QUESTIONS

1. What factors are responsible for the recent surge in international portfolio investment (IPI)?

Answer: The recent surge in international portfolio investments reflects the globalization of financial markets. Specifically, many countries have liberalized and deregulated their capital and foreign exchange markets in recent years. In addition, commercial and investment banks have facilitated international investments by introducing such products as American Depository Receipts (ADRs) and country funds. Also, recent advancements in computer and telecommunication technologies led to a major reduction in transaction and information costs associated with international investments. In addition, investors might have become more aware of the potential gains from international investments.

2. Security returns are found to be less correlated across countries than within a country. Why can this be?

Answer: Security returns are less correlated probably because countries are different from each other in terms of industry structure, resource endowments, macroeconomic policies, and have non-synchronous business cycles. Securities from a same country are subject to the same business cycle and macroeconomic policies, thus causing high correlations among their returns.

3. Explain the concept of the world beta of a security.

Answer: The world beta measures the sensitivity of returns to a security to returns to the world market portfolio. It is a measure of the systematic risk of the security in a global setting. Statistically, the world beta can be defined as:

\[ \text{Cov}(R_i, R_M)/\text{Var}(R_M), \]

where \( R_i \) and \( R_M \) are returns to the i-th security and the world market portfolio, respectively.

4. Explain the concept of the Sharpe performance measure.
Answer: The Sharpe performance measure (SHP) is a risk-adjusted performance measure. It is defined as the mean excess return to a portfolio above the risk-free rate divided by the portfolio's standard deviation.

5. Explain how exchange rate fluctuations affect the return from a foreign market measured in dollar terms. Discuss the empirical evidence on the effect of exchange rate uncertainty on the risk of foreign investment.

Answer: It is useful to refer to Equations 15.4 and 15.5 of the text. Exchange rate fluctuations mostly contribute to the risk of foreign investment through its own volatility as well as its covariance with the local market returns. The covariance tends to be positive in most of the cases, implying that exchange rate changes tend to add to exchange risk, rather than offset it. Exchange risk is found to be much more significant in bond investments than in stock investments.

6. Would exchange rate changes always increase the risk of foreign investment? Discuss the condition under which exchange rate changes may actually reduce the risk of foreign investment.

Answer: Exchange rate changes need not always increase the risk of foreign investment. When the covariance between exchange rate changes and the local market returns is sufficiently negative to offset the positive variance of exchange rate changes, exchange rate volatility can actually reduce the risk of foreign investment.

7. Evaluate a home country’s multinational corporations as a tool for international diversification.

Answer: Despite the fact that MNCs have operations worldwide, their stock prices behave very much like purely domestic firms. This is puzzling yet undeniable. As a result, MNCs are a poor substitute for direct foreign portfolio investments.

8. Discuss the advantages and disadvantages of closed-end country funds (CECFs) relative to the American Depository Receipts (ADRs) as a means of international diversification.
CECFs can be used to diversify into exotic markets that are otherwise difficult to access such as India and Turkey. Being a portfolio, CECFs also provide instant diversification. ADRs do not provide instant diversification; investors should form portfolios themselves. In addition, there are relatively few ADRs from emerging markets. The main disadvantage of CECFs is that their share prices behave somewhat like the host country’s share prices, reducing the potential diversification benefits.

9. Why do you think closed-end country funds often trade at a premium or discount?

Answer: CECFs trade at a premium or discount because capital markets of the home and host countries are segmented, preventing cross-border arbitrage. If cross-border arbitrage is possible, CECFs should be trading near their net asset values.

10. Why do investors invest the lion’s share of their funds in domestic securities?

Answer: Investors invest heavily in their domestic securities mainly because there are barriers to investing overseas. The barriers may include excessive transaction costs, information costs for foreign securities, legal and institutional restrictions, extra taxes, exchange risk and political risk associated with overseas investments, etc. Investors may also disproportionately invest in domestic securities due to the behavioral bias toward familiarity.

11. What are the advantages of investing via international mutual funds?

Answer: The advantages of investing via international mutual funds include: (1) save transaction/information costs, (2) circumvent legal/institutional barriers, and (3) benefit from the expertise of professional fund managers.

