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HW1

FINN 2300

P8-7 (a) Coefficient of variation (CV) = $\frac{\sigma_r}{\bar{r}}$

$CV_A = \frac{7}{20} = ,35$, $CV_B = \frac{9,5}{22} = ,4318$, $CV_C = \frac{6}{19} = ,3158$

$CV_D = ,3438$

(b) Asset C, because it has the lowest CV, that means it is the least risk compared to other alternatives.

P8-8 (a) Asset A has the lowest range, and it equals 4%.

(b) Asset A has the lowest σ. Because the standard deviation can not measure the risks of assets with differing expected returns.

(c) $CV_A = \frac{2,9}{12} = ,24167$, $CV_B = \frac{3,2}{12,5} = ,256$, $CV_C = \frac{3,5}{13} = ,2692$

$CV_D = \frac{3}{12,8} = ,2344$

Project D should be chosen, because it has the ~~lowest~~ lowest CV (,2344), So it has the lowest risk.

P8-9 (a) Required rate of return $(r_t) = \frac{P_t - P_{t-1} + C_t}{P_{t-1}}$

* Hi-Tech stock did not pay any dividends during these 4 years. so ct equals zero for each year.

$r_{2012} = \frac{21,55 - 14,36}{14,36} = ,50069 = 50,07\%$

$r_{2013} = \frac{64,78 - 21,55}{21,55} = 2,006 = 200,6\%$

$r_{2014} = \frac{72,38 - 64,78}{64,78} = ,1173 = 11,73\%$

$r_{2015} = \frac{91,80 - 72,38}{72,38} = ,2683 = 26,83\%$

(b) Average return $(\bar{r}) = \frac{\sum r_i}{n} = \frac{50,07\% + 200,6\% + 11,73\% + 26,83\%}{4} = 72,31\%$

(c) Standard deviation $\sigma_{2012-2015} = \sqrt{\frac{\sum (r_i - \bar{r})^2}{n-1}}$

$\sigma_{2012-2015} = \sqrt{\frac{(50,07 - 72,31)^2 + (200,6 - 72,31)^2 + (11,73 - 72,31)^2 + (26,83 - 72,31)^2}{4-1}}$

$= 86,97\%$

(d) Coefficient of variation $(CV) = \frac{\sigma_r}{\bar{r}} = \frac{86,97}{72,31} = 1,202$

(e) Because the coefficient of variation (CV) on Hi-Tech stock over the 2012-2015 period of 1,202 is not below ,90, He will not accept this investment because it contains high risk.

P8-11 (a) Expected return ($\bar{r}$) = $\Sigma r_i \times Pr_i$

Possible outcomes	Probability	Returns	weighted value
Asset F			
1	,1	,4 = 40%	,04
2	,2	,1 = 10%	,02
3	,4	0%	0
4	,2	-,05 = -5%	-,01
5	,1	-,1 = -10%	-,01
Total	1		,04
Asset G			
1	,4	,35 = 35%	,14
2	,3	,1 = 10%	,03
3	,3	-,2 = -20%	-,06
Total	1		,11
Asset H			
1	,1	,4 = 40%	,04
2	,2	,2 = 20%	,04
3	,4	,1 = 10%	,04
4	,2	0%	0
5	,1	-,2 = -20%	-,02
Total	1		,1

* Asset G has the largest return.

(b) $\sigma_r = \sqrt{\Sigma (r_j - \bar{r})^2 \times Pr_j}$

$$\sigma_{rf} = \sqrt{(,4 - ,04)^2 \times ,1 + (,1 - ,04)^2 \times ,2 + (0 - ,04)^2 \times ,4 + (-,05 - ,04)^2 \times ,2 + (-,1 - ,04)^2 \times ,1}$$

$= ,1338$

$$\sigma_{rg} = \sqrt{(,35 - ,11)^2 \times ,4 + (,1 - ,11)^2 \times ,3 + (-,2 - ,11)^2 \times ,3}$$

$= ,2278$

$$\sigma_{rH} = \sqrt{(,4 - ,1)^2 \times ,1 + (,2 - ,1)^2 \times ,2 + (,1 - ,1)^2 \times ,4 + (0 - ,1)^2 \times ,2 + (-,2 - ,1)^2 \times ,1}$$

$= \cancel{\$},14832$

* Asset G has the greatest risk, because it has the largest SD.

