Chapter 9

The Case for International Diversification
Introduction

In this chapter we cover:

- The advantages and disadvantages of international investing.
- Present the traditional case for international diversification.
- Calculate the expected return and standard deviation for a two-asset portfolio containing a domestic asset and a foreign asset.
- Demonstrate how changes in currency exchange rates can affect return and risk that investors earn on foreign security investments.
Introduction

- In this chapter we also cover:
  - Discuss global equity market correlations and global bond market correlations.
  - Benefits of a global approach in light of the recent changes in the global economic landscape.
  - The case for investing in emerging markets.
Exhibit 9.1: Stock Market Capitalization
*Developed Markets to 2000, all Markets from 2002*

Source: Data from World Federation of Stock Exchanges.

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International Investing

- Foreign investment allows investors to reduce the total risk of the portfolio while offering additional return potential.

- By expanding the investment opportunity set, international diversification helps to improve the risk-adjusted performance of a portfolio.
Traditional Case for International Diversification

- A low international correlation allows for reduction of volatility of a global portfolio.
- A low international correlation provides profit opportunities for an active investor.
- Otherwise, the lower the correlation, the bigger the risk reduction.
- \( \text{Cov}_{d,f} = \rho_{d,f} \sigma_d \sigma_f \)
Traditional Case for International Diversification

- The expected return on the portfolio is simply equal to the average expected return on the two asset classes:
  - \( E(R_p) = w_d E(R_d) + w_f E(R_f) \)
  - The standard deviation of the portfolio is equal to:
    \[
    \sigma_p = \left( w_d^2 \sigma_d^2 + w_f^2 \sigma_f^2 + 2 w_d w_f \rho_{df} \sigma_d \sigma_f \right)^{1/2}
    \]
- The portfolio’s total risk (\( \sigma_p \)) will always be less than the average of the two standard deviations (\( w_d \sigma_d + w_f \sigma_f \)).
- The only case in which it will be equal is when \( \rho_{d,f} = +1 \).
Example

Assume that the domestic and foreign assets have standard deviations of $\sigma_d = 12\%$ and $\sigma_f = 20\%$ respectively, with a correlation of $\rho_{d,f} = -0.2$.

1. What is the standard deviation of a portfolio equally invested in domestic and foreign assets?

2. Repeat the previous calculation only this time assume $\rho_{d,f} = +0.8$ and that 60% of the portfolio is invested in foreign assets.
Example - Answer

1. \( \sigma_p = (w_d^2 \sigma_d^2 + w_f^2 \sigma_f^2 + 2w_d w_f \rho_{df} \sigma_d \sigma_f)^{1/2} \)

\[ \sigma_p = ((0.5)^2 (0.12)^2 + (0.5)^2(0.20)^2 + 2(0.5)(0.5)(-0.2)(0.12)(0.20))^{1/2} \]

\( \sigma_p = 10.58\% \)

2. \( \sigma_p = (w_d^2 \sigma_d^2 + w_f^2 \sigma_f^2 + 2w_d w_f \rho_{df} \sigma_d \sigma_f)^{1/2} \)

\[ \sigma_p = ((0.4)^2 (0.12)^2 + (0.6)^2(0.20)^2 + 2(0.4)(0.6)(+0.8)(0.12)(0.20))^{1/2} \]

\( \sigma_p = 16.10\% \)
Currency Considerations

- The dollar value of an asset is equal to its local currency value \( V \) multiplied by the exchange rate \( S \) (number of dollars/local currency):

\[
V^$ = V \times S
\]

- The rate of return over the period is:

\[
r^$ = r + s + (r \times s)
\]

where \( r \) = return in local currency

\( s \) = percentage exchange rate movement
Example – Currency Risk

- Suppose we have a foreign investment with the following characteristics:

  \[ \sigma = 16.5\%, \ \sigma_s = 8\% \text{ and } \rho = +0.1 \]

  What is the risk in domestic currency and the contribution of currency risk?
Example – Currency Risk

Answer:
\[ \sigma_f^2 = (0.165)^2 + (0.08)^2 + 2(0.1)(0.165)(0.08) \]
\[ = 0.036265 \]
\[ \sigma_f = 19.04\% \]

Contribution of currency risk:
\[ \sigma_f - \sigma = 19.04\% - 16.5\% = 2.54\% \]
Exhibit 9.2: Risk-Return Trade-off of Internationally Diversified Portfolios
Exhibit 9.3 Risk-Return Trade-Off of Internationally Diversified versus Domestic-Only Portfolios
Exhibit 9.4: Correlation of Stock Markets, 1997-2007  Monthly returns in U.S. dollars (bottom left) and currency hedged (top right)

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Canada</th>
<th>United Kingdom</th>
<th>France</th>
<th>Germany</th>
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Market Correlations (Stock Markets)

