Investment Analysis and Portfolio Management 11th edition Reilly Solutions Manual

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Investment Analysis and Portfolio Management 11th edition Reilly Solutions Manual

CHAPTER 2

ASSET ALLOCAITON AND SECURITY SELECTION

Answers to Questions

1. In answering this question, one assumes that the young person has a steady job, adequate insurance coverage, and sufficient cash reserves. The young individual is in the accumulation phase of the investment life cycle. During this phase, an individual should consider moderately high-risk investments, such as common stocks, because he/she has a long investment horizon and much earnings ability over time.

2. In answering this question, one assumes that the 63-year-old individual has adequate insurance coverage and a cash reserve. Depending on her income from social security, she may need some current income from her retirement portfolio to meet living expenses. At the same time, she will need to protect herself against inflation. Removing money from her company's retirement plan and investing it in money market funds and bond funds would satisfy the investor's short-term and income needs. But some long-term investments, such as common stock mutual funds, are needed to provide the investor with needed inflation protection.

3. Typically investment strategies change during an individual's lifetime. In the accumulating phase, the individual is accumulating net worth to satisfy short-term needs (e.g., house and car purchases) and long-term goals (e.g., retirement and children's college needs). In this phase, the individual is willing to invest in moderately high-risk investments in order to achieve above-average rates of return.

   In the consolidating phase, an investor has paid off many outstanding debts and typically has earnings that exceed expenses. In this phase, the investor is becoming more concerned with long-term needs of retirement or estate planning. Although the investor is willing to accept moderate portfolio risk, he/she is not willing to jeopardize the "nest egg."

   In the spending phase, the typical investor is retired or semi-retired. This investor wishes to protect the nominal value of his/her savings, but at the same time must make some investments for inflation protection.

   The gifting phase is often concurrent with the spending phase. The individual believes that the portfolio will provide sufficient income to meet expenses, plus a reserve for uncertainties. If an investor believes there are excess amounts available in the portfolio, he/she may decide to make "gifts" to family or friends, institute charitable trusts, or establish trusts to minimize estate taxes.

4. A policy statement is important for both the investor and the investment advisor. A policy

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statement assists the investor in establishing realistic investment goals, as well as providing a benchmark by which a portfolio manager's performance may be measured.

5. The 45-year old uncle and 35-year old sister differ in terms of time horizon. However, each has some time before retirement (20 versus 30 years). Each should have a substantial proportion of his/her portfolio invested in equities, with the 35-year old sister possibly having more equity investments in small firms or international firms (i.e., can tolerate greater portfolio risk). These investors could also differ in current liquidity needs (such as children, education expenses, etc.), tax concerns, and/or other unique needs or preferences.

6. Before constructing an investment policy statement, the financial planner needs to clarify the client's investment objectives (e.g., capital preservation, capital appreciation, current income, or total return) and constraints (e.g., liquidity needs, time horizon, tax factors, legal and regulatory constraints, and unique needs and preferences). Data on current investments, portfolio returns, and savings plans (future additions to the portfolio) are helpful as well.

7. Student Exercise

8. CFA Examination III (1993)

8(a). At this point we know (or can reasonably infer) that Mr. Franklin is:

- unmarried (a recent widower)
- childless
- 70 years of age
- in good health
- possessed of a large amount of (relatively) liquid wealth intending to leave his estate to a tax-exempt medical research foundation, to whom he is also giving a large current cash gift
- free of debt (not explicitly stated, but neither is the opposite)
- in the highest tax brackets (not explicitly stated, but apparent)
- not skilled in the management of a large investment portfolio, but also not a complete novice because he owned significant assets of his own prior to his wife's death
- not burdened by large or specific needs for current income
- not in need of large or specific amounts of current liquidity

Taking this knowledge into account, his Investment Policy Statement will reflect these specifics:

Objectives:

<u>Return Requirements</u>: The incidental throw-off of income from Mr. Franklin's large asset pool should provide a more than sufficient flow of net spendable income. If not, such a

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need can easily be met by minor portfolio adjustments. Thus, an inflation-adjusted enhancement of the capital base for the benefit of the foundation will be the primary return goal (i.e., real growth of capital). Tax minimization will be a continuing collateral goal.

