- DURATION OF BONDS

→ IR ↑ → P ↓
IR ↓ → P ↑

INVERSE RELATIONSHIP

⇒ MEASURE OF IR SENSITIVITY

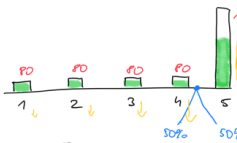
⇒ MODIFIED DURATION

- Ex. 2)

$$D = \sum_{t=1}^{T} t \times w_t$$

$$w_t = \frac{CF_t}{(1+i)^t} \Big/ \text{PRICE}$$

FV = 1,000 USD
YTM = 4% ⇒ COUPON
CR = 8%
TIME = 5 YEARS



P = 1,178.1 USD

$$w_1 = \frac{80}{(1.04)^1} \Big/ 1,178.1$$

$$w_2 = \frac{80}{(1.04)^2} \Big/ 1,178.1$$

$$\vdots$$

$$w_5 = \frac{1,080}{(1.04)^5} \Big/ 1,178.1$$

$$D = (1 \times w_1) + (2 \times w_2) + (3 \times w_3) + (4 \times w_4) + (5 \times w_5)$$

D = 4.37 YEARS

$$MD = \frac{D}{1+IR} = \frac{4.37}{1.04} = 4.2\%$$

IR ↑ 1% ⇒ PRICE ↓ 4.2%

- Ex. 3)
  - FACTORS INFLUENCE SENSITIVITY (DURATION)
    - TTM ⊕
    - COUPON ⊖
    - YTM ⊖

INVESTMENT

- RISK
  - SYSTEMATIC → BETA
  - NON-SYSTEMATIC
    - → ELIMINATION BY DIVERSIFICATION

- Ex. 1) CAPM

$$E_{R_i} = R_F + \beta_i \times (E_{R_m} - R_F)$$

R_F: RISK FREE
β_i: RISK FUL
E_{R_m}: MARKET RISK PREMIUM

→ WE DON'T KNOW

RRR

$$\frac{E_{R_i} - R_F}{\beta_i}$$

- Ex. 2) $E_R = 8 + 0.7 \times (16 - 8) = 13.6\%$

5.6%

- Ex. 3)

0	-2,000,000	
1	+600,000	$\frac{600,000}{(1.1)^1}$
2	+600,000	⋮
3	+600,000	⋮
4	+600,000	⋮
5	+600,000	⋮
6	+600,000	$\frac{600,000}{(1.1)^6}$

$\frac{CF_t}{(1+IR)^t}$

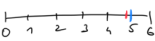
2,239,474.7
-2,000,000
239,474.7
NPV

NPV = ?

IRR = ? IRR > WACC 10%

PP = 3.5 YEARS

DPP = 4.94 YEARS



MONEY MARKET HEDGE

- Ex. 5)

FUTURE CASH OUTFLOW → 1,000,000 USD ; 2 MONTHS

FUTURE CASH INFLOW → 1,000,000 USD ; 2 MONTHS

③ $\frac{1,000,000 \text{ USD}}{\left(1 + \frac{0.03}{6}\right)} = 995,025$ USD (LEND)

② $\frac{995,025}{1.2500} = 796,020$ EUR (EXCHANGE)

① $796,020 \times \left(1 + \frac{0.04}{6}\right) = 801,327$ EUR (BORROW) (COST)

FUTURE CASH INFLOW → 1,000,000 USD ; 2 MONTHS

FUTURE CASH OUTFLOW → 1,000,000 USD ; 2 MONTHS

$\frac{1,000,000 \text{ USD}}{\left(1 + \frac{0.03}{6}\right)} = 995,025$ USD (BORROW)

$\frac{995,025}{1.2500} = 796,020$ EUR (WE HAVE)