Homework Assignment 2 Fall 2021

Due Date: November 25, 2021 Student's Name: Chan Cho Kit

## Question 1

Consider the following two mutually exclusive projects:

Year	Cash Flow(A)	Cash Flow(B)
0	-\$470,000	-\$40,000
1	30,000	21,000
2	60,000	15,000
3	60,000	18,000
4	670,000	11,500

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Whichever project you choose, if any, you require a 16 percent return on your investment.

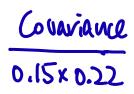
- a) If you apply the NPV criterion, which investment will you choose? Why?
- b) If you apply the IRR criterion, which investment will you choose? Why?
- c) Based on your answers in (a) through (b), which project will you finally choose? Why?

## **Question 2**

Consider the following information about three stocks: 35% 35% 36%

State of	Probability of	Rate of Return if State Occurs		
Economy	State of Economy	Stock A	Stock B	Stock C
Boom	0.34	0.28	0.38	0.57
Normal	0.50	0.15	0.12	0.08
Bust	0.16	0.00	-0.27	-0.49

- a) If your portfolio is invested 35 percent each in A and B and 30 percent in C, what is the portfolio expected return? The variance? The standard deviation?
- b) If the expected T-bill rate is 3.20 percent, what is the expected risk premium on the portfolio?



## **Question 3**

Suppose Johnson & Johnson and the Walgreen Company have expected returns and volatilities shown below, with a correlation of 22%.

- 51		Expected Return	Standard Deviation
55%		9%	15%
50%	Walgreen Company	12%	22%

- a) What is the expected return a portfolio that is equally invested in Johnson & Johnson's and Walgreen's stock?
- b) What is the volatility (standard deviation) of this portfolio?

If the correlation between Johnson & Johnson's and Walgreen's stock were to increase,

- c) Would the expected return of the portfolio rise or fall?
- d) Would the volatility of the portfolio rise or fall?

## **Question 4**

Consider the following information about Stocks I and II:

State of	Probability of	Rate of Return if State Occurs		
Economy	State of Economy	Stock I	Stock II	
Recession	0.16	0.24	-0.28	
Normal	0.60	0.21	0.10	
Irrational exuberance	0.24	0.09	0.45	

The market risk premium is 8.5 percent, and the risk-free rate is 5 percent.

- a) Which stock has the most systematic risk?
- b) Which one has the most unsystematic risk?
- c) Which stock is "riskier"? Explain.

$$\frac{Q1.}{(a)} \frac{$30000}{\text{NPV}_{A}} = \frac{$30000}{1.16} + \frac{$60000}{1.16^{2}} + \frac{$60000}{1.16^{2}} + \frac{$670000}{1.16^{4}} - $470000$$

$$= $8926.34 (2 dp.)//$$

$$1NPV_{B} = \frac{$21000}{1.16} + \frac{$15000}{1.16^{2}} + \frac{$18000}{1.16^{3}} + \frac{$11500}{1.16^{4}} - $40000$$

$$= $7134.08 (2 dp.)//$$

(6) NPVA = 
$$D = \frac{\$30000}{|+IRR|} + \frac{\$60000}{(|+IRR|)^2} + \frac{\$60000}{(|+IRR|)^3} + \frac{\$670000}{(|+IRR|)^4} - \$470000$$

$$NPV_{B} = 0 = \frac{\$21000}{1+IRR} + \frac{\$15000}{C1+IRR)^{2}} + \frac{\$18000}{C1+IRR)^{3}} + \frac{\$11500}{(1+IRR)^{4}} - \$40000$$

$$IRR = 25.50 \% (2d.p.) //$$

- .. NPVB > NPVA > Required return rate (16%)
- .: Investment B will be chosen.
- cash flows as shown in this case.
  - & NPV directly measures the increase in value to the firm.
  - ... NPV criterion is applied when there is a conflict between NPV and another decision rule like this case.
  - ... Insectment A will be chosen.

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QZ.
(a) Expected return:
      0.34 \times (0.35 \times 0.28 + 0.35 \times 0.38 + 0.3 \times 0.57)
   + 0.5 \times (0.35 \times 0.15 + 0.35 \times 0.12 + 0.3 \times 0.08)
   + 0.16 \times | 0.35 \times 0.00 + 0.35 \times (0.27) + 0.3 \times (-0.49) |
  = 0.17729 //
     Variance:
      0.34 \times (0.462 - 0.17729)^{2}
   + 0.5 \times (0.05925 - 0.17729)^{2}
   + 0.16x (-0.03864 - 0.17729)2
   = 3.1595 % (4 dp.) //
    Standard deviation:
    0.03159500178
   = 17.7750% (4 dp.) //
(b) Expected risk premium:
      17.729% - 3.20%
   = 14.529 % //
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any items in expected return.

(d) Volatility = Variance of two stocks  $= \sqrt{W_1^2 T_1^2 + W_2^2 T_2^2 + 2W_1 W_2 T_1 T_2}$ (correlation) + +

- The horease in will lead to an increase in volatility.
- .: The volatility will rise.

(a) By applying Beta coefficient (b): E(RI) = Rf + BI x (E(Rm) - Rf)  $E(R_m) = 8.5\% + 5\% = 13.5\%$  $\& E(RI) = 0.16 \times 0.24 + 0.6 \times 0.21 + 0.24 \times 0.09$ = 0.186." We have: 0.186 = 0.05 + BIX (0.135-0.05)

BI = 1.6/

 $E(RI) = 0.16 \times (-0.28) + 0.6 \times 0.1 + 0.24 \times 0.45$ = 0.1232

: We have:  $0.1232 = 0.05 + \beta_2 (0.135 - 0.05)$  $\beta_2 = 0.8612 \quad (4 d.p.)$ 

-.' β<sub>1</sub> > β<sub>2</sub>
.'. Stock I has the most systematic risk./

