BA II Plus: $\boxed{N}$ = # of Cash flow period

Price ⇐ $\boxed{PV}$ = present value of Cash flow

$\boxed{PMT}$: regular payment

(Actual amount of coupon)

$\boxed{I/Y}$: Interest (discount rate) rate per ~~year~~ period

$\boxed{FV}$: Final Value (= Redemption value)

if coupon=yield ⇒ price=par

If semi-annual, twice? ex: par=100, 10% rate, 5 year, semi-annual, annual YTM 8%, twice,

(Yield to maturity, discount rate)

⇒ N=10, PMT=5 (∵ 100·10%/2), I/Y=4 (8%÷2), FV=100 ⇒ PV=−108.11

- Assumption
  - Hold till end
  - reinvestment O
  - No credit risk

BUT, Actually we don't buy bonds exactly at the issue date. ⇒ Then how?

i.e. 5%, 6/15 and 12/15: payment, YTM: 4%

August 21 settlement ⇒ Price?

① N=4, I/Y=2, PMT=2.5, FV=100 ⇒ PV=−101.904

② Price= $\underbrace{PV}_{\text{Market full-price}}$ + Accured Interest

① $2.5 \times \frac{\text{Date}}{365}$

② $2.5 \times \frac{30}{360}$ ⇒ 12×30

or $P_0 \times (1+Y)^{\frac{\text{Date}}{183}}$ = Full price = Flat price + Accured Int.

(clean = Quoted price)

- YTM ↓ → Price ↑
- Coupon rate ↓ → sensitivity ↑
- Maturity ↑ sensitivity ↑
- price-yield is convex

- Pull to-par: if YTM is fixed, price converges to par value as time passes

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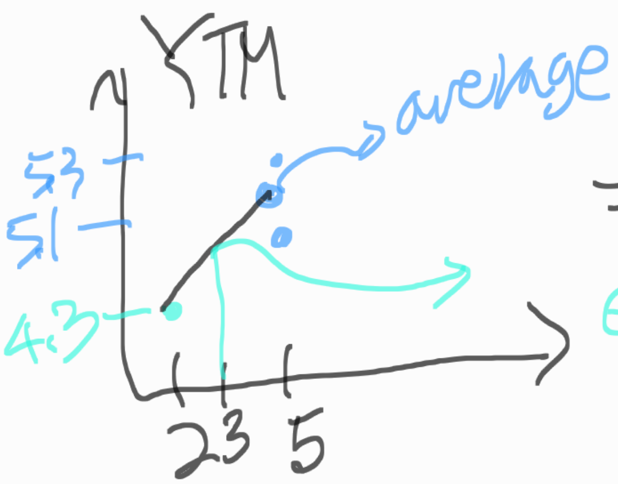
- Matrix pricing: estimating required YTM of illiquid bonds (linear interpol)



⇒ At 3year-bond, YTM?

estimated YTM

4-Year US bond YTM 1.48

5-year corp. YTM 2.64

6-year US Bond YTM 2.15

① 5-Year US Bond: $\frac{1.48+2.15}{2}$
$= 1.815$

② Spread btw US bond and A corp

$\Rightarrow 2.64 - 1.815 = 0.825$

③ $0.825 + 2.15 = 2.975$ (minimum YTM)

Effective Annual yield = Actual yield

① 4%, semi annual $\Rightarrow (1.02)^2 - 1$

4%, quaterly $\Rightarrow (1.01)^4 - 1$

current yield = $\frac{\text{annual coupon}}{\text{bond price}}$

simple yield = $\dfrac{\text{annual coupon} + \text{discount from par}}{\text{Price}}$

Yield to first call) Exercise in first date

Yield to second call

⋮

Yield to Maturity → Held to maturity

worst: yield to worst…

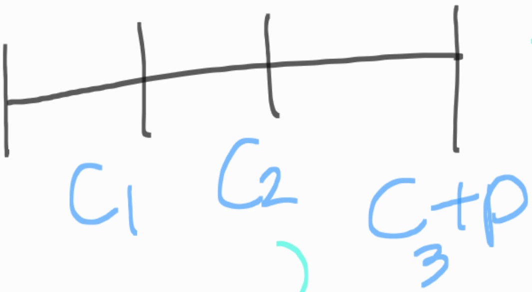
Corp Yield − (Government Bond = G-Spread