12. Discuss how the advent of the euro would affect international diversification strategies.

Answer: As the euro-zone has the same monetary and exchange-rate policies, the correlations among euro-zone markets are likely to go up. This will reduce diversification benefits. However, to the extent that the adoption of euro strengthens the European economy, investors may benefit from enhanced returns.
PROBLEMS

1. Suppose you are a euro-based investor who just sold Microsoft shares that you had bought six months ago. You had invested 10,000 euros to buy Microsoft shares for $120 per share; the exchange rate was $1.15 per euro. You sold the stock for $135 per share and converted the dollar proceeds into euro at the exchange rate of $1.06 per euro. First, determine the profit from this investment in euro terms. Second, compute the rate of return on your investment in euro terms. How much of the return is due to the exchange rate movement?

Solution: It is useful first to compute the rate of return in euro terms:

\[ r^e \equiv r_s + c \]

\[ = \left( \frac{135 - 120}{120} \right) + \left( \frac{1}{1.06} - \frac{1}{1.15} \right) \]

\[ = 0.125 + 0.085 \]

\[ = 0.210 \]

This indicates that this euro-based investor benefited from an appreciation of dollar against the euro, as well as from an appreciation of the dollar value of Microsoft shares. The profit in euro terms is about €2,100, and the rate of return is about 21.0% in euro terms, of which 8.5% is due to the exchange rate movement.

2. Mr. James K. Silber, an avid international investor, just sold a share of Nestlé, a Swiss firm, for SF5,080. The share was bought for SF4,600 a year ago. The exchange rate is SF1.60 per U.S. dollar now and was SF1.78 per dollar a year ago. Mr. Silber received SF120 as a cash dividend immediately before the share was sold. Compute the rate of return on this investment in terms of U.S. dollars.

Solution: Mr. Silber must have paid $2,584.27 (=4,600/1.78) for a share of Néstle a year ago. When the share was liquidated, he must have received $3,250 [= (5,080 + 120)/1.60]. Therefore, the rate of return in dollar terms is:

\[ R($) = \left( \frac{(3,250 - 2,584.27)}{2,584.27} \right) \times 100 = 25.76\% \]
3. In the above problem, suppose that Mr. Silber sold SF4,600, his principal investment amount, forward at the forward exchange rate of SF1.62 per dollar. How would this affect the dollar rate of return on this Swiss stock investment? In hindsight, should Mr. Silber have sold the Swiss franc amount forward or not? Why or why not?

Solution: The dollar profit from selling SF4,600 forward is equal to:

\[
\text{Profit ($)} = 4,600 \left( \frac{1}{1.62} - \frac{1}{1.60} \right) \\
= 4,600 \left( 0.6173 - 0.625 \right) \\
= -$35.42.
\]

Thus, the total return of investment is:

\[
\text{R($)} = \left[ \frac{(3,250 - 2,584.27 - 35.42)}{2,584.27} \right] \times 100 = 24.39\%.
\]

By 'hindsight', Mr. Silber should not have sold the SF amount forward as it reduced the return in dollar terms. But this is only by hindsight. Obviously, hedging decision must be made \textit{ex ante}.

4. Japan Life Insurance Company invested $10,000,000 in pure-discount U.S. bonds in May 1995 when the exchange rate was 80 yen per dollar. The company liquidated the investment one year later for $10,650,000. The exchange rate turned out to be 110 yen per dollar at the time of liquidation. What rate of return did Japan Life realize on this investment in yen terms?

Solution: Japan Life Insurance Company spent ¥800,000,000 to buy $10,000,000 that was invested in U.S. bonds. The liquidation value of this investment is ¥1,171,500,000, which is obtained from multiplying $10,650,000 by ¥110/$. The rate of return in terms of yen is:

\[
\left[ (¥1,171,500,000 - ¥800,000,000) / ¥800,000,000 \right] \times 100 = 46.44\%.
\]

5. At the start of 1996, the annual interest rate was 6 percent in the United States and 2.8 percent in Japan. The exchange rate was 95 yen per dollar at the time. Mr. Jorus, who is the manager of a Bermuda-based hedge fund, thought that the substantial interest advantage associated with investing in the United States relative to investing in Japan was not likely to be offset by the decline of the dollar against the yen. He thus concluded that it might be a good idea to borrow in Japan and invest in the United States. At the start of 1996, in fact, he borrowed ¥1,000 million for one year and invested in the United States. At the end of 1996, the exchange rate became 105 yen per dollar. How much profit did Mr. Jorus make in dollar terms?