Risk Tolerance: Account circumstances and the long-term return goal suggest that the portfolio can take somewhat above-average risk. Mr. Franklin is acquainted with the nature of investment risk from his prior ownership of stocks and bonds, he has a still long actuarial life expectancy and is in good current health, and his heir—the foundation, thanks to his generosity—is already possessed of a large asset base.

Constraints:

Time Horizon: Even disregarding Mr. Franklin's still-long actuarial life expectancy, the horizon is long-term because the remainder of his estate, the foundation, has a virtually perpetual life span.

Liquidity Requirement: Given what we know and the expectation of an ongoing income stream of considerable size, no liquidity needs that would require specific funding appear to exist.

Taxes: Mr. Franklin is no doubt in the highest tax brackets, and investment actions should take that fact into account on a continuing basis. Appropriate tax-sheltered investment (standing on their own merits as investments) should be considered. Tax minimization will be a specific investment goal.

Legal and Regulatory: Investments, if under the supervision of an investment management firm (i.e., not managed by Mr. Franklin himself) will be governed by state law and the Prudent Person rule.

Unique Circumstances: The large asset total, the foundation as their ultimate recipient, and the great freedom of action enjoyed in this situation (i.e., freedom from confining considerations) are important in this situation, if not necessarily unique.

8(b). Given that stocks have provided (and are expected to continue to provide) higher risk-adjusted returns than either bonds or cash, and considering that the return goal is for long-term, inflation-protected growth of the capital base, stocks will be allotted the majority position in the portfolio. This is also consistent with Mr. Franklin's absence of either specific current income needs (the ongoing cash flow should provide an adequate level for current spending) or specific liquidity needs. It is likely that income will accumulate to some extent and, if so, will automatically build a liquid emergency fund for Mr. Franklin as time passes.

Because the inherited warehouse and the personal residence are significant (15 percent)

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real estate assets already owned by Mr. Franklin, no further allocation to this asset class is made. It should be noted that the warehouse is a source of cash flow, a diversifying asset and, probably, a modest inflation hedge. For tax reasons, Mr. Franklin may wish to consider putting some debt on this asset, freeing additional cash for alternative investment use.

Given the long-term orientation and the above-average risk tolerance in this situation, about 70 percent of total assets can be allocated to equities (including real estate) and about 30 percent to fixed income assets. International securities will be included in both areas, primarily for their diversification benefits. Municipal bonds will be included in the fixed income area to minimize income taxes. There is no need to press for yield in this situation, nor any need to deliberately downgrade the quality of the issues utilized. Venture capital investment can be considered, but any commitment to this (or other "alternative" assets) should be kept small.

The following is one example of an appropriate allocation that is consistent with the Investment Policy Statement and consistent with the historical and expected return and other characteristics of the various available asset classes:

	Range (%)	Current Target (%)
Cash/Money Market	0 – 5	0
U.S. Fixed Income	10 – 20	15
Non-U.S. Fixed Income	5 – 15	10
U.S. Stocks (Large Cap)	30 – 45	30
(Small Cap)	15 – 25	15
Non-U.S. Stocks	15 – 25	15
Real Estate	10 – 15	15*
Other	0 – 5	0
		100

*Includes the Franklin residence and warehouse, which together comprise the proportion of total assets shown.

9. The major advantage of investing in common stocks is that generally an investor would earn a higher rate of return than on corporate bonds. Also, while the return on bonds is pre-specified and fixed, the return on common stocks can be substantially higher if the investor can pick a "winner" – i.e., if the company's performance turns out to be better than current market expectations. The main disadvantage of common stock ownership is the higher risk. While the income on bonds is certain (except in the extreme case of bankruptcy), the return on stocks will vary depending upon the future performance of the

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company and could well be negative. A line graph of returns over time should indicate a lower average level of return and lower variability of returns over time for bonds than for common stock.

