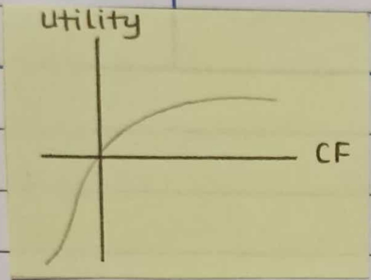
UTILITY Approach to Capital Budgeting

Expected utility = ΣPU

Cash Flows	Probability (P)	Utility (U)	PU
		Expected Utility = xxx	

↑ Higher the better



Q.1

We will select that project which provides highest expected utility

→ Project A :-

Cash Flow	Probability (P)	Utilities (U)	PU
-15000	0·1	-100	-10
-10000	0·2	-60	-12
15000	0·4	40	16
10000	0·2	30	6
5000	0·1	20	2
		Expected Utility = 2	

→ Project B :-

Cash Flow	Probability (P)	Utilities (U)	PU
-10000	0·10	-60	-6
- 4000	0·15	- 3	-0·45

15000	0·40	40	16
5000	0·25	20	5
10000	0·10	30	3
		Expected Utility = ΣPU =	17·55

Certainty Equivalent Coefficient & RADR.

0 ———————— 1 $\quad R_f = 8\%$, $K_c = 17\%$

(50000) $\quad$ 70000 → expected CF → uncertain.

Govt. sec. → 56000 → certain → no risk

$$NPV = \frac{56000}{1.08} - 50000 \cong 1852$$

'n' = normal risk premium = $K_c - R_f = 17 - 8 = 9\%$.

↳ risk for current risk of the firm.

If 70000 represents average risk or existing risk of the firm, then use 'K_c'.

1. RADR → given .... dance
2. RADR → $K_c + dk$ .... (dk = extra / differential risk premium)

Eg: extra risk risk premium would be 25% of normal risk premium.

$\therefore$ $dk = 9 \times 0.25 = 2.25$

RADR = $K_c + 2.25 = 17 + 2.25 = 19.25\%$.

3. RADR → R_f + Risk premium.

Eg: For above project use risk premium of 11.25%.

$\therefore$ RADR = $R_f + 11.25 = 8 + 11.25 = 19.25\%$.

4• RADR → $R_f + (k_e - R_f)$ Risk Index .... (CAPM ka cheater)
sensitivity of project w.r.t. firm not nifty.

5• RADR depends on "CV"

0 — 1

(50000) — 70000 (with risk)

↑

iske badle kitna certain chahiye

0.8

certainty coefficient (α) ← 0.95

56000 → Manmohan Singh

66500 → Modiji

$$\sum_{t=1}^{n}\left[\frac{\text{Expected CF} \times \alpha_t}{(1+r_f)}\right] - I$$

→ If something is certain, $\alpha = 1$
→ If something is uncertain, $\alpha < 1$
↑
kitna less ?
↓

- If firm is highly risk averse (jada fattu), α would be low - Manmohan Singh.
- If something is too risky, α would be low.

∘∘∘ Link b/w α & RADR -
If α is low, high risk → high RADR

Q.2 / pg

Q.3

$$\alpha_{t+1} = \frac{\alpha_t(1.09)}{1+k}$$

$\alpha_0 = 1 \quad \therefore \quad \alpha_1 = \dfrac{1(1.09)}{1+k}$

$\alpha_2 = \dfrac{(1.09)^2}{(1+k)^2}$

$\alpha_3 = \dfrac{(1.09)^3}{(1+k)^3}$

$\therefore \alpha_t = \left[\dfrac{1.09}{1+k}\right]^t$

$NPV = 10 \times \dfrac{1.09}{1+k} \times d_f(8\%, 1) + 15 \times \dfrac{(1.09)^2}{(1+k)^2} \times d_f(8\%, 2) +$

