CHARTA LEARNING · LESSON NOTES

Bond features, covenants, cash flows and structures

CFA Level I · Fixed Income

You will learn: List the features of a bond, work out coupons, explain covenants and embedded options, and describe how principal is repaid, including weighted average life.

Running example: Worked examples follow one made-up company, Kestrel Energy: a bond with par 100, coupon rate 6% paid semiannually, maturity 5 years (ten payments), in US dollars. Every figure is an example, not market data.

1. The basic features of a bond

- A bond is a loan that can be bought and sold. The issuer is the borrower and the investor is the lender. Par value (face value, principal) is the amount repaid at maturity, the date the loan ends.
- The coupon rate is a percentage of par, set at issue. The coupon is always based on par, never on the price paid, so two investors who paid different prices receive the same coupon. Frequency is the number of payments a year (semiannual 2, quarterly 4, annual 1).
- Ranking if the issuer cannot pay: secured bonds (backed by collateral) first, then senior unsecured, then subordinated, then shareholders. The lower the ranking, the higher the coupon usually needed.
- The coupon rate is a promise about par; the current yield is a fact about the price paid. A bond bought below par earns more than its coupon rate.

Coupon payment = Par × Coupon rate ÷ Payments a year

KESTREL, PAR HELD 100,000, 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**
Bought at 95: current yield	6.00 ÷ 95.00	**6.32% (coupon rate stays 6.00%)**

Watch out: Calculating the coupon from the price paid instead of par; treating the coupon rate as the yield.

2. The indenture and covenants

- The indenture is the legal contract between issuer and lenders. A trustee, usually a bank, acts for all bondholders and enforces it. The rules inside are called covenants.
- Affirmative (positive) covenants say what the issuer must do: pay on time, keep property insured, send audited accounts. They cost the issuer little.
- Negative (restrictive) covenants say what the issuer must not do: borrow beyond a limit, pledge assets to other lenders, sell major assets without consent, pay dividends above a limit. These protect value and matter most.
- A common negative covenant is a maximum debt ÷ EBITDA (earnings before interest, taxes, depreciation and amortisation). Lower is safer. A breach is a technical default even if every coupon is paid, and lenders usually negotiate a waiver or fee.

Debt ÷ EBITDA must stay at or below the limit

KESTREL: DEBT 600, EBITDA 200, LIMIT 3.5 TIMES ($ MILLIONS)

Ratio today	600 ÷ 200	**3.0x**
Debt allowed	3.5 × 200	**700**
Room to borrow	700 − 600	**100**
Planned new debt 150	600 + 150 = 750	**750**
Ratio if borrowed	750 ÷ 200	**3.75x (breach)**
If EBITDA falls to 160	600 ÷ 160	**3.75x (breach, no new debt)**

Watch out: Mixing up the two kinds of covenant; thinking affirmative ones protect most; believing a breach means a missed payment.

3. Embedded options and conversion

- An embedded option is a right that belongs to one side only. A call lets the issuer redeem early, a put lets the investor sell back, and conversion lets the investor swap for shares. The owner gains, so the other side is paid through price or yield.
- A call caps the price when yields fall; a put sets a floor when rates rise. American call: any time after the first call date; European: one date; Bermudan: set dates. Make-whole call: pays the present value of remaining payments.
- A convertible is never worth less than the higher of its straight (plain bond) value and conversion value. Investors accept a lower coupon for the share upside. A warrant is a separate right to buy shares.
- Yield ranking of otherwise identical bonds, lowest to highest: convertible, putable, no options, callable. Ask first who owns the option.

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

KESTREL: CALLABLE, PUTABLE AND CONVERTIBLE BONDS

Call: 6% bond, 3 years left, yield 4%	105.6 option-free vs call price 102	**investor gives up 3.6**
Make-whole price	PV at 3.5%	**107.06**
Put at 100, yield 8%	100 − 94.76	**value of put 5.24**
Convertible: ratio 2, shares $60	100 ÷ 2; 60 × 2	**conversion price 50; value 120**
Floor	higher of 94 and 120	**120**
Market price 125	5 ÷ 120	**premium 4.17%**

Watch out: Forgetting who owns the option when ranking yields.

4. Floating and other coupon designs

- A floating rate note (FRN) pays a reference rate plus a fixed quoted margin, reset each period. The coupon keeps up with the market, so the price stays near par. Interest rate risk mostly goes but credit risk stays: if credit worsens, the price falls.
- The reference rate is set at the start of the period and interest paid at the end. 150 basis points is 1.5%. A cap is a maximum coupon, a floor a minimum.
- Step-up: coupon rises on a schedule. Credit-linked: coupon rises on a downgrade. Payment-in-kind (PIK): interest paid in more bonds, often a weak-borrower sign. Index-linked: payments follow inflation. A zero-coupon bond pays no coupon and sells at a discount: a five-year zero at 4% costs 82.0348.

FRN coupon rate = Reference rate + Quoted margin; payment = Par × annual rate ÷ payments a year

KESTREL FRN: PAR 100, MARGIN 1.5%, SEMIANNUAL; CAP 6%, FLOOR 3%

Reference 4.0%: coupon 5.5%	100 × 5.5% ÷ 2	**2.75**
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**
Credit-linked 5% + 2 notches	5% + 2 × 0.25% = 5.50%	**2.75 per half-year**
PIK 6%, par after year 1 and 2	100 + 6.00; 106 + 6.36	**106.00; 112.36**
Index-linked year 1 (inflation 3%)	100 × 1.03; 103 × 2%	**principal 103.00; coupon 2.06**

5. How principal is repaid

- A bullet bond repays all principal at maturity. An amortising bond repays some principal in every payment, so credit risk shrinks, but cash must be reinvested, perhaps at lower rates. A partially amortising bond leaves a balloon at the end.
- A sinking fund bond makes the issuer retire part of the issue on a schedule. Weighted average life (WAL) is the average time until each unit of principal is repaid: equal to maturity for a bullet bond, shorter for amortising or sinking fund bonds.
- A sinking fund can be met by buying bonds in the market when the price is below par, or by calling bonds by lot at a fixed price, often par. Holders face reinvestment risk.

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

KESTREL: AMORTISING AND SINKING FUND BONDS

Level payment (100, 3% per half-year, 4 payments)	100 × 3% ÷ (1 − 1.03^−4)	**26.90**
Period 1: interest, principal	100 × 3%; 26.90 − 3.00	**3.00; 23.90**
Balance after period 1 and 2	100 − 23.90; 76.10 − 24.62	**76.10; 51.48**
Sinking fund 100m: 20 in yr 3, 20 in yr 4, 60 in yr 5	60 + 80 + 300 = 440	**WAL 440 ÷ 100 = 4.4 years**
Bond trades at 106, drawn at par	106 − 100	**loss 6.00**

Watch out: Judging risk by stated maturity instead of WAL; ignoring that a drawn sinking fund bond is repaid at par even when it trades above.

Key takeaways

- Coupon = par × rate ÷ frequency. It depends on par, not on the price paid, and yield is not the coupon rate.
- Negative covenants protect value; a breach is a technical default, not a missed payment.
- A call favours the issuer (higher yield); a put and conversion favour the investor (lower yield).
- A convertible's floor is the higher of straight value and conversion value (share price × ratio).
- An FRN pays reference rate + quoted margin and stays near par, but credit risk remains.
- Bullet, amortising and sinking fund bonds differ in risk: judge life by weighted average life.

Quick check

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.

Summary notes for the Charta whiteboard lesson. Examples use made-up figures. Watch the full lesson at charta-learning.com.