10. The three factors are:
    (1) Limiting oneself to the U.S. securities market would imply effectively ignoring more than 50 percent of the world securities market. While U.S. markets are still the largest single sector, foreign markets have been growing in absolute and relative size since 1969.
    (2) The rates of return available on non-U.S. securities often have substantially exceeded those of U.S. securities.
    (3) Diversification with foreign securities reduces portfolio risk.

11. International diversification reduces portfolio risk because of the low correlation of returns among the securities from different countries. This is due to differing international trade patterns, economic growth, fiscal policies, and monetary policies among countries.

12. There are different correlations of returns between securities from the U.S. and alternate countries because there are substantial differences in the economies of the various countries (at a given time) in terms of inflation, international trade, monetary and fiscal policies, and economic growth.

13. The correlations between U.S. stocks and stocks for different countries should change over time because each country has a fairly independent set of economic policies. Factors influencing the correlations include international trade, economic growth, fiscal policy, and monetary policy. A change in any of these variables will cause a change in how the economies are related. For example, the correlation between U.S. and Japanese stock will change as the balance of trade shifts between the two countries. Closer economic ties and increased trade will likely result in higher correlations between financial markets. For example we expect larger correlations between the U.S. and Canada; Canada is the largest trading partner of the U.S. Looking at regions with lower trade flows with the U.S., Exhibit 2.16 shows a correlation (using the Wilshire 5000 cap-weighted index) of 0.726 with the MSCI Europe index and a correlation of 0.542 with IFC Emerging Market index.

14. The major risks that an investor must consider when investing in any bond issue are business risk, financial risk, and liquidity risk. Additional risk associated with foreign bonds, such as Japanese or German bonds, are exchange rate risk and country risk. Country risk is not a major concern for Japanese or German securities. Exchange rate risk is the uncertainty that arises from floating exchange rates between the U.S. dollar and the Japanese yen or Euro.

15. The additional risks that some investors believe international investing introduces include foreign exchange risk and country risk. For example, according to Exhibit 2.9, in 2010

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the U.S. return of 15.30 was higher than that of Germany (7.10 percent) and Japan (13.80 percent), while in 2007 the U.S. return was only 3.80 percent, while the German market rose to 30.50 percent and the Japanese market fell to 6 percent. The returns for these two countries include the domestic return in the issuing country and an adjustment for any exchange rate movement between their currencies and the dollar.

16. There are four alternatives to direct investment in foreign stocks available to investors:
(1) purchase American Depository Receipts (ADRs)
(2) purchase of American shares (issued by a transfer agent)
(3) direct purchase of foreign shares listed on a foreign or U.S. exchange
(4) purchase of international mutual funds.

17. Unlike corporate bonds, interest on municipal bonds is exempt from taxation by the federal government and by the state that issued the bond, provided the investor is a resident of that state. For instance, a marginal tax rate of 35 percent means that a regular bond with an interest rate of 8 percent yields a net return after taxes of only 5.20 percent [.08 x (1 -.35)]. A tax-free bond with a 6 percent yield would be preferable.

18. The convertible bond of the growth company would have the lower yield. This is intuitive because there is a greater potential for the price of the growth company stock to increase, which would make the conversion feature of the bond extremely attractive. Thus, the investor would be willing to trade off the higher upside potential resulting from conversion for the lower yield.

19. Liquidity is the ability to buy or sell an asset quickly at a price similar to the prior price assuming no new information has entered the market. Common stocks have the advantage of liquidity because it is very easy to buy or sell a small position (there being a large number of potential buyers) at a price not substantially different from the current market price. Raw land is relatively illiquid because it is often difficult to find a buyer immediately and often the prospective buyer will offer a price that is substantially different from what the owner considers to be the true market value. A reason for this difference is that while common stock data are regularly reported in a large number of daily newspapers and several magazines and closely watched by a large number of individuals, raw land simply lacks this kind of interest. Further, the speculative nature of raw land investment calls for high risk and longer maturity before profits can be realized. Finally, the initial investment on a plot of raw land would be substantially greater than a round lot in most securities. As a result, the small investor is generally precluded from this kind of investment.

