ends is the maturity.

2 Meet Kestrel Energy

Kestrel Energy bond (made-up example)

Feature	Kestrel bond
Issuer, currency	Kestrel, US dollars
Par value	100 per bond
Coupon rate	6%, semiannual
Maturity	5 years

IN THE LESSON

- To make this concrete we follow one company all lesson, a made-up energy company called Kestrel Energy.
- Every figure is an example, not real market data.
- Kestrel issues a bond.
- The issuer is Kestrel.
- The par value is one hundred per bond, and we will quote prices per one hundred of par.
- The coupon rate is six per cent, paid in two equal parts each year, which is called semiannual.
- The maturity is five years, so there are ten payments.
- And the currency of denomination is dollars.
- Every payment, and the price paid, is in that one currency.
- These five features describe any plain bond.

3 Coupon payment each period

Coupon payment = Par × Coupon rate ÷ Payments a year

Coupon payment	Cash received each period
Par value	Amount repaid at maturity
Coupon rate	Yearly interest as % of par
Payments a year	Semiannual = 2

IN THE LESSON

- The interest an investor receives each period comes from one short rule.
- Take the par value, multiply by the coupon rate to get the interest for a whole year, then divide by the number of payments a year.
- Notice that the coupon is always based on par, not on the price you paid for the bond.
- Two investors who bought at different prices still receive exactly the same coupon, because the coupon belongs to the bond, not to the buyer.
- Payments a year is called the frequency.
- Semiannual means twice a year, quarterly means four times, and annual means once.

4 Example 1: the coupon cash flows

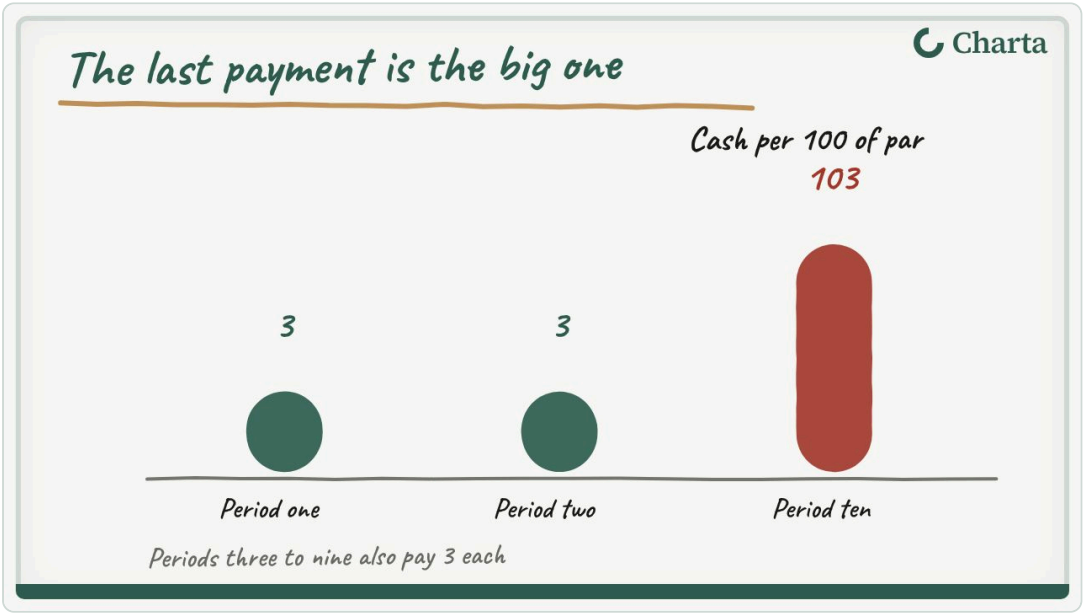
Par held 100,000, coupon 6%, semiannual, 5 years

Interest for a year	100,000 × 6%	**6,000**
Coupon each half-year	6,000 ÷ 2	**3,000**
Ten coupons in all	3,000 × 10	**30,000**
Final payment	3,000 + 100,000	**103,000**

IN THE LESSON

- Example one.
- An investor holds one hundred thousand dollars of Kestrel par.
- Par times six per cent is six thousand dollars a year, and splitting it over two payments gives three thousand dollars every six months.
- Over five years there are ten payments, so the coupons add up to thirty thousand dollars.
- At the very end, the last coupon arrives together with the par value, so the final payment is one hundred and three thousand dollars.