(c) $CV = \frac{\sigma_r}{\bar{r}}$

$CV_f = \frac{,1338}{,04} = 3,345$

$CV_g = \frac{,2278}{,11} = 2,071$

$CV_h = \frac{,14832}{,1} = 1,4832$

Asset F has the greatest relative risk, because it is the largest $CV = 3,345$

P8-14 (a) $r_p = (w_1 \times r_1) + (w_2 \times r_2) + \dots + (w_n \times r_n) = \sum w_1 \times r_1$

We can find portfolio return by this equation

* Case I: 100% of asset F

Year	Forecasted return Asset F	Portfolio return	expected return
2016	16%	(16% x1)	16 %
2017	17%	(17% x1)	17 %
2018	18%	(18% x1)	18 %
2019	19%	(19% x1)	19 %

$\bar{r}_p = \frac{16 + 17 + 18 + 19}{4} = 17,5\%$

* Case II: 50% of asset F and 50% of asset G

Year	Forecasted return Asset F	Asset G	Portfolio return calculation	Portfolio return
2016	16%	17%	(16%x,5 + 17%x,5)	16,5 %
2017	17%	16%	(17%x,5 + 16%x ,5)	16,5 %
2018	18%	15%	(18%x,5 + 15%x,5)	16,5 %
2019	19%	14%	(19%x,5 + 14%x,5)	16,5 %

$r_p = \frac{16,5 + 16,5 + 16,5 + 16,5}{4} = 16,5\%$

* Case III: 50% of asset F and 50% of asset H

Year	Forecasted return Asset F	Asset H	Portfolio return calculation	expected return
2016	16%	14%	(16% x ,5 + 14% x ,5)	15%
2017	17%	15%	(17% x ,5 + 15% x ,5)	16%
2018	18%	16%	(18% x ,5 + 16% x ,5)	17%
2019	19%	17%	(19% x ,5 + 17% x ,5)	18%

$$r_p = \frac{15+16+17+18}{4} = 16,5\%$$

(b) $$\sigma_r = \sqrt{\frac{\Sigma(r_i - \bar{r})^2}{n-1}}$$

$$\sigma_F = \sqrt{\frac{(16\% - 17,5\%)^2 + (17-17,5)^2 + (18-17,5)^2 + (19-17,5)^2}{4-1}}$$

$$= 1,291$$

$$\sigma_{FG} = \sqrt{\frac{(16,5-16,5)^2 + (16,5-16,5)^2 + (16,5-16,5)^2 + (16,5-16,5)^2}{4-1}}$$

$$= \sqrt{\frac{0}{3}} = 0$$

$$\sigma_{FH} = \sqrt{\frac{(15-16,5)^2 + (16-16,5)^2 + (17-16,5)^2 + (18-16,5)^2}{4-1}}$$

$$= 1,291$$

P8-20 $\beta = ,8$

(a) Asset's return will increase by 33,6% (,8 x 42%)

(b) Asset's return will decrease by 25,6%, [illegible] (,32 x ,8)

(c) Asset's return will not change (stay the same)

(d) This asset is considered to be less risky, because his beta (,8) is less than the market beta (1).

P8-21 (a) Asset W will decrease by ,09 (10% x ,9)
Asset X will increase by ,06 (10% x ,6)
Asset Y will decrease by ,18 (10% x 1,8)
Asset Z will decrease by ,23 (10% x 2,3)

(b) Asset W will increase by ,09 (10% x ,9)
Asset X will decrease by ,06 (10% x ,6)
Asset Y will increase by ,18 (10% x 1,8)
Asset Z will increase by ,23 (10% x 2,3)

(c) Asset X, because it will move in the opposite direction to market (will increase)

(d) Asset Z, because it will move in the same direction to market (will increase).

