Assignment 8 Solution

Correct answer is in bold font

Question 1: Consider the data provided on mutual funds below

Fund	Return (%)	Standard Deviation (%)	Beta
1	15	7	2.5
2	13	5	1.5
3	17	9	2
4	11	7	1.5
5	21	11	3

In addition, the riskfree rate is given as 4%, expected return on market is 12%, standard deviation of market is 4%. Compute the Sharpe Ratio of Fund 1.

(a) 0.5-1.0. Hint. $Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P}$

(b) 1.0-1.50. Hint. $Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P}$

(c) 1.5-2.0. Hint. $\boldsymbol{Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P} = \frac{15\% - 4\%}{7\%} = 1.57}$

(d) 2.0-2.5. Hint. $Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P}$

Question 2: In question 1, compute the Treynor's measure (%) for Fund 3.

(a) 0-2. Hint. $Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P}$

(b) 2-4. Hint. $Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P}$

(c) 4-6. Hint. $Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P}$

(d) 6-8. Hint. $\boldsymbol{Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P} = \frac{17 - 4}{2} = 6.5}$

Question 3: In question 1, compute the Jensen's alpha measure (also called differential measure) for Fund 5 if beta is the appropriate risk measure.

(a) - 1% to -4%. Hint. $\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f)$

(b) **-4% to -8%. Hint. $\boldsymbol{\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f) = 21 - 4 - 3 * (12 - 4) = -7\%}$**

(c) -8% to -12%. Hint. $\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f)$

(d) -12% to -16%. Hint. $\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f)$

Question 4: In question 1, Compute the Sharpe Ratio of Fund 2.

(a) 0.5-1.0. Hint. $Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P}$

(b) 1.0-1.50. Hint. $Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P}$

(c) 1.5-2.0. Hint. $\boldsymbol{Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P} = \frac{13\% - 4\%}{5\%} = 1.8}$

(d) 2.0-2.5. Hint. $Sharpe\ Ratio: \frac{R_P - R_F}{\sigma_P}$

Question 5: In question 1, compute the Treynor's measure (%) for Fund 4.

(a) 0-2. Hint. $Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P}$

(b) 2-4. Hint. $Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P}$

(c) 4-6. Hint. $\boldsymbol{Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P} = \frac{11 - 4}{1.5} = 4.67}$

(d) 6-8. Hint. $Treynor's\ Measure\ (TM) = \frac{R_P - R_f}{\beta_P}$

Question 6: In question 1, compute the Jensen's alpha measure (also called differential measure) for Fund 1 if beta is the appropriate risk measure.

(a) - 1% to -5%. Hint. $\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f)$

(b) **-5% to -10%. Hint.** $\boldsymbol{\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f) = 15 - 4 - 2.5 * (12 - 4) = -9\%}$

(c) -10% to -15%. Hint. $\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f)$

(d) -15% to -20%. Hint. $\alpha_{Jen} = \bar{R}_P - R_f - \beta_P * (\bar{R}_m - R_f)$

Question 7: In question 6, compute the Jensen's alpha measure (also called differential measure) for Fund 1 if total risk (standard deviation) is the appropriate risk measure.

(a) **-1% to -5%. Hint.** $\boldsymbol{\alpha_{diff} = \bar{R}_P - R_f - \left(\frac{\sigma_P}{\sigma_m}\right) * (\bar{R}_m - R_f) = 15 - 4 - \frac{7}{4} * (12 - 4) = -3.00\%}$

(b) -5% to -10%. Hint. $\alpha_{diff} = \bar{R}_P - R_f - \left(\frac{\sigma_P}{\sigma_m}\right) * (\bar{R}_m - R_f)$

(c) -10% to -15%. Hint. $\alpha_{diff} = \bar{R}_P - R_f - \left(\frac{\sigma_P}{\sigma_m}\right) * (\bar{R}_m - R_f)$

(d) -15% to -20%. Hint. $\alpha_{diff} = \bar{R}_P - R_f - \left(\frac{\sigma_P}{\sigma_m}\right) * (\bar{R}_m - R_f)$

Question 8: Which of the following is incorrect in value-vs-growth investing.

(a) Value stocks are cheap stocks. Hint: Value stocks have lower price to earnings ratios as compared to their peers.
(b) Growth stocks are sold at premium. Hint: Growth stocks P/E ratios are high (e.g., technology stocks). The high prices are justified by considerable growth prospects in future.
(c) Value minus growth offers on average positive returns. Hint: Value stocks are underpriced and may offer higher returns as compared to growth stocks that are sold at premium.
(d) Growth minus value offers on average positive returns. Hint: Growth stocks are sold at premium and on average may offer lower returns than value stocks.

Question 9: In the context of timing and selection of securities, identify the incorrect statement.

(a) A timing strategy would involve increasing the beta of the portfolio in anticipation of market rise. Hint: Timing involves taking changing portfolio composition in anticipation of market movements.
(b) Increasing bonds composition vis-à-vis equity is part of timing strategy. Hint: If you anticipate the market to go down, one can decrease the portfolio beta by increasing the proportion of bonds in the portfolio.
(c) Stock selection would involve picking securities with negative alphas. Hint: A positive alpha would offer excess risk-adjusted returns.
(d) To find securities with positive alphas one needs asset pricing models to estimate expected returns commensurate with the risk of the security. Hint: Models like 3-factor Fama-French, CAPM, etc., are required to examine whether the returns from the portfolio are higher, lower, or commensurate with respect to the risk of the portfolio.

Question 10: In the context of factor investing the following is an incorrect statement.

(a) Small stocks offer higher returns than large stocks, on average. Hint: Small stocks are risky, and offer additional premia
(b) High book to market stocks offers high returns than low book to market, on average. Hint: As per the Fama-French 3-factor model, this High-Minus-Low (HML) factor captures value – growth premium.
(c) Low P/E stocks offer higher returns than High P/E stocks, on average. Hint: Low P/E stocks are value stocks and are often undervalued. High P/E stocks are usually growth stocks and are often sold at premium.
(d) Large stocks offer higher returns than small stocks, on average. Hint: Large stocks are safe stocks and if efficiently priced, offer lower returns than small stocks.