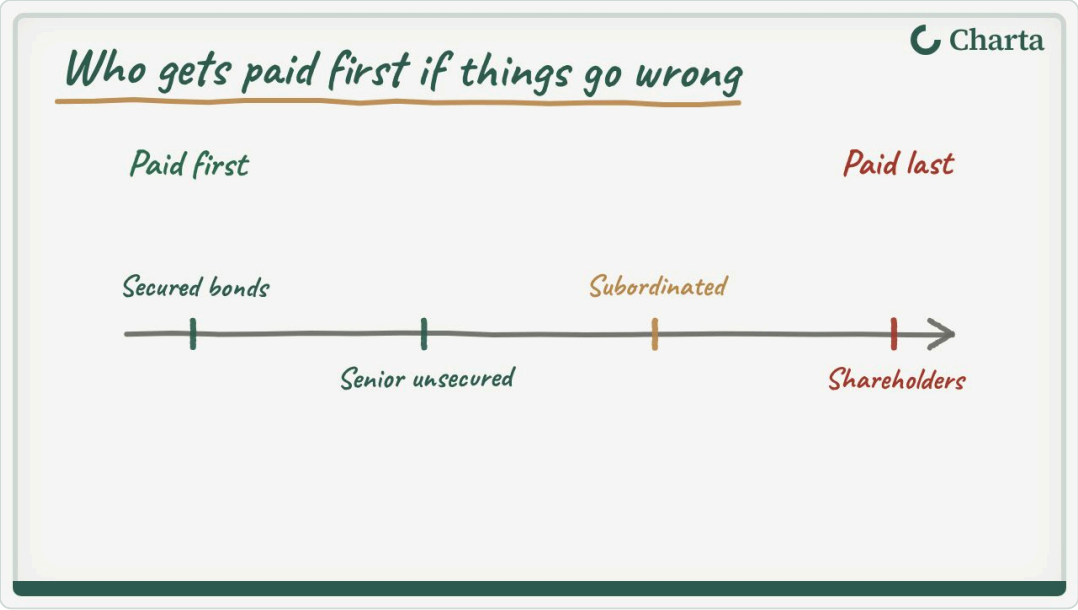
5 The last payment is the big one



IN THE LESSON

- Here are the same cash flows as bars, per one hundred of par.
- The line along the bottom is time, and the side label says how much cash arrives.
- The first bar is the first coupon, three.
- The second bar is the second coupon, also three.
- Coupons three to nine are the same size, so we skip them.
- The last bar is period ten, and it towers over the others at one hundred and three, because it holds the last coupon and the whole par value.
- Remember this picture.
- Most of what you buy in a bond is that single large payment at the end, which is why the issuer's ability to repay on the maturity date matters so much.

6 Who gets paid first if things go wrong



IN THE LESSON

- Another feature is how a bond ranks if the issuer cannot pay.
- Think of a queue at a closing shop.
- Secured bonds are at the front, because they are backed by collateral, which means specific assets that the lender can take if the issuer defaults.
- Next come senior unsecured bonds, which have only the issuer's general promise.
- Behind them are subordinated bonds, which are paid only after the senior lenders.
- At the very back stand the shareholders, who are paid last, if anything is left.
- The lower a bond sits in this queue, the higher the coupon it usually needs to offer, to compensate for the extra risk of losing money.

7 Example 2: coupon rate is not yield

Kestrel bond bought at 95 per 100 of par

Yearly coupon	100 × 6%	**6.00**
Price paid	per 100 of par	**95.00**
Current yield	6.00 ÷ 95.00	**6.32%**
Coupon rate (unchanged)	set on par	**6.00%**

IN THE LESSON

- Example two, which is also a classic trap.
- Suppose an investor buys Kestrel's bond not at par but at ninety-five.
- The coupon is still six per year per hundred of par, because the coupon depends on par.
- But the investor paid only ninety-five, so the return from coupons alone, the current yield, is six divided by ninety-five, or six point three two per cent.
- That is higher than the six per cent coupon rate.
- The yield to maturity is higher still.
- The coupon rate is a promise about par.
- The yield is a fact about the price you paid.

8 A story: the house rules for a loan

- Indenture: the legal contract between issuer and lenders
- Trustee: acts for all bondholders and enforces the terms
- Covenants: the promises and limits written in the contract
- Two kinds: affirmative and negative

IN THE LESSON

- Suppose you lend a large sum to a friend.
- Before handing it over, you might want rules in writing.
- Do not lend to anyone else first.
- Do not sell the car I am counting on.
- Show me your accounts every year.
- A bond works the same way, but there may be thousands of lenders, so the rules go into one legal contract called the bond indenture.
- Because no single lender can watch the borrower, a trustee, usually a bank, is appointed to act for all the bondholders and to enforce the contract.
- The rules inside the indenture are called covenants.
- There are two kinds.

