Fin 532

Problem Set 1

① $\mathcal{F}_x = \{\emptyset; \{w_i\}_{i=1}^4 ; \{w_i, w_j\}_{i,j=1, i\neq j}^4$

$\{w_1, w_2, w_3\}, \{w_1, w_3, w_4\},$

$\{w_1, w_2, w_4\}, \{w_2, w_3, w_4\}, \Omega\}$

$\mathcal{F}_{-1} = \{\emptyset, \{w_1, w_2\}, \{w_3, w_4\}, \Omega\}$

② $HPR = \frac{987 + 17}{980} - 1 = 2.45\%$

③ a) $Price = \frac{\text{Expected CF}}{1 + r}$

$= \frac{0.5 \times 200\,000 + 0.5 \times 70\,000}{1.14}$

$= \frac{135\,000}{1.14} = \$118\,421.1$

b) $HPR = 14\%$

c) $Price = \frac{135\,000}{1.18} = \$114\,407.8$

(4) Let's denote by x the total cash flow and by r the rate of return.

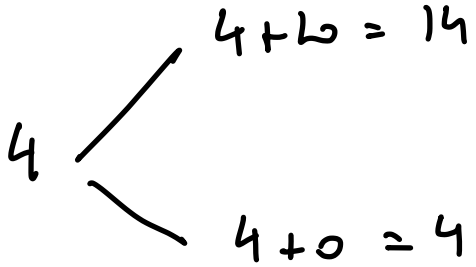
Prob	x	r	$r - E(r)$
0.3	123	23%	18.9%
0.5	102	2%	-2.1%
0.2	81	-19%	-2.31%

$$E(r) = 0.3 \times 0.23 + 0.5 \times 0.02 + 0.2 \times (-0.19)$$
$$= 4.1\%$$

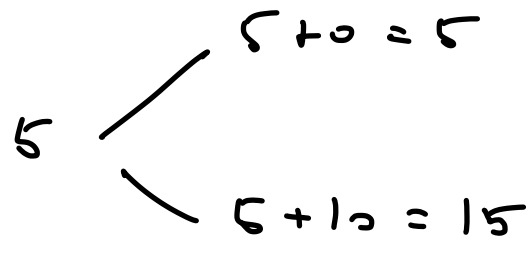
$$V(r) = 0.3 \times 0.189^2 + 0.5 \times (-0.021)^2 + 0.2\,(-0.0231)^2$$
$$= 0.021609$$

$$\sigma(r) = \sqrt{0.021609} = 14.70\%$$

(5)



Security 1



Security 2

a) $E(r_1) = 0.5 \times \frac{10}{4} + 0.5 \times 0 = 125\%$

$E(r_2) = 0.5 \times 0 + 0.5 \times \frac{10}{5} = 100\%$

b) $V(r_1) = 0.5 \times (2.5 - 1.25)^2 + 0.5 \times (0 - 1.25)^2$

$= 1.25^2$

$\sigma_1 = \sqrt{1.25^2} = 125\%$

$V(r_2) = 0.5 \times (0 - 1)^2 + 0.5 \times (2 - 1)^2 = 1$

$\sigma_2 = \sqrt{1} = 100\%$

c) $\sigma_{12} = 0.5 \times 1.25 \times (-1) + 0.5 \times (-1.25) \times 1$

$= -1.25$

$\rho_{12} = -\frac{1.25}{1.25 \times 1} = -1.$