Investment Decision Cheatsheet

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Time Value of Money

	Compound Interests	Annuities
Present Value	$V_0 = \frac{V_n}{(1+r)^n} = V_n \times (1+r)^{-n}$	$V_0 = a \times \frac{(1-(1+r)^{-n})}{r}$
Future Value	$V_n = V_0 \times (1+r)^n$	$V_n = a \times \frac{((1+r)^n-1)}{r}$

Present value of any financial asset $P_0 = \sum_{t=1}^{n} \frac{F_t}{(1+r)^t} = \frac{F_1}{(1+r)} + \frac{F_2}{(1+r)^2} + \ldots + \frac{F_n}{(1+r)^n}$

Equity Cost and Value

Gordon Model $P_0 = \frac{Div_1}{(k_E - g)}$ thus cost of equity $k_E = \frac{Div_1}{P_0} + g$ P_0 is stock price here

CAPM Cost of equity $k_E = r_f + \beta \times (E(R_m) - r_f)$ $\beta_{UL} = \frac{\beta}{\left[\left(\frac{D \times (1-\tau)}{E}\right) + 1\right]}$

Debt Cost and Value

$$\text{Bond price } P_0 = \text{CouponValue} \times \frac{(1 - (1 + YTM)^{-n})}{YTM} + \frac{\text{Repayment}}{(1 + YTM)^n}$$

Cost of debt $k_D = i \times (1 - \tau)$ Note: use $i = YTM$ for k_D calculation

WACC

$$WACC = \left(\frac{D}{(D+E)} \times k_D\right) + \left(\frac{E}{(D+E)} \times k_E\right)$$

Investment decision

Net cash flow:

Investment CF (negative) + Operating CF (EBITDA - Tax - Increase in WCR) + End of project CF (e.g. after tax final value of assets)

$$NPV = \sum_{t=0}^{n} \frac{F_t}{(1+WACC)^t} = F_0 + \frac{F_1}{(1+WACC)} + \frac{F_2}{(1+WACC)^2} + \ldots + \frac{F_n}{(1+WACC)^n}$$

Note: F_0 is usually negative (investment cash outflow + initial WCR outflow)

V_0 P_0 Value or price at time 0 present value

V_t P_t Value or price at time t

i r Interest, discount rate or return %

F_t CF_t Cash flow at time t

D Debt market value

k_D Cost of debt (rate in %)

YTM Yield to Maturity (rate in %)

E Equity market value

k_E Cost of equity (rate in %)

Div_t Dividend for period t

τ Corporate tax rate

g Compound growth rate %

$E(R_m)$ Expected market return %

r_f Risk free rate %

β_{UL} Unlevered beta