9 Affirmative and negative covenants

Which kind is it? Examples of each

Covenant	Kind
Supply audited accounts	Affirmative
Limit total debt to a ratio	Negative
Do not pledge assets to others	Negative
Cap dividends paid out	Negative

IN THE LESSON

- An affirmative covenant, sometimes called a positive covenant, says what the issuer must do.
- It must pay interest and principal on time, keep its property in good repair and insured, and send audited accounts to the lenders.
- These are good housekeeping and cost the issuer little.
- A negative covenant, also called a restrictive covenant, says what the issuer must not do.
- It must not borrow beyond a stated limit, must not pledge its assets to other lenders, must not sell major assets without consent, and must not pay dividends above a limit.
- These are the ones that really matter, because they stop the issuer from moving value to shareholders or to other lenders after your money has been handed over.

10 A common test: debt to EBITDA

Debt ÷ EBITDA must stay at or below the limit

Total debt	All borrowings added together
EBITDA	Profit before interest, tax, D&A
Covenant limit	Maximum ratio in the indenture

IN THE LESSON

- Negative covenants are often written as a ratio the issuer must stay inside.
- A very common one is debt to E B I T D A.
- E B I T D A stands for earnings before interest, taxes, depreciation and amortisation.
- It is a rough measure of the cash profit a business earns each year before paying interest and tax.
- Dividing total debt by it tells you how many years of that profit it would take to pay off the debt.
- A lower ratio is safer.
- The indenture states a limit, and if the ratio goes above it, the issuer breaks the covenant, which is called a covenant breach, or technical default, even if every coupon has been paid.

11 Example 3: how much more can Kestrel borrow?

Debt 600, EBITDA 200, limit 3.5 times ($ millions, made up)

Ratio today	600 ÷ 200	**3.0x**
Debt allowed	3.5 × 200	**700**
Room to borrow	700 − 600	**100**
Planned new debt	600 + 150 = 750	**750**
Ratio if borrowed	750 ÷ 200	**3.75x**

IN THE LESSON

- Example three.
- Kestrel has debt of six hundred million and E B I T D A of two hundred million, so debt to E B I T D A is three point zero times.
- The indenture sets a limit of three point five times.
- That limit allows total debt of three point five times two hundred, which is seven hundred million, so Kestrel can add only one hundred million of new debt.
- Suppose the managers want to borrow one hundred and fifty million to pay a special dividend.
- Debt would be seven hundred and fifty million, and the ratio three point seven five times, over the limit.
- The covenant blocks the move and protects the lenders.
- A bad year hurts too.
- If E B I T D A fell to one hundred and sixty, the ratio would be three point seven five times, a breach with no new borrowing.

12 Mistakes to avoid so far

- Coupon uses par, never the price paid
- Coupon rate is fixed; yield moves with the price
- Affirmative: must do. Negative: must not do
- Negative covenants protect value; affirmative cost little
- A breach is not a missed payment: a technical default

IN THE LESSON

- Let us pause and collect the traps.
- First, the coupon is paid on par, never on the price you paid.
- A bond bought below par earns more than its coupon rate.
- Second, the coupon rate is not the yield.
- One is fixed in the contract, the other changes with the market price.
- Third, mixing up the two kinds of covenant.
- Affirmative covenants say must do.
- Negative covenants say must not do.
- Fourth, thinking affirmative ones protect value most.
- They do not.
- Negative covenants are the ones that stop the issuer from handing value to shareholders.
- Fifth, believing a covenant breach means a missed payment.
- It does not.
- It is a technical default, and lenders usually negotiate a waiver or a fee.

