Chapter 25: Problem 1

Using standard deviation as the measure for variability, the reward-to-variability ratio for a fund is the fund’s excess return (average return over the riskless rate) divided by the standard deviation of return, i.e., the fund’s Sharpe ratio. E.g., for fund A we have:

\[
\frac{\bar{R}_A - R_f}{\sigma_A} = \frac{14 - 3}{6} = 1.833
\]

See the table in the answers to Problem 5 for the remaining funds’ Sharpe ratios.

Chapter 25: Problem 2

The Treynor ratio is similar to the Sharpe ratio, except the fund’s beta is used in the denominator instead of the standard deviation. E.g., for fund A we have:

\[
\frac{\bar{R}_A - R_f}{\beta_A} = \frac{14 - 3}{1.5} = 7.833
\]

See the table in the answers to Problem 5 for the remaining funds’ Treynor ratios.

Chapter 25: Problem 3

A fund’s differential return, using standard deviation as the measure of risk, is the fund’s average return minus the return on a naïve portfolio, consisting of the market portfolio and the riskless asset, with the same standard deviation of return as the fund’s. E.g., for fund A we have:

\[
\bar{R}_A - \left( R_f + \frac{\bar{R}_m - R_f}{\sigma_m} \times \sigma_A \right) = 14 - \left( 3 + \frac{13 - 3}{5} \times 6 \right) = -1\%
\]

See the table in the answers to Problem 5 for the remaining funds’ differential returns based on standard deviation.
Chapter 25: Problem 4

A fund’s differential return, using beta as the measure of risk, is the fund’s average return minus the return on a naïve portfolio, consisting of the market portfolio and the riskless asset, with the same beta as the fund’s. This measure is often called “Jensen’s alpha.” E.g., for fund A we have:

\[
\bar{R}_A = (\bar{R}_F + (\bar{R}_m - R_F) \times \beta_A) = 14 - (3 + (13 - 3) \times 1.5) = -4\%
\]

See the table in the answers to Problem 5 for the remaining funds’ Jensen alphas.

Chapter 25: Problem 5

This differential return measure is the same as the one used in Problem 4, except that the riskless rate is replaced with the average return on a zero-beta asset. E.g., for fund A we have:

\[
\bar{R}_A = (\bar{R}_Z + (\bar{R}_m - R_Z) \times \beta_A) = 14 - (4 + (13 - 4) \times 1.5) = -3.5\%
\]

The answers to Problems 1 through 5 for all five funds are as follows:

<table>
<thead>
<tr>
<th>Fund</th>
<th>Sharpe Ratio</th>
<th>Treynor Ratio</th>
<th>Differential Return Based On Standard Deviation</th>
<th>Differential Return Based On Beta and RF</th>
<th>Differential Return Based On Beta and R_Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.833</td>
<td>7.333</td>
<td>−1%</td>
<td>−4%</td>
<td>−3.5%</td>
</tr>
<tr>
<td>B</td>
<td>2.250</td>
<td>18.000</td>
<td>1%</td>
<td>4%</td>
<td>3.5%</td>
</tr>
<tr>
<td>C</td>
<td>1.625</td>
<td>13.000</td>
<td>−3%</td>
<td>3%</td>
<td>3.0%</td>
</tr>
<tr>
<td>D</td>
<td>1.063</td>
<td>14.000</td>
<td>−5%</td>
<td>2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>E</td>
<td>1.700</td>
<td>8.500</td>
<td>−3%</td>
<td>−3%</td>
<td>−2.0%</td>
</tr>
</tbody>
</table>
Chapter 25: Problem 6

Looking at the table in the answers to Problem 5, we see that Fund B is ranked higher than Fund A by their Sharpe ratios. Solving for the average return that would make Fund B’s Sharpe ratio equal to Fund A’s we have:

\[
\frac{\bar{R}_B - R_f}{\sigma_B} = \frac{\bar{R}_B - 3}{4} = 1.833
\]

or

\[
\bar{R}_B = 10.33\%
\]

So, for the ranking to be reversed, Fund B’s average return would have to be lower than 10.33%.