- The degree of independence of a stock market is directly linked to the independence of a nation’s economy and governmental policies.
- Purely national or regional factors seem to play an important role in asset prices, leading to sizeable differences in the degree of independence between markets.
Market Correlations (Stock Markets)

- Correlations between various stock and bond markets are systematically monitored by major international money managers.
- Low correlation across countries offers risk-diversification and return enhancement opportunities.
- Technological specialization
- Cultural and sociological differences.
Exhibit 9.5: Correlation of Bond Markets, January 1992-2002  *Monthly Returns in U.S. Dollar (bottom right) and Currency Hedged (top right)*

<table>
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<tr>
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<td>0.08</td>
<td>−0.14</td>
<td>0.01</td>
<td>0.11</td>
<td>1.00</td>
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Market Correlations (Bond Markets)

- In general, long-term bond return variations are not highly correlated across countries.
- Regional blocs do appear.
- Eurozone bond markets now exhibit a correlation close to 1.0 for government bonds.
- Foreign bonds offer excellent diversification benefits to a U.S. stock portfolio manager.
Market Correlations (Bond Markets)

- Factors causing bond market correlations across countries to be low are the differences in national monetary and budgetary policies.
- National monetary/budgeting policies are not fully synchronized.
- There exists a correlation between currency movements and bond yield movements.
- Some countries practice a “leaning against the wind” policy, whereby they raise their interest rates to defend their currencies.
Exhibit 9.6: Stock Exchange Trade Hours in Greenwich Mean Time (GMT) and Eastern Time (EST) Clocks
Portfolio Return Performance

- A common way to evaluate a portfolio’s risk-adjusted performance is to evaluate its Sharpe Ratio.
- The Sharpe Ratio is the ratio of return on a portfolio, in excess of the risk-free rate, divided by its standard deviation.

\[
\text{Sharpe ratio} = \frac{E(R_p - r_f)}{\sigma_p}
\]
Sharpe Ratio

- In other words, the Sharpe ratio measures the excess return per unit of risk.
- Money managers attempt to maximize the Sharpe ratio.
- Investing in foreign assets allows a reduction in portfolio risk and possibly an increased return.
Example – Sharpe Ratio

- You are given the following information:
  \( \sigma_f = 15\% \), \( \sigma_d = 12\% \), \( \rho_{df} = 0.55 \),
  \( E(R_f) = 12\% \), \( E(R_d) = 10\% \),
  \( r_{fd} = r_{ff} = 4\% \)

Calculate the Sharpe ratio for the domestic asset, the foreign asset and an internationally diversified portfolio equally invested in the domestic and foreign assets.
Example – Sharpe Ratio

- Domestic:

$$\text{Sharpe ratio} = \frac{E(R_p - r_f)}{\sigma_p}$$

$$\text{Sharpe ratio} = \frac{10 - 4}{12}$$

$$\text{Sharpe ratio} = 0.5$$
Example – Sharpe Ratio

Foreign:

\[ \text{Sharpe ratio} = \frac{E(R_p - r_f)}{\sigma_p} \]

\[ \text{Sharpe ratio} = \frac{12 - 4}{15} \]

\[ \text{Sharpe ratio} = 0.533 \]
Example – Sharpe Ratio

Portfolio

\[ E(R_p) = 0.5(10) + 0.5(12) = 11\% \]

The standard deviation of the portfolio is equal to:

\[ \sigma_p = (w_d^2 \sigma_d^2 + w_f^2 \sigma_f^2 + 2w_d w_f \rho_{df} \sigma_d \sigma_f)^{1/2} \]

\[ \sigma_p = ((0.5)^2(12)^2 + (0.5)^2(15)^2 + 2(0.5)(0.5)(0.55)(12)(15))^{1/2} \]

\[ \sigma_p = 11.91\% \]

\[ \text{Sharpe ratio} = \frac{E(R_p - r_f)}{\sigma_p} \]

\[ \text{Sharpe ratio} = \frac{11 - 4}{11.91} \]

\[ \text{Sharpe ratio} = 0.588 \]

Currency Risk

- In a global portfolio, the depreciation of one currency is often offset by the appreciation of another.
- Market and currency risk are not additive (only true if the two are perfectly correlated).
- The exchange rate risk of an investment may be hedged for major currencies by selling futures or forward currency contracts, buying put currency options, or even borrowing foreign currency.
- The contribution of currency risk should be measured for the total portfolio.
- Contribution of currency risk decreases with the length of the investment horizon.
Case Against International Diversification

- International correlations have trended upward over the past decade.
- It has also been observed that international correlation increases in periods of high market volatility.
- Markets that used to be segmented are moving towards global integration.
Increases in Correlations

- The increases in correlations have been due to such factors as deregulation, capital mobility, free trade, and the globalization of corporations.
- Capital mobility has increased especially among developed countries.
- The country-specific argument against international diversification arises during periods when the domestic market does better than most other markets.
Increases in Correlations

