

BOND MATHEMATICS AT A GLANCE

PRICE | YIELD | CASH FLOWS | INTEREST-RATE RISK

PRICE

Discount the promised coupon payments and principal at the required yield.

YIELD

YTM is the IRR of promised cash flows at the price paid; realised returns can differ.

RISK

Duration estimates sensitivity. Convexity improves the approximation.

WORKED EXAMPLE: Face 100 | Coupon 8% p.a. | YTM 10% p.a. | 5 years

Annual coupons; settlement on a coupon date; accrued interest = 0; no embedded options.

PRICE

92.42

Per 100 face value

MACAULAY

4.281 years

PV-weighted cash-flow timing

MODIFIED

3.892

Approx. sensitivity per unit yield

CONVEXITY

20.097

Adds curvature to the estimate

DV01

0.0360

Price change for a 1 bp yield move

PRICE / PAR

DISCOUNT

Coupon 8% < yield 10%

THE TWO PRICE CONVENTIONS

Dirty price = Clean price + Accrued interest

Use dirty price for cash paid and consistent DV01 calculations.

THE SENSITIVITY APPROXIMATION

Change in P / P $\approx$ -Dmod $\times$ dy + 0.5 $\times$ Convexity $\times$ dy²

dy is a decimal yield change: 1 bp = 0.0001; 1 percentage point = 0.01.

EXCEL: PV / PRICE $\rightarrow$ price | RATE / YIELD $\rightarrow$ yield | DURATION / MDURATION $\rightarrow$ risk

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