Solution: Let us first compute the maturity value of U.S. investment:
(¥1,000,000,000/95)(1.06) = $11,157,895.
The dollar amount necessary to pay off yen loan is:
(¥1,000,000,000)(1.028)/105 = $9,790,476.
The dollar profit = $11,157,895 - $9,790,476 = $1,367,419.
Mr. Jorus was able to realize a large dollar profit because the interest rate was higher in the U.S.
than in Japan and the dollar actually appreciated against yen. This is an example of uncovered
interest arbitrage.

6. Suppose we obtain the following data in dollar terms:

<table>
<thead>
<tr>
<th>Stock market</th>
<th>Return (mean)</th>
<th>Risk (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>1.26% per month</td>
<td>4.43%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.23% per month</td>
<td>5.55%</td>
</tr>
</tbody>
</table>

The correlation coefficient between the two markets is 0.58. Suppose that you invest equally, i.e.,
50% each, in the two markets. Determine the expected return and standard deviation risk of the
resulting international portfolio.

Solution: The expected return of the equally weighted portfolio is:
\[ E(R_p) = (.5)(1.26\%) + (.5)(1.23\%) = 1.25\% \]
The variance of the portfolio is:
\[
\text{Var}(R_p) = (.5)^2(4.43)^2 + (.5)^2(5.55)^2 + 2(.5)^2(4.43)(5.55)(.58)
\]
\[ = 4.91 + 7.70 + 7.13 = 19.74 \]
The standard deviation of the portfolio is thus 4.44%.

7. Suppose you are interested in investing in the stock markets of 7 countries--i.e., Australia,
Canada, Germany, Japan, Switzerland, the United Kingdom, and the United States--the same 7
countries that appear in Exhibit 15.9. Specifically, you would like to solve for the optimal
(tangency) portfolio comprising the above seven stock markets. In solving the optimal portfolio,
use the input data (i.e. correlation coefficients, means, and standard deviations) provided in
Exhibit 15.4. The risk-free interest rate is assumed to be 0.2% per month and you can take a short
position in any stock market. What are the optimal weights for each of the seven stock markets? What is the risk and return of the optimal portfolio? This problem can be solved using MPTSolver.xls spreadsheet.

Solution:

<table>
<thead>
<tr>
<th>Stock Market</th>
<th>AU</th>
<th>CN</th>
<th>GM</th>
<th>JP</th>
<th>SW</th>
<th>UK</th>
<th>US</th>
<th>Mean (%)</th>
<th>SD (%)</th>
<th>Optimal Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia (AU)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.550</td>
<td>7.18</td>
<td>-0.0557</td>
</tr>
<tr>
<td>Canada (CN)</td>
<td>9</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.549</td>
<td>6.11</td>
<td>-0.2081</td>
</tr>
<tr>
<td>Germany (GM)</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.565</td>
<td>6.87</td>
<td>-0.3597</td>
</tr>
<tr>
<td>Japan (JP)</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>0.437</td>
<td>6.59</td>
<td>-0.0344</td>
</tr>
<tr>
<td>Switzerland (SW)</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td></td>
<td></td>
<td>0.709</td>
<td>5.42</td>
<td>0.7968</td>
</tr>
<tr>
<td>United Kingdom (UK)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.4</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States (US)</td>
<td>0.6</td>
<td>0.7</td>
<td>0.6</td>
<td>0.3</td>
<td>0.6</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The monthly mean return and standard deviation of the optimal portfolio are 0.772% and 4.790%, respectively. Hence, the Sharpe ratio of the optimal portfolio is equal to $0.119 = (0.772-0.20)/4.790$. 