- Correlation seems to increase dramatically in periods of crises.
- So the benefits of international risk diversification disappears when they are most needed.
- A phenomenon referred to as “correlation breakdown”.
Exhibit 9.10: Mean Return and Correlation of Selected Markets with the U.S. Equity Market

Five Year Period from 1971 to 2000, in U.S. Dollars

<table>
<thead>
<tr>
<th>5-Year Period</th>
<th>Mean Return (in % per year)</th>
<th>Correlation with U.S. Equity</th>
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<td>1996–2000</td>
<td>18.4</td>
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<td>2001–2005</td>
<td>−0.2</td>
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Exhibit 9.11: Real Growth Rate (GDP Growth) of Selected Regions
Ten-Year Periods from 1971 to 2000

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<th>GDP Growth</th>
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<td>1971–1980</td>
<td>2.76%</td>
<td>4.51%</td>
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<td>1981–1990</td>
<td>2.48%</td>
<td>4.15%</td>
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<td>1991–2000</td>
<td>3.40%</td>
<td>1.30%</td>
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One-Day Movement in Units of “Normal” Daily Standard Deviations

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<td>USD</td>
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<td>DAX</td>
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Source: Bookstaber (1997).
Barriers to International Investment

- **Familiarity with Foreign Markets:**
  - this could include cultural differences, trading procedures, the way reports are presented, different languages, different time zones.

- **Political Risk:**
  - some countries run the risk of being politically unstable in the form of political, economic or monetary crises.
Barriers to International Investment

- **Market Efficiency**
  - one issue is liquidity. Some markets are very small; others have many assets traded in large volumes.
  - Capital controls is another form of liquidity risk on foreign investments.

- **Price Manipulation and Insider Trading**

- **Currency Risk**
  - can be hedged with derivative
  - Hedging leads to additional administrative and trading costs.
Barriers to International Investment

- **Regulations**
  - In some countries, regulations constrain the amount of foreign investment that can be undertaken by local investors.
  - The European Union prohibits any ownership discrimination amongst its members.

- **Taxes**
  - Withholding taxes: The country where a corporation is headquartered generally withholds an income tax on the dividends paid by the corporations.
Barriers to International Investment

Transaction Costs:

- Brokerage commissions (fixed, negotiable, variable schedule, part of bid-ask spread)
- In foreign countries, brokerage commissions vary between 0.1-1%
- A large component is the price impact of a trade.
Barriers to International Investment

- **Transaction Costs:**
  - Custodial costs add to transaction costs.
  - International money management fees tend to be higher because of:
    - data collection and research
    - international database subscriptions
    - international accounting systems
    - and communication costs
Exhibit 9.14: Average Correlation of Countries and of Industries

Source: UBS Global Asset Management.
The Case for Emerging Markets

- Expected profit is potentially large.
- As are local risks (volatility, liquidity and political risks).
- Emerging markets also present a positive but moderate correlation with developed markets.
- The correlation with the world index of developed markets from 1987 to 2007 was 0.64.
The Case for Emerging Markets

- The volatility of emerging markets is much larger than that of developed markets.
- Investment risk in emerging economies often comes from the possibility of a financial crisis.
  - e.g. Mexican peso crisis (1994)
  - Asian financial crisis (1997)
Exhibit 9.15  Performance of World Developed Markets and Emerging Markets
Volatility, Correlations and Risk

- Distribution of emerging market returns is not symmetric.
- The development of many emerging markets stems from political reform and liberalization.
- Existing infrastructure can limit growth (for example, Thailand and China).
- Corruption is a rampant problem everywhere but may be more so in some emerging markets.
Volatility, Correlations and Risk

- The banking sector is sometimes poorly regulated, unsupervised, undercapitalized for the lending risks assumed.
- International correlation tends to increase in periods of crisis, and emerging markets are subject to large periodic crises.
- In emerging markets, both the stock market and the currency are affected by the state of the economy.
- Contagion spread depends on whether the factors creating the boom or crisis are primarily global or local.
Emerging Market Portfolio Return Performance

- Most analysts expect economies to grow at a higher rate than developed nations, given the liberalization of international trade.
- Emerging markets have shown signs of becoming more efficient, providing more rigorous research on companies and progressively applying stricter standards of market supervision.
- Many have adopted international accounting standards, automated trading and settlement procedures.
Investing in Emerging Markets

- The investability in emerging markets is constrained by various regulations and liquidity problems.
- Emerging markets tend to be segmented and mispricing is evident.
- “Investable” or “free” indexes have been introduced to reflect investability of emerging markets.
Investing in Emerging Markets

- Restrictions can take the form of:
  - Foreign ownership
  - Free float
  - Repatriation of income or capital
  - Discriminatory taxes
  - Foreign currency restrictions
  - Authorized investors