$\ldots\ldots + 5 \times \dfrac{(1.09)^7}{(1+k)^7} \times d_f(8\%, 7) - 6000000$

$NPV = \dfrac{10.09}{1+k} + \dfrac{15.28}{(1+k)^2} + \dfrac{16.45}{(1+k)^3} + \dfrac{16.6}{(1+k)^4} + \dfrac{12.57}{(1+k)^5} + \dfrac{8.46}{(1+k)^6}$

$+ \dfrac{5.33}{(1+k)^7} - 6000000$

Extra cash Flow p.a.
$= (10.09 + 15.28 + 16.45 + 16.6 + 12.57 + 8.46 + 5.33 - 60) \div 7$ years
$= 3.54$
Expected rate $= \dfrac{\text{Extra CF}}{I} \times 100 \times 1.5$
$= \dfrac{3.54}{60} \times 100 \times 15$
$= 8.85\%$
(shuru me cash Flow jada hai
$\therefore$ Good pattern $\therefore$ higher rate $= 10\%$)

Let $k = 10\%$.
$NPV = 0.81$

Let $k = 11\%$,
$NPV = -1$

$k = LR + \dfrac{NPV_{LR}}{NPV_{LR} - NPV_{HR}}(HR - LR)$

$= 10 + \dfrac{0.81}{0.81 - (-1)}(11 - 10)$

$k \cong 10.45\%$

Q.7

$kc = 12\%$

$Rf = 7\%$

$\therefore n = 5\%$

$dk = 1/2 \text{ of } n = 1/2 \text{ of } 5 = 2.5\%$

$\therefore RADR = kc + dk = 12 + 2.5 = 14.5\%$

$$NPV = \frac{60}{(1.145)} + \frac{55}{(1.145)^2} - 100 = -5.65$$

$\therefore$ The project is rejected.

Q.6

$NPV = 3000000 \times PVAF\,(15\%, 5) - 1100000$

$= -943534.7$

Co. should not enter into new project.

Q.5

$RADR = Rf + (kc - Rf) \times RI$

$= 10 + (15 - 10) \times 1.8$

$= 19\% \rightarrow$ Project 1

similarly

$RADR = 15\% \rightarrow$ Project 2

$RADR = 13\% \rightarrow$ Project 3

Q.4

Project X $\rightarrow$ $NPV = 70000 \times 3.274 - 210000$

$= 19180$

Project Y $\rightarrow$ $NPV = 42000 \times 3.433 - 120000$

$= 24186$

Project Z $\rightarrow$ $NPV = 30000 \times 3.605 - 100000$

$= 8150$

Inflation & Capital Budgeting

CA Final AFM → 60% syllabus → DCF

$$PV = \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \dots\dots + \frac{CF_n}{(1+r)^n}$$

Nature of Cash Flows & Discount rate should be same

Cash Flows	required rate (r)	
certain	R_f	Risk
uncertain	RADR	
Real (Todays purchasing power)	Real 'r'	Inflation
Nominal	Nominal 'r'	
Home currency CF	HC 'r'	International project appraisal } currency
Foreign currency CF	FC 'r'	
Pre-tax CF	pre-tax 'r'	taxation
Post tax CF	post-tax 'r'	

0 ———— 1
(50000)

ek saal baad jo
output sale krenge
usme agar aajka
price lenge .... jo raw
material & labour
cost hai ... usme bhi
aajka rate liye .... toh
$CFAT_1$ is in real terms
i.e. not PV .... it is standing at
T=1 but reflecting today's purch. power.

Inflation k sath
CF ka projection
↳ nominal.

Inflation k bina
CF ka projection
↳ real.

- Discount rate

$\downarrow$

Re
- → RF real = 3%
- → Inflation premium = 4%
- → Risk premium = 5%

RF nominal = 7.12%
RA real = 8.15%
RA nominal = 12.476%

- Cash Flows
  - → Nominal → RA nominal → Nominal Kc
  - → Real → RA real → Real Kc