$\boxed{P8-23}$ (a) $B_P = (w_1 \times B_1) + (w_2 \times B_2) + \ldots + (w_n \times B_n) = \sum w_j \times B_j$

$B_X = (2,5 \times 20\%) + (,8 \times 10\%) + (1,2 \times 30\%) + (,9 \times 10\%)$
$+ (1,6 \times 30\%) = 1,51$

$B_y = (2,5 \times 10\%) + (,8 \times 30\%) + (1,2 \times 10\%) + (,9 \times 30\%)$
$+ (1,6 \times 20\%) = 1,2$

(b) The risks of two portfolios are more risky than the market risk (because the two B >1). In addition, Portfolio X is more risky than portfolio Y.

$\boxed{P8-26}$ $r_j = R_F + [B_j \times (r_m - R_F)]$

(a) $B = 2,2$, $R_F = 5\%$, $r_m = 32\%$

$r_j = 5\% + [2,2 \times (32\% - 5\%)] = ,644 = 64,4\%$

(b) $r_j = 23,75\%$, $B = 1,25$, $r_m = 20\%$

$23,75\% = R_F + [1,25 \times (20\% - R_F)]$
$23,75\% = R_F + ,25 - 1,25 R_F$
$,2375 = ,25 - ,25 R_F$
$-,0125 = -,25 R_F$
$R_F = ,05 = 5\%$

ⓒ $r_j = 18\%$, $\beta = 1{,}2$, $R_F = 8\%$

$$18\% = 8\% + [1{,}2 \times (r_m - 8\%)]$$
$$,18 = ,08 + 1{,}2\, r_m - ,096$$
$$,18 = 1{,}2\, r_m - ,016$$
$$,196 = 1{,}2\, r_m$$
$$r_m = ,1633 = 16{,}33\%$$

ⓓ $r_j = 15\%$, $R_F = 3\%$, $r_m = 15\%$

$$15\% = 3\% + [\beta \times (15\% - 3\%)]$$
$$,15 = ,03 + ,15\beta - ,03\beta$$
$$,12 = ,12\,\beta$$
$$\beta = 1$$

$\boxed{P8-27}$ ⓐ Total cost of all assets = 20 000 + 35000 + 30000 + 15000 = 100 000 $

+ proportion of each asset in the portfolio:

$W_A = \frac{20\,000}{100\,000} = ,2$, $W_B = \frac{35\,000}{100\,000} = ,35$, $W_C = \frac{30000}{100000} = ,3$, $W_D = \frac{15000}{100\,000} = ,15$

$$\beta_p = (w_1 \times \beta_1) + (w_2 \times \beta_2) + \dots + (w_n \times \beta_n) = \sum (w_j \times \beta_j)$$

$$\beta_p = (,2 \times ,8) + (,35 \times ,95) + (,3 \times 1{,}5) + (,15 \times 1{,}25) = 1{,}13$$

ⓑ $$r_t = \frac{P_t - P_{t-1} + C_t}{P_{t-1}}$$

$$r_A = \frac{20\,000 - 20\,000 + 1600}{20\,000} = ,8 = 8\%$$

9

$r_B = \frac{36\,000 - 35\,000 + 1400}{35\,000} = ,0686 = 6,86\%$

$r_C = \frac{34500 - 30\,000 + 0}{30\,000} = ,15 = 15\%$

$r_D = \frac{16500 - 15000 + 375}{15000} = ,125 = 12,5\%$

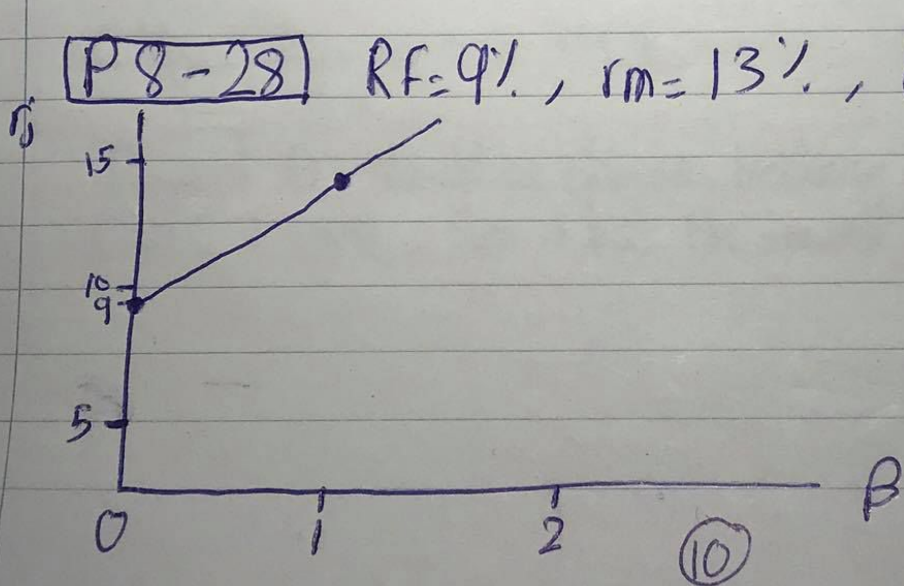
(c) $r_P = \frac{107000 - 100\,000 + 3375}{100\,000} = ,10375 = 10,375\%$

