MBA 614 Sample Final Exam

Problem 1:

Delta Corporation is considering an investment of $400,000 in a new machine, which belongs to asset class 43 with a CCA rate of 30 percent. The machine is not the only asset in the asset class. The firm's effective tax rate is 40 percent. The company has the following estimates:

	Base case	Best case	Worst case
Project life	6 years	8 years	4 years
Discount rate (k)	10%	8%	12%
Salvage value	$50,000	$60,000	$40,000
Annual after-tax operating cash flows	$80,000	$100,000	$60,000

A. Determine the NPV for each scenario.
B. Would you recommend the company to undertake the project if each scenario is equally likely? Why?
   Suggested Answer

A.   Base case scenario:

$$PV(CCATS) = \frac{\$400,000*.4*.3}{(.1+.3)} \times \frac{1.05}{1.10} - \frac{\$50,000*.4*.3}{(.1+.3)} \times \frac{1}{1.10^6} = \$106,078.35$$

$$PV(CFAT) = \$80,000*PVAF(10\%,6) = \$348,420.86$$

$$PV(ECF) = \frac{\$50,000}{1.10^6} = \$28,223.70$$

$$NPV = -\$400,000 + \$106,078.35 + \$348,420.86 + \$28,223.70 = \$82,722.91$$

Best case scenario:

$$PV(CCATS) = \frac{\$400,000*.4*.3}{(.08+.3)} \times \frac{1.04}{1.08} - \frac{\$60,000*.4*.3}{(.08+.3)} \times \frac{1}{1.08^8} = \$111,400.75$$

$$PV(CFAT) = \$100,000*PVAF(8\%,8) = \$574,663.89$$

$$PV(ECF) = \frac{\$60,000}{1.08^8} = \$32,416.13$$

$$NPV = -\$400,000 + \$111,400.75 + \$574,663.89 + \$32,416.13 = \$318,480.77$$

Worst case scenario:

$$PV(CCATS) = \frac{\$400,000*.4*.3}{(.12+.3)} \times \frac{1.06}{1.12} - \frac{\$40,000*.4*.3}{(.1+.3)} \times \frac{1}{1.12^4} = \$100,900.20$$

$$PV(CFAT) = \$60,000*PVAF(12\%,4) = \$182,240.96$$

$$PV(ECF) = \frac{\$40,000}{1.12^4} = \$25,420.72$$

$$NPV = -\$400,000 + \$100,900.20 + \$182,240.96 + \$25,420.72 = -\$91,438.12$$

B. The Expected NPV = $\dfrac{\$82,722.91 + \$318,480.77 - \$91,438.12}{3} = \$103,255.19$

The base case NPV suggests that the project should be accepted because it generates a positive NPV. The best case NPV suggests that the project is very attractive and should be accepted. The worst case NPV suggests that the project is unattractive and should be rejected.

Examining these three scenarios reveals that the project is risky though it seems attractive and has significant upside, because it could turn out to be a losing proposition.

Given the project's expected NPV is of a positive, large value, the project should be accepted.

Problem 2:
The risk-free rate is 4 percent. The expected return on the market portfolio is 12 percent with a standard deviation of 16 percent. Which security is over, under, or correctly priced?

Security	P_0	D_1	P_1	Beta
ABC	$25.00	$1.50	$28.46	1.6
DEF	$12.00	$0.60	$13.80	2.0
GHI	$18.00	$0.80	$19.25	1.3

Suggested Answer:

Security	Expected Return		Required Return	
ABC	$\dfrac{\$1.5+\$28.46}{\$25}-1=19.84\%$	>	$4\%+1.6(12\%-4\%)=16.8\%$	Underpriced
DEF	$\dfrac{\$0.6+\$13.8}{\$12}-1=20\%$	=	$4\%+2(12\%-4\%)=20\%$	Correctly priced
GHI	$\dfrac{\$0.8+\$19.25}{\$18}-1=11.39\%$	<	$4\%+1.3(12\%-4\%)=14.4\%$	Overpriced