① Default risk

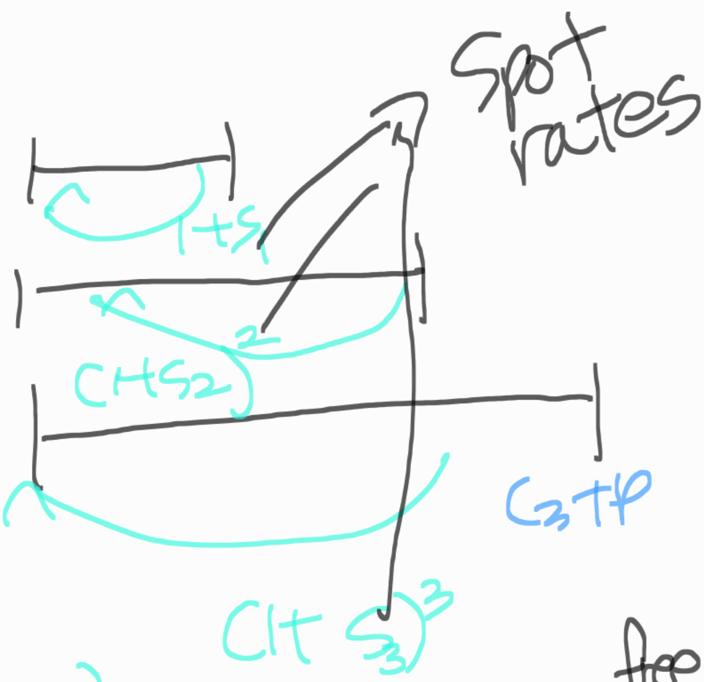
② Liquidity risk

Swap rate = I-Spread.

Spot rate:



discount rate
(considering reinvestment)



⇒ Arbitrage-free Price

$S_1 = TS_1 + Z_1$ → zero-voltality

TS_1 → Government Bond Spread

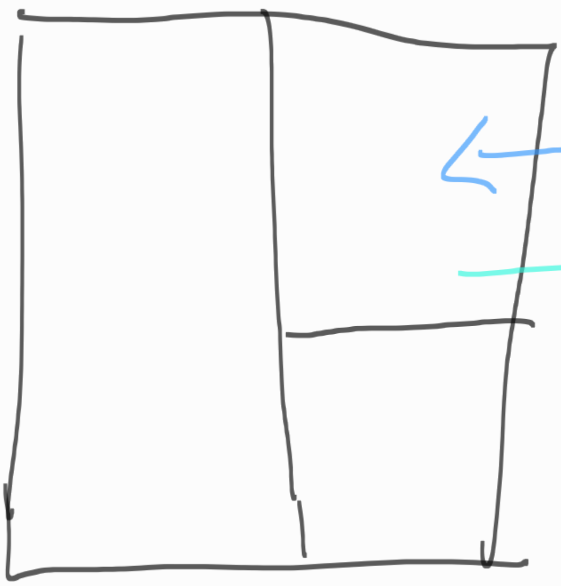
S_1: Spot rate for each period

Callable bond's Z > option-adjusted bond's Z

Given Callable Bond

// removed spread from option //

Floating-Rate Instruments



$100 (Face Value)

FRN

coupon = 1 Year

Libor + 200BP (Quoted Margin)

Money Market yields - $1000, 90, 1.20% discount

$\Rightarrow \frac{1}{4} \times 1.2\% \times 1000 = \$3$ (discount) $\Rightarrow \$997$

⇒ add-on yield: $3/997 \cdot \frac{365}{40} = 1.2230$

- \$1 Milion CD with 120 days to maturity, add-on yield of 1.40% on 365

should be annualized

$\Rightarrow \frac{120}{360} \times 1.4 = 0.46$ ⇒ pay 1.004603

1.40% ⇒ Yield

- 100, add-on 1.50% ⇒ $1.5 \times \frac{365}{360}$
by 360day $= 1.5208\%$

- 180-day quoted at 2.2%, 360-day

$\Rightarrow 180/360 \times 2.2 = 1.1\%$ ⇒ T-bill 989

$\therefore \frac{1000}{989} - 1 = 1.11$

bank quoted add-on yield of 1.5%, 360day based,

semi-annual yield?

⇒ ① Bank is based on simple int.

⇒ Need Effective Bond rate

$$\Rightarrow \left(1 + \frac{0.15}{360} \cdot 100\right)^{\frac{360}{100}} - 1 = 1.5294\%$$

② Adjust rate to semi-annual

$$1.015294^{\frac{1}{2}} - 1 = 0.7618\%$$

③ ×2 (As coupon twice)

$$0.7618 \times 2 = 1.5236$$