Sample Problem 2. Solution

Show your work to receive full credit.

Consider the following, and assume the CAPM holds.

<table>
<thead>
<tr>
<th>Asset</th>
<th>beta</th>
<th>standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riskless asset, yielding 3%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Delta Company stock</td>
<td>1.50</td>
<td>40%</td>
</tr>
<tr>
<td>Gamma Company stock</td>
<td>0.50</td>
<td>15%</td>
</tr>
<tr>
<td>Expected return on the market:</td>
<td>9%</td>
<td></td>
</tr>
</tbody>
</table>

a) You invest $6,000 in Delta, and $4,000 in Gamma. What is the expected return on your portfolio?

First use CAPM to find expected returns, then use weighted average for portfolio returns:

Delta: \( E[R_D] = rf + B_D (E[r_m] - rf) = .03 + 1.5 (.09-.03) = .03 + 1.5 (.06) = 12\% \)

Gamma: \( E[R_G] = rf + B_G (E[r_m] - rf) = .03 + 0.5 (.09-.03) = .03 + 0.5 (.06) = 6\% \)

Portfolio: \( E[r_p] = 0.6 E[R_D] + 0.4 E[R_G] = 0.6 (12\%) + 0.4 (6\%) = 9.6\% \)

b) Assume you are restricted to owning only Delta & Gamma. What dollar investment in each of the two stocks would be required to achieve an expected return of 10%?

Set \( E[r_p] = 10\% = y E[R_D] + (1-y) E[R_G] \), then solve for \( y \):

\[
\begin{align*}
10\% &= y (12\%) + (1-y) (6\%) \\
10\% - 6\% &= 6\% y \\
4\% &= 6\% y \\
4%/6\% &= 2/3 = y
\end{align*}
\]

So put $6,666 into Delta, and $3,333 into Gamma.