

1. Instrument Characteristics

- **Basic terms:** issuer, maturity, par (FV), coupon rate & frequency, day-count.
- **Coupon types:** fixed, floating ($Ref_t + Spread$), zero, step-up, deferred, PIK.
- **Seniority:** secured \rightarrow senior unsecured \rightarrow subordinated; covered bonds have dual recourse.
- **Legal:** indenture, covenants (affirmative/negative), cross-default, change-of-control.
- **Contingency provisions:** call, put, conversion, sinking fund, make-whole call.

2. Cash-Flow Structures

- **Level:** bullet (principal at N), fully amortising, balloon (partial amort).
- **Floating-rate note:** $Coupon_t = Ref_t + QM$; quoted margin vs required margin \rightarrow discount/premium.
- **Indexed:** inflation (CPI)-linkers, TIPS — principal indexed, coupon on adj. principal.
- **Dual currency:** coupons in one, principal in another; FX risk.

3. Issuance, Trading, Settlement

- **Primary:** underwritten vs best-effort; auction (uniform vs discriminatory); shelf registration (Rule 415).
- **Secondary:** OTC quote-driven; bid-ask \rightarrow liquidity cost.
- **Settlement:** T+2 corporates, T+1 Treasuries; cash vs delivery-versus-payment.
- **Price quotation:**
- **Day-count:** 30/360 (corp), Act/Act (govt), Act/360 (money market).

4. Bond Pricing & Accrued Interest

- **Full price:** $P_{full} = \sum_{t=1}^N \frac{CF_t}{(1+r)^t}$.
- $Accrued = \frac{Days_{sett}}{Days_{period}} \times Coupon$; $Clean = Full - Accrued$.
- **Yield-price relationship:** convex, inversely related; price elasticity \propto duration.
- **Matrix pricing:** derive YTM via interpolation of comparable bonds.
- **Bootstrapping:** solve for spot z_t sequentially using coupon bonds.

5. Yield Metrics & Spreads

- **Current yield:** $CY = \frac{Coupon}{P_{clean}}$ (ignores capital gain).
- Yield-to-maturity (Street vs true), Yield-to-first-call, Yield-to-worse.
- **Money-market:** discount yield $r_d = \frac{FV - P}{FV} \frac{360}{t}$; add-on $r_{add} = \frac{FV - P}{P} \frac{360}{t}$; $BEY \approx r_{add} \frac{365}{360}$.
- **Par vs spot vs forward curves;** derive forward: $(1+z_A)^A(1+f_{A,B})^{B-A} = (1+z_B)^B$.
- **Spreads:** nominal (vs on-the-run), G-spread (govt), I-spread (swap), Z-spread (zero-vol), $OAS = Z - \text{option cost}$, swap spread = swap – govt.
- Yield ratio (Muni/UST) gauges tax benefit.

6. Duration, DV01 & Convexity

- Macaulay $Mac = \sum t PV(CF_t)/P$; Modified $Mod = \frac{Mac}{1+y/m}$.
- $\% \Delta P \approx -Mod \Delta y$; $DV01 = 0.0001 \times Mod \times P$.
- Effective duration uses scenario prices $D_{eff} = \frac{P_- - P_+}{2P_0 \Delta y}$ for optioned bonds.
- **Key-rate dur:** isolate sensitivity at 2y,5y,10y...; bucket curve shifts.
- **Convexity** $C = \frac{P_- + P_+ - 2P_0}{P_0 (\Delta y)^2}$; $\% \Delta P \approx -D \Delta y + \frac{1}{2} C (\Delta y)^2$.

7. Embedded Options

- $Price_{callable} = Price_{option-free} - Call_{option} \rightarrow$ negative convexity near call price.
- $Price_{puttable} = P_{option-free} + Put_{option} \rightarrow$ floored downside.
- Effective duration/convexity lower (call) or higher (put) than option-free.
- **Yield measures:** Yield-to-call, yield-to-put; OAS adjusts Z for option cost (binomial or Monte Carlo).

8. Term-Structure Theories & Strategies

- Expectations (pure), Liquidity premium (preferred habitat), Market segmentation.
- **Strategies:** bullet vs barbell vs ladder; riding the yield curve; carry-roll-down.
- **Immunisation:** match Macaulay duration to horizon, PV of assets = PV of liabilities; requires rebalancing if yields shift.

9. Credit Risk Analysis

- Expected loss = $PD \times LGD$, credit VaR considers exposure.
- **Ratios:** leverage (D/EBITDA), interest coverage (EBIT/Int), FFO/debt.
- Structural vs reduced-form models; credit migration—transition matrices.
- **Bond spread decomposition:** default risk, liquidity, tax, option, issuance.

10. Securitised Products

- **MBS:** pass-through, PSA prepayment benchmark (100 PSA = 2% CPR in 30th month).
- Average life shorter/longer under contraction/extension; negative convexity.
- **CMO:** PAC tranche (stable CF), support tranche (absorbs prepay variability).
- ABS structures: credit card, auto — amortising vs bullet pay; credit enhancements (subordination, reserve account).

11. Repo & Funding Markets

- Classic repo: sell security, agree to repurchase; reverse repo = other side.
- Repo rate drivers: collateral quality, term, collateral availability, delivery option, Fed policy.
- **Haircut** = $1 - \frac{PP}{MV}$; variation margin resets collateral value.
- **Bank discount yield:** r_d ; Bond-equivalent yield converts MM to bond basis.

12. Performance Attribution & TR Analysis

- **Total return** = Price return + Coupon + Re-investment; horizon return uses projected yield curve.
- Attribution buckets: yield-curve effect, spread effect, selection (issuer), currency (intl).
- Tracking risk measured vs benchmark (index) using ex-post tracking error.