ASSET ALLOCATION ANSWERS

Question 1

Part A

X: \(0.101 - 0.5(3)(0.151)^2 = 0.0668\)

Y: \(0.106 - 0.5(3)(0.153)^2 = 0.0709\)

Z: \(0.095 - 0.5(3)(0.149)^2 = 0.0617\)

Choose Manager Y

**Sample Scoring Key:** 1 point for each correct calculation and 1 point for selecting Y based on those calculations.

**Candidate discussion:** Utility adjusted return = expected portfolio return \(- 0.5\) (risk aversion) (portfolio variance). The calculation can also be performed using percent for the return and standard deviation instead of decimal form and adjusting the 0.5 to 0.005 resulting in the same conclusion. For example, the calculation for Client A and Manager X would be calculated as: \(10.1\% - 0.005(3)(15.1\%)^2 = 6.68\%\).

Part B

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Client Most Likely to Exhibit Behavior (circle one)</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Low tolerance for shortfall risk</td>
<td>Client A [Client B]</td>
<td>With the higher risk <em>aversion</em> factor, B is more risk averse and would have a lower tolerance for shortfall risk.</td>
</tr>
<tr>
<td>ii. Higher turnover</td>
<td>Client A [Client B]</td>
<td>B has a zero tax rate and can trade without tax drag while A will have to reduce turnover to defer taxes and reduce tax drag.</td>
</tr>
</tbody>
</table>

**Sample Scoring Key:** 1 point for each correct circle and if that is correct, 2 points for the explanation.

**Candidate discussion:** Client A is more aggressive (a lower risk aversion) and may have higher turnover than B but that does not answer the question asked. The question was specific to how taxes affect turnover.
Question 2

Part A

<table>
<thead>
<tr>
<th>Comment</th>
<th>Is the comment correct? (circle one)</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>An asset class with lower return and risk can by definition be excluded from analysis. It cannot be on the efficient frontier of portfolios made up of higher return and lower risk assets.</td>
<td>Yes</td>
<td>An asset that on a standalone basis may be unattractive could with low enough correlation be attractive because it would allow increasing the weight in higher risk and return asset, to the benefit of the portfolio.</td>
</tr>
<tr>
<td>Resampling is one technique to deal with the instability of the efficient frontier but it has no basis in statistical methodology.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Black-Litterman is another way to deal with the instability problem and has the advantage of normally being run unconstrained and allowing short sales to profit from overvalued securities.</td>
<td>Yes</td>
<td>Normally run on a constrained basis as a strategic allocation to short an asset class is highly unusual.</td>
</tr>
<tr>
<td>By using corner portfolios, we will not need a mean variance optimization model which will save time and computer calculations.</td>
<td>Yes</td>
<td>They are not an alternative. The MVO is required to find the corner portfolios. They are just a short cut to interpolate points along the efficient frontier.</td>
</tr>
</tbody>
</table>

Sample Scoring Key: 2 points for the yes decision. 1 point each for the three no decisions and then 1 point for explaining each no.

Candidate discussion: Even long/short hedge funds short individual assets when overvalued and not just a perpetual short of an asset class.
Part B

It must be an efficient portfolio (i.e., on the efficient frontier).

It is a portfolio where a positive asset class weight shifts to 0% or 0% shifts to a positive weight.

Except the 0% versus positive rule does not apply to the GMVP, which is by definition the starting CP.

Sample Scoring Key: 2 points for each explanation.

Candidate discussion: These are the three issues in determining corner portfolios and explain the disagreement. Portfolio 1 can be a corner because it is the lowest return and could be the GMVP. Portfolio 2 cannot be a corner because it cannot be on the efficient frontier; it has the same risk but less return than Portfolio 3.

Question 3

Part A

<table>
<thead>
<tr>
<th></th>
<th>Sharpe ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing portfolio</td>
<td>(7 − 1) / 8 = 0.75</td>
</tr>
<tr>
<td>International bonds</td>
<td>(4 − 1) / 5 = 0.60</td>
</tr>
<tr>
<td>International equity</td>
<td>(8 − 1) / 11 = 0.63</td>
</tr>
</tbody>
</table>

Insufficient data to determine because there are the following conflicting issues:

- The higher standalone Sharpe favors adding international equity.
- The lower correlation to existing portfolio favors adding international bonds.

Sample Scoring Key:

Two points each for: determining there is insufficient data and correctly discussing the standalone Sharpe ratios. One point for correctly discussing the correlation issue.

Candidate discussion: Any suggestion that neither addition is beneficial is incorrect because, with low enough correlations, both could be beneficial additions to the portfolio. Final numeric resolution requires knowing the correlations.

Part B

- Lo would borrow the domestic currency and pay 1% interest.
- She will convert to and invest in the foreign currency to earn the foreign interest rate and the change in value of the foreign currency.
• Country D is the best currency to invest in and earns $2.0 + 3.0 = 5.0\%$.
• This makes the net return $5 – 1 = 4.0\%$.

**Sample Scoring Key:**

One point each for: borrow the lower interest rate domestic currency, invest in the higher interest rate foreign currency, D is the optimal foreign currency, and 4.0\% is the net return expected.

**Part C.**

i: Discontinue the carry trade because such trades can be very unprofitable during market crisis periods (upward spikes in volatility).

ii: Use a long straddle (buy at-the-money calls and puts on the foreign currencies) because it will profit if currencies either increase or decrease in value. (An alternate explanation is that both long option positions in the straddle will increase in value with increasing volatility.)

**Sample Scoring Key:**

One point each for: discontinue the carry trade and explaining it can be unprofitable in periods of high volatility.

One point each for: the long straddle and some discussion that the two long options benefit from increasing volatility.

**Candidate discussion:** Note that the question asked for which option strategy is best; therefore, it is recommended you give the affirmative reason for what is selected rather than discussing what is not selected. The collar and strangle are incorrect. The collar is a long and short option position; the short option position loses when volatility increases. The strangle is a less-costly version of a straddle, using long OTM options. The OTM options will be less responsive and profitable given Lo’s strong view that volatility will increase.