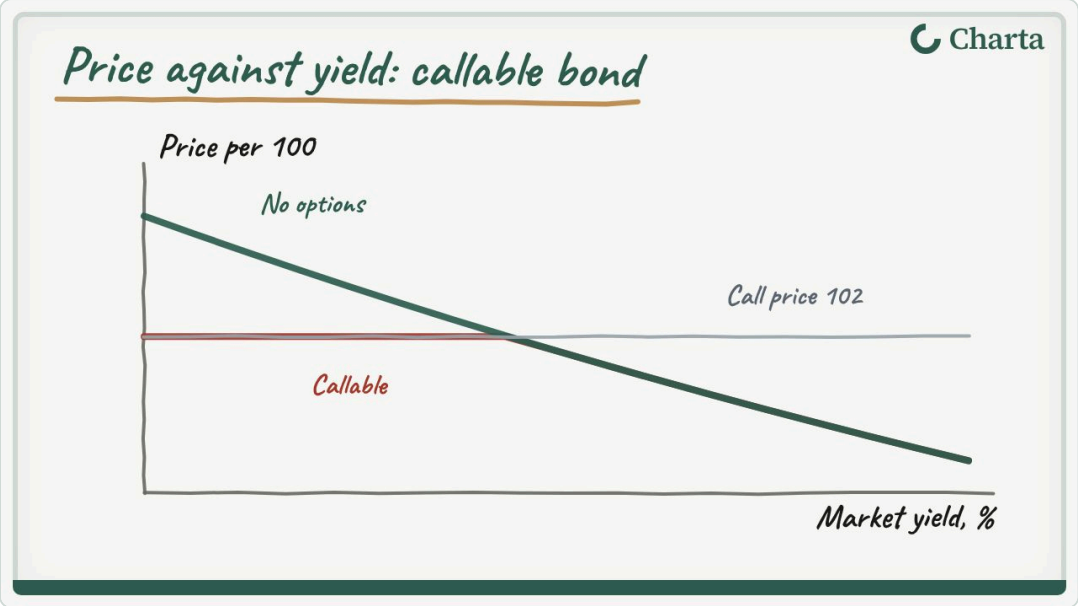
13 A story: the option on the contract

- Call: the issuer may redeem the bond early
- Put: the investor may sell the bond back early
- Conversion: the investor may swap the bond for shares
- Whoever owns the option gains; the other side is paid

IN THE LESSON

- Think about a mortgage.
- If interest rates fall, you can refinance to a cheaper loan, so the option belongs to you, the borrower.
- Bonds can hold options too.
- An embedded option is a right written into the bond that belongs to one side only, and it depends on an event, such as a move in interest rates or in the issuer's share price.
- There are three main kinds.
- A call gives the issuer the right to buy the bond back early.
- A put gives the investor the right to sell it back early.
- A conversion right lets the investor swap the bond for shares.
- The key rule is simple.
- The owner of the option gains, so the other side must be compensated through price or yield.

14 Price against yield: callable bond



IN THE LESSON

- Here is the effect of a call as a picture.
- The bottom axis is the market yield, from two to ten per cent.
- The side axis is the bond price per hundred.
- The upper curve is a bond with no options.
- It slopes down, because when yields rise, prices fall, and it bends upward as yields drop.
- The lower curve is the same bond, but callable at one hundred and two.
- On the right, at high yields, the two curves sit together, because the issuer has no reason to call.
- On the left, where yields are low, the callable line goes flat at the call price, because the issuer will redeem it rather than keep paying a high coupon.
- The investor loses the gains just where an ordinary bond would rise most.

15 Example 4: call price and make-whole price

6% bond, 3 years left, market yield 4%, callable at 102

Option-free price at 4%	PV of 6 periods	**105.6**
Fixed call price	set in the indenture	**102.00**
Investor gives up	105.6 − 102	**3.6**
Make-whole price	PV at 3.5%	**107.06**

IN THE LESSON

- Example four.
- Three years after issue, Kestrel's six per cent bond has six coupon periods left.
- Market yields have fallen to four per cent, so an ordinary bond would be worth one hundred and five point six.
- If the bond is callable at one hundred and two, the issuer can redeem it for that, and the holder gets one hundred and two instead of a bond worth one hundred and five point six, a gap of three point six.
- That is why callable bonds pay higher yields.
- An American call works any time after the first call date, a European call on one date only, a Bermudan call on set dates.
- A make-whole call is different.
- The issuer must pay the present value of the remaining payments, discounted at a government rate plus a small spread, here three point five per cent.
- That comes to one hundred and seven point zero six, so the holder is made whole.

16 Example 5: the put protects the holder

6% bond, 3 years left, putable at 100, market yield 8%

Option-free price at 8%	PV of 6 periods	**94.76**
Put price	set in the indenture	**100.00**
Value of using the put	100 − 94.76	**5.24**

IN THE LESSON

- Example five, the mirror image.
- Suppose the same bond is putable at par, one hundred.
- The investor may sell it back to Kestrel at one hundred on that date.
- Now yields rise to eight per cent, four per cent per half-year.
- An ordinary bond with six periods left is then worth only ninety-four point seven six.
- But the holder does not have to accept that.
- The holder uses the put, sells at one hundred, and gains five point two four per hundred of par, then can reinvest at the higher rates.
- Because the put is valuable to the investor, a putable bond sells for a higher price and offers a lower yield than an otherwise identical bond with no put.
- A put sets a floor under the price when rates rise, just as a call sets a ceiling when rates fall.

17 Convertible bonds: two simple rules

Conversion value = Share price × Conversion ratio
Conversion price = Par ÷ Conversion ratio

Conversion value	Worth if swapped today
Share price	Market price of one share
Conversion ratio	Shares received per bond
Conversion price	Price paid per share when swapped

IN THE LESSON

- A convertible bond lets the investor swap it for a fixed number of the issuer's shares.
- That number is the conversion ratio.
- Divide par by it and you get the conversion price, the price paid for each share if you swap.
- The conversion value is what you would get today: the share price times the conversion ratio.
- The bond also has a straight value, which is what it would be worth as an ordinary bond with no conversion right.
- A convertible is never worth less than the higher of the two, so the conversion right acts like a floor.
- Investors accept a lower coupon in return for the chance to share in the shares' rise.
- A warrant is similar, but it is a separate right to buy shares.

