

## FINANCE QUESTION BANK WITH SOLUTIONS

### 1. DCF MODELLING

#### NUMERICAL QUESTIONS:

1. A firm's free cash flows for the next 3 years are ■100, ■120, and ■140. WACC = 10%, growth = 5%. Find the firm's value.

Solution:

$$PV = (100/1.1) + (120/1.1^2) + (140/1.1^3) + [140*(1.05)/(0.10 - 0.05)]/(1.1^3)$$

$$PV = 90.9 + 99.2 + 105.2 + 1470.7 = \text{■}1765.9$$

2. Terminal value if FCF4 = ■200, g = 4%, WACC = 10%.

$$TV = 200*(1.04)/(0.10-0.04) = \text{■}3466.67$$

3. DCF = ■1000 crores, debt = ■200 crores. Equity value = 1000-200 = ■800 crores.

4. When WACC increases, valuation decreases because discounting increases.

5. Project NPV: FCF = ■50,000 for 5 yrs, WACC=8%

$$NPV = 50,000*(1-(1.08)^{-5})/0.08 = \text{■}199,636.$$

6. If TV = 500, FCF5=25, r=10%:

$$500 = 25*(1+g)/(0.10-g) \rightarrow g=0.05 \text{ or } 5\%$$

7. FCF=100, g=3%, r=9%. Value =  $100*(1.03)/(0.09-0.03) = \text{■}1716.7$

#### THEORY:

1. Define DCF and why it's used.
2. Differentiate between WACC and cost of equity.
3. Why is terminal value important?
4. What are limitations of DCF?

### 2. RISK AND RETURN

#### NUMERICAL QUESTIONS:

1. Given returns: 10%, 12%, 8% with probabilities 0.2, 0.5, 0.3. Find E(R).

$$= (0.2*10)+(0.5*12)+(0.3*8)=10.9\%$$

2. Find variance.

$$= 0.2*(10-10.9)^2 + 0.5*(12-10.9)^2 + 0.3*(8-10.9)^2 = 2.09$$

$$SD = \sqrt{2.09} = 1.45\%$$

3. If risk-free = 5% and market return = 10%, find market premium.

$$= 10 - 5 = 5\%$$

4. If expected return = 14%, risk-free = 4%, market premium = 8%. Find beta.

$$\beta = (14-4)/8 = 1.25$$

5. Two assets:  $R_1=10\%$ ,  $R_2=15\%$ ,  $w_1=0.4$ ,  $w_2=0.6$ . Portfolio return =  $(0.4*10)+(0.6*15)=13\%$

6. If variance<sub>1</sub>=0.01, variance<sub>2</sub>=0.04, covariance=0.015, find portfolio variance.

$$= (0.4^2*0.01)+(0.6^2*0.04)+2*(0.4*0.6*0.015)=0.0244$$

7.  $SD_p = \sqrt{0.0244} = 15.6\%$

THEORY:

1. Define risk and return.
2. Explain systematic vs unsystematic risk.
3. Why is diversification beneficial?

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3. CAPM

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NUMERICAL:

1.  $R_f=5\%$ ,  $R_m=12\%$ ,  $\beta=1.2$ .  $E(R)=5+1.2*(12-5)=13.4\%$
2. If  $\beta=0.8$ ,  $R_f=6\%$ ,  $R_m=10\%$ ,  $E(R)=6+0.8*(4)=9.2\%$
3. If expected=11%,  $R_f=4\%$ ,  $R_m=12\%$ , find  $\beta$ :  $\beta=(11-4)/(12-4)=0.875$
4. Portfolio  $\beta$ :  $w_1=0.4$ ,  $\beta_1=1.2$ ,  $w_2=0.6$ ,  $\beta_2=0.8 \rightarrow \beta_p=0.96$
5. If market premium=5% and  $\beta=1.5$ , excess return=7.5%
6. Risk-free = 3%, expected=12%, find market premium if  $\beta=1.5 \rightarrow (12-3)/1.5=6\%$
7. If risk-free rate increases, expected return increases.

THEORY:

1. State assumptions of CAPM.
2. Explain SML and what it represents.
3. Limitations of CAPM.

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4. STOCKS AND BONDS

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NUMERICAL:

1.  $D_0=2$ ,  $g=4\%$ ,  $r=10\%$ .  $P_0=2*(1.04)/(0.10-0.04)=\blacksquare 34.67$
2. Bond:  $C=80$ ,  $F=1000$ ,  $n=3$ ,  $r=8\%$ .  $P=80/(1.08)+80/(1.08)^2+1080/(1.08)^3=\blacksquare 1026.8$
3. YTM:  $950=80/(1+y)+1080/(1+y)^2 \rightarrow y=10.6\%$
4. If coupon  $\uparrow$ , price  $\uparrow$  (inverse relation).
5. Growth = (ROE \* Retention ratio).
6. Duration =  $\sum t*PV(CF)/P$
7. If rate rises by 1%, bond price falls by Duration% approx.

THEORY:

1. What is intrinsic value?
2. Explain why bond prices and interest rates move inversely.
3. Differentiate coupon rate and YTM.
4. Explain growth rate estimation.

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(More topics continue similarly...)