(d) $r_m = 10\%$, $R_F = 4\%$, $r_j = R_F + [\beta(r_m - R_F)]$

$r_A = 4\% + [,8(10\% - 4\%)] = 8,8\%$
$r_B = 4\% + [,95(10\% - 4\%)] = 9,7\%$
$r_C = 4\% + [1,5(10\% - 4\%)] = 13\%$
$r_B = 4\% + [1,25(10\% - 4\%)] = 11,5\%$

(e) asset C and asset d have actual return bigger than the expected return.
The factors could be because there are diversifiable risks (unsystematic risk).

$\boxed{P8-28}$ $R_F = 9\%$, $r_m = 13\%$, $\beta_{market} = 1$



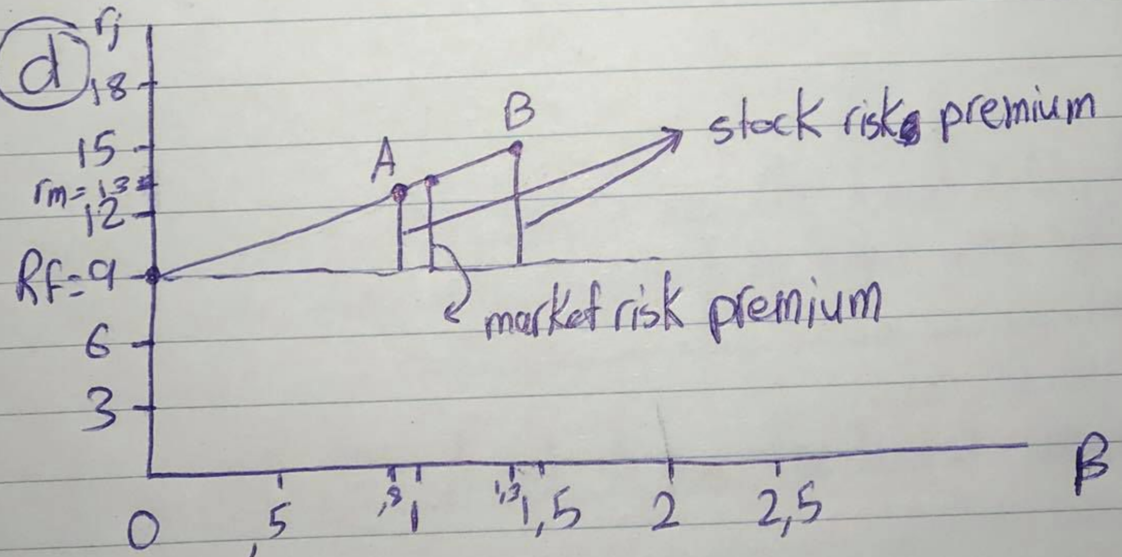
(b) Market risk premium = $r_m - R_f = 13\% - 9\% = 4\%$

(c) $\beta_A = ,8$, $\beta_B = 1,3$, $r_i = R_f + [(\beta_i \times (r_m - R_f)]$

~~A~~ $r_A = 9 + [,8(13-9)] = 12,2\%$ 58

$r_B = 9 + [1,3(13-9)] = 14,2\%$

(d)



* Asset B has more required return (r_i) than asset B, so asset B is more risky.