18 Example 6: a Kestrel convertible

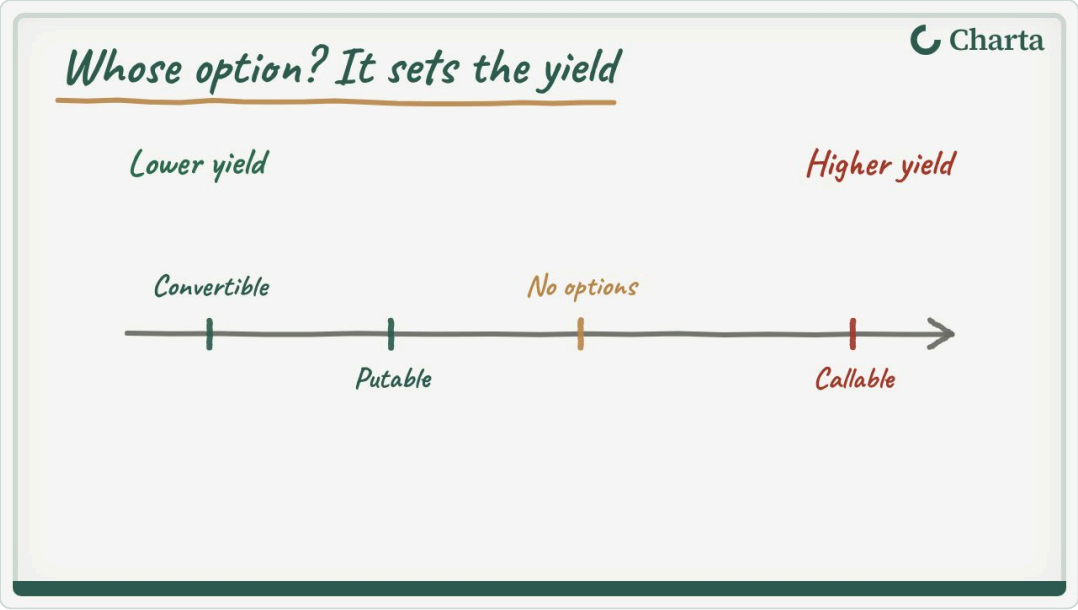
Convertible, 2 shares per 100 of par, shares at $60

Conversion price	100 ÷ 2	**50**
Conversion value	60 × 2	**120**
Floor	higher of 94 and 120	**120**
Market price	5 above floor	**125**
Conversion premium	5 ÷ 120	**4.17%**

IN THE LESSON

- Example six.
- Suppose Kestrel sells a convertible with a conversion ratio of two shares per hundred of par.
- The conversion price is one hundred divided by two, fifty dollars.
- The shares trade at sixty, so the conversion value is sixty times two, one hundred and twenty.
- As a plain bond it would be worth only ninety-four.
- The floor is the higher of the two, so one hundred and twenty.
- The convertible trades at one hundred and twenty-five, five above its conversion value.
- That five is the conversion premium, four point one seven per cent of conversion value, the price for the extra safety of the bond.
- If the shares fell to forty, conversion value would be only eighty, so the bond value would take over as the floor.

19 Whose option? It sets the yield



IN THE LESSON

- Here is the whole story on one line.
- We compare yields of bonds that are the same in every other way.
- In the middle is the plain bond with no options, our reference point.
- A callable bond sits to the right, with a higher yield, because the issuer owns the option and the investor must be paid for giving it up.
- A putable bond sits to the left, with a lower yield, because the investor owns the option and pays for it with a lower return.
- A convertible sits furthest left, because the investor owns a share option, and gives up the most yield.
- When a question asks which bond has the highest yield, ask first who owns the option.

20 A story: the loan that follows the market

- FRN coupon = reference rate + quoted margin
- The coupon resets each period, so price stays near par
- Credit risk remains if the margin is too thin
- Cap: maximum coupon. Floor: minimum coupon

IN THE LESSON

- Not every bond pays the same coupon from start to finish.
- Think of a variable rate mortgage whose payment changes with the bank's rate.
- A floating rate note, or F R N, works the same way.
- Its coupon is a reference rate, a market benchmark such as a short-term interbank rate, plus a fixed extra called the quoted margin.
- The rate is reset at the start of each period.
- Because the coupon keeps up with the market, the price stays close to par.
- If the issuer's credit worsens, though, investors want a bigger margin than the one quoted, and the price falls.
- So a floater removes most of the interest rate risk and leaves the credit risk.
- Some floaters also carry a cap, a ceiling on the coupon, or a floor, a minimum.

21 Floating rate note coupon

FRN coupon rate = Reference rate + Quoted margin

Coupon rate	Annual rate for the next period
Reference rate	Market benchmark at the reset date
Quoted margin	Fixed extra, e.g. 150 basis points

IN THE LESSON

- The rule for a floating rate note is as short as they come.
- The coupon rate for the next period equals the reference rate on the reset date plus the quoted margin.
- The reference rate moves with the market, while the margin is fixed for the life of the bond when it is issued.
- The margin is often quoted in basis points, where one basis point is one hundredth of one per cent, so a hundred and fifty basis points is one and a half per cent.
- The reference rate is set at the start of the period, and the interest is paid at the end.
- The cash payment is par times the annual rate, divided by the number of payments a year.

22 Example 7: a Kestrel floater, with a cap and floor

Par 100, margin 1.5%, semiannual; cap 6%, floor 3%

Reference 4.0%: coupon 5.5%	100 × 5.5% ÷ 2	**2.75**
Reference 4.5%: coupon 6.0%	100 × 6.0% ÷ 2	**3.00**
Reference 3.0%: coupon 4.5%	100 × 4.5% ÷ 2	**2.25**
Reference 5.5%: capped at 6%	7.0% cut to 6.0%	**3.00**
Reference 1.0%: floored at 3%	2.5% lifted to 3.0%	**1.50**

IN THE LESSON

- Example seven.
- Kestrel issues a floating rate note with a margin of one and a half per cent, paid semiannually.
- In the first period the reference rate is four per cent, so the coupon rate is five and a half per cent, and the payment is two point seven five per hundred.
- In the second the reference rate rises to four and a half, giving six per cent and a payment of three.
- In the third it falls to three, giving four and a half and two point two five.
- Now add a cap at six per cent.
- If the reference rate hit five and a half, the formula says seven, but the cap holds it to six, so the payment is three.
- And with a floor at three per cent, a reference rate of one would give two and a half, lifted to three, a payment of one point five.

23 Other coupon designs at a glance

Coupon designs and what they do

Design	How it pays
Step-up	Coupon rises on a schedule
Credit-linked	Coupon rises on a downgrade
Payment-in-kind	Interest paid in more bonds
Index-linked	Inflation adjusts payments

IN THE LESSON

- Now the other designs, each with a different reason.
- A step-up coupon rises on a fixed schedule, so it can reward investors for waiting.
- A credit-linked coupon rises when the issuer is downgraded, which pays holders more at the moment the risk goes up.
- A payment-in-kind bond, or P I K, pays its interest in extra bonds rather than cash, which saves the issuer's cash and often signals a weak borrower.
- An index-linked bond adjusts principal or coupon with an inflation index, so the issuer carries the inflation risk.
- A zero-coupon bond pays no coupons at all and sells at a discount.
- A five-year zero at a four per cent yield costs eighty-two point zero three four eight per hundred.
- A deferred coupon bond pays nothing for a while and then pays.

24 Example 8: step-up and credit-linked

Par 100, semiannual payments

Step-up, first stage	100 × 4% ÷ 2	**2.00**
Step-up, second stage	100 × 5% ÷ 2	**2.50**
Step-up, last stage	100 × 6% ÷ 2	**3.00**
Credit-linked, two notches	5% + 2 × 0.25%	**5.50%**
Credit-linked payment	100 × 5.5% ÷ 2	**2.75**

IN THE LESSON

- Example eight.
- Kestrel sells a step-up bond.
- The coupon rate is four per cent in the first stage, five per cent in the second, and six per cent in the last, all paid semiannually.
- Per hundred of par, the payments are two, two point five and three each half-year.
- Now a credit-linked bond.
- The coupon starts at five per cent and goes up a quarter of one per cent for each downgrade notch.
- If Kestrel is downgraded two notches, the coupon becomes five point five zero per cent, and each payment is two point seven five.
- The investor is compensated automatically, just when the credit risk has risen.

25 Example 9: payment in kind and index-linked

Par 100, yearly steps for simplicity

PIK 6%: year 1 interest	100 × 6%	**6.00**
PIK par after year 1	100 + 6.00	**106.00**
PIK par after year 2	106 + 6.36	**112.36**
Index-linked principal, year 1	100 × 1.03	**103.00**
Index-linked coupon, year 1	103 × 2%	**2.06**

IN THE LESSON

- Example nine, in yearly steps to keep it short.
- Kestrel issues a six per cent payment-in-kind bond with par of one hundred.
- At the end of year one it pays no cash.
- It pays six of new par instead, so the bond becomes one hundred and six.
- In year two the interest is six per cent of one hundred and six, which is six point three six, so par grows to one hundred and twelve point three six.
- Now an index-linked bond.
- The real coupon is two per cent, and the principal rises with inflation.
- If inflation is three per cent in year one, principal becomes one hundred and three and the coupon is two point zero six.
- If inflation is two per cent in year two, principal becomes one hundred and five point zero six and the coupon two point one zero.

26 A story: repaying the loan

- Bullet: all principal at maturity
- Amortising: some principal in every payment
- Sinking fund: the issuer retires part of the issue each year
- The pattern changes credit risk and real life

IN THE LESSON

- There are different ways to pay back a loan.
- Imagine borrowing money for a car.
- You could pay only interest all the way, and hand over the whole sum on the last day.
- Or you could pay a little of the borrowed amount with each instalment, so the debt shrinks month by month.
- Or you could agree to put money aside for repayment every year.
- Bonds have all three.
- A bullet bond repays the whole principal at maturity.
- An amortising bond repays part of the principal in every payment.
- A sinking fund bond requires the issuer to retire a portion of the issue on a schedule, often by buying bonds in the market or calling them.
- Each pattern changes how risky the bond is for the lender.

27 Example 10: an amortising bond

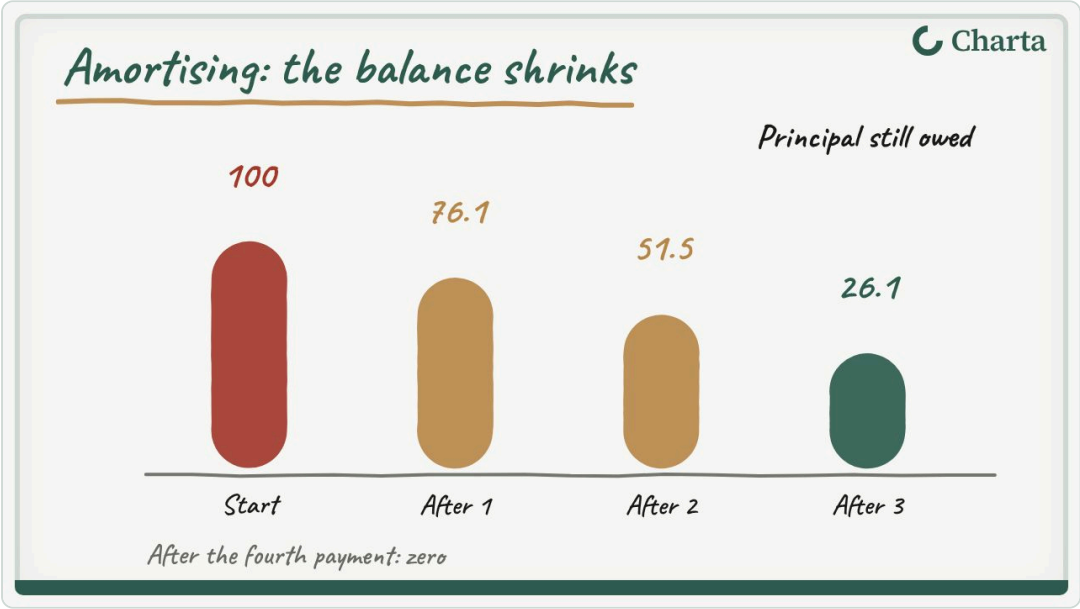
Par 100, 3% per half-year, 4 level payments

Level payment	100 × 3% ÷ (1 − 1.03^−4)	**26.90**
Period 1: interest	100 × 3%	**3.00**
Period 1: principal repaid	26.90 − 3.00	**23.90**
Balance after period 1	100 − 23.90	**76.10**
Balance after period 2	76.10 − 24.62	**51.48**

IN THE LESSON

- Example ten.
- Kestrel borrows one hundred over two years, paid in four half-year instalments at three per cent per period.
- The bond is fully amortising, so the final payment clears the balance and nothing is left over.
- The level payment works out to twenty-six point nine zero two seven each period.
- In period one, interest is three per cent of one hundred, which is three.
- The rest, twenty-three point nine zero two seven, repays principal, and the balance falls to seventy-six point zero nine seven three.
- In period two, interest is three per cent of seventy-six point zero nine seven three, which is two point two eight two nine, so principal repaid is twenty-four point six one nine eight and the balance falls to fifty-one point four seven seven five.
- A partially amortising bond leaves a balloon at the end, so instalments are smaller.

28 Amortising: the balance shrinks



IN THE LESSON

- Here is the balance of that amortising bond as bars.
- The bottom line is time, in half-year steps.
- The side label is the amount of principal still owed.
- The first bar is the start, one hundred.
- After the first payment, the balance is seventy-six point zero nine seven three, after the second it is fifty-one point four seven seven five, and after the third it is twenty-six point one one nine one.
- After the fourth, nothing is owed.
- A bullet bond, in contrast, would show four bars all at one hundred, and the lender stays exposed to the full amount until the very last day.
- The amortising lender has less and less at risk, which lowers credit risk.
- But the repayments come back as cash that must be reinvested, perhaps at lower rates.

29 Weighted average life

WAL = Σ (t × Principal repaid at t) ÷ Total principal

Weighted average life	Average years to repayment
Time, t	Years from today to a payment
Principal repaid	Principal repaid then
Total principal	All principal at the start

IN THE LESSON

- Stated maturity tells you when the last payment arrives.
- It says little about when most of your money comes back.
- For that we use weighted average life, the average time until each unit of principal is repaid.
- Take every date on which principal is paid, multiply the date in years by the principal repaid then, add the results, and divide by the total principal.
- For a bullet bond, weighted average life equals maturity.
- For an amortising bond, it is always shorter.
- Our two-year amortising bond has a weighted average life of only one point two seven years, far less than its maturity of two.
- This is why analysts prefer it to maturity when judging how long capital is really at risk.

30 Example 11: a sinking fund bond

Issue 100m: retire 20 in year 3, 20 in year 4, 60 in year 5

Year 3	3 × 20	**60**
Year 4	4 × 20	**80**
Year 5	5 × 60	**300**
Sum of the three	60 + 80 + 300	**440**
Weighted average life	440 ÷ 100	**4.4 years**

IN THE LESSON

- Example eleven.
- Kestrel issues a five-year bond of one hundred million with a sinking fund.
- It must retire twenty million at the end of year three, another twenty at the end of year four, and the remaining sixty at maturity in year five.
- Multiply each date by the principal repaid then.
- Three times twenty is sixty.
- Four times twenty is eighty.
- Five times sixty is three hundred.
- The total is four hundred and forty.
- Divided by one hundred of total principal, the weighted average life is four point four years, less than the stated five.
- Early retirement shortens the life and lowers credit risk.
- The sinking fund can be met by buying bonds in the market when the price is below par, or by calling bonds at par.

31 Example 12: the sinking fund trap

Sinking fund redeems by lot at par

Market price of the bond	rates have fallen	**106.00**
Sinking fund price	par, drawn by lot	**100.00**
Loss if your bond is drawn	106 − 100	**6.00**

IN THE LESSON

- Example twelve, the catch for the investor.
- When a sinking fund calls bonds, the bonds are usually chosen by lot, like a draw, at a fixed price, often par.
- Suppose Kestrel's bond now trades at one hundred and six because rates have fallen.
- If your bond is drawn, you receive one hundred, and you lose the six premium and must reinvest at the lower rates.
- If your bond is not drawn, you keep it.
- So holders of a sinking fund bond face reinvestment risk, and the issuer may use the fund to call bonds exactly when it is cheapest for the issuer.
- If the market price were below par, say ninety-six, the issuer would simply buy bonds in the market instead, which is cheaper than paying par.

32 Recap: what to remember

- Coupon = par × rate ÷ frequency; yield is not the coupon
- Negative covenants protect; a breach is not a miss
- Call favours issuer; put and conversion favour investor
- Bullet, amortising, sinking fund: judge life by WAL

IN THE LESSON

- A bond has an issuer, a par value, a coupon rate applied to par, a frequency, a maturity and a currency.
- The indenture is the contract, enforced by a trustee.
- Affirmative covenants say what the issuer must do, and negative covenants say what it must not do, and those protect value.
- Embedded options belong to one side only.
- A call favours the issuer, so it needs a higher yield.
- A put and a conversion right favour the investor, so they accept a lower yield.
- A floater pays a reference rate plus a margin and stays near par.
- Other coupons step up, follow credit, pay in kind or track inflation.
- And principal can come back as a bullet, in instalments, or through a sinking fund.

33 Try three quick questions

1. Par 100,000, coupon 5%, semiannual. Each coupon payment?
   Answer: 100,000 × 5% ÷ 2 = 2,500.
2. Conversion ratio 4, share price 30, straight value 98. Conversion value and floor?
   Answer: 4 × 30 = 120. Floor = higher of 98 and 120 = 120.
3. Repays 50 at year 1 and 50 at year 3. Weighted average life?
   Answer: (1×50 + 3×50) ÷ 100 = 2.0 years.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A bond has a par value of one hundred thousand dollars and a five per cent coupon, paid semiannually.
- What is each coupon payment?
- Par times five per cent, divided by two, is two thousand five hundred dollars.
- Question two.
- A convertible has a conversion ratio of four and the shares trade at thirty.
- The straight bond value is ninety-eight.
- What is the conversion value, and what is the floor?
- Four times thirty is one hundred and twenty, and the floor is the higher of the two, one hundred and twenty.
- Question three.
- A bond repays fifty at the end of year one and fifty at the end of year three.
- What is its weighted average life?
- One times fifty plus three times fifty, divided by one hundred, is two point zero years.