20. Art and antiques are considered illiquid investments because in most cases they are sold at auctions. The implication of being traded at auctions rather than on a developed exchange is that there is tremendous uncertainty regarding the price to be received and it takes a long time to contact a buyer who offers the "right" price. Besides, many buyers of art and antiques are accumulators rather than traders, and this further reduces trading.

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Coins and stamps are more liquid than art and antiques because an investor can determine the "correct" market price from several weekly or monthly publications. There is no such publication of current market prices of the numerous unique pieces of art and antiques and owners are forced to rely on dealer estimates. Further, while a coin or stamp can be readily disposed of to a dealer at a commission of about 10–15 percent, the commissions on paintings range from 30–50 percent.

To sell a portfolio of stocks that are listed on the New York Stock Exchange, an investor simply contacts his/her broker to sell the shares. The cost of trading stocks varies depending on whether the trade is handled by a full service broker or a discount broker.

21. The results of Exhibit 2.16 would tend to support adding some stocks from emerging markets to your portfolio. The table indicates a low positive correlation with U.S. stocks (0.542 with the Wilshire 5000), which implies reasonable diversification opportunities. However, such markets tend to be less liquid than markets of developed countries.

22. International stocks versus U.S. stocks – Problems:

    1. Information about foreign firms is often difficult to obtain on a timely basis and once obtained, can be difficult to interpret and analyze due to language and presentation differences.
    2. Financial statements are not comparable from country to country. Different countries use different accounting principles. Even when similar accounting methods are used, cultural, institutional, political, and tax differences can make cross-country comparisons hazardous and misleading.
    3. Stock valuation techniques useful in the United States may be less useful in other countries. Stock markets in different countries value different attributes.
    4. Currency and political risk must be considered when selecting non-U.S. stocks for a portfolio.
    5. Increased costs: custody, management fees, and transactions expenses are usually higher outside the United States.

23. Arguments in favor of adding international securities include:

    1. Benefits gained from broader diversification, including economic, political, and/or geographic sources.
    2. Expected higher returns at the same or lower (if properly diversified) level of portfolio risk.
    3. Advantages accruing from improved correlation and covariance relationships across the portfolio's exposures.
    4. Improved asset allocation flexibility, including the ability to match or hedge non-U.S. liabilities.
    5. Wider range of industry and company choices for portfolio construction purposes.
    6. Wider range of managers through whom to implement investment decisions.
    7. Diversification benefits are realizable despite the absence of non-U.S. pension

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liabilities.

At the same time, there are a number of potential problems associated with moving away from a domestic-securities-only orientation:

1. Possible higher costs, including those for custody, transactions, and management fees.
2. Possibly reduced liquidity, especially when transacting in size.
3. Possible unsatisfactory levels of information availability, reliability, scope, timeliness, and understand-ability.
4. Risks associated with currency management, convertibility, and regulations/controls.
5. Risks associated with possible instability/volatility in both markets and governments.
6. Possible tax consequences or complications.
7. Recognition that overseas investments may underperform U.S. investments.

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CHAPTER 2
Answers to Problems

1. Most experts recommend that about six months' worth of living expenses be held in cash reserves. Although these funds are identified as "cash," it is recommended that they be invested in instruments that can easily be converted to cash with little chance of loss in value (e.g., money market mutual funds, etc.).

   Most experts recommend that an individual should carry life insurance equal to 7–10 times an individual's annual salary, but final determination needs to include the expected expenses and needs facing one's dependents over their lifetime. An unmarried individual may not need coverage but should consider purchasing some insurance while they are "insurable." A married individual with two children should definitely have coverage (possibly 9–10 times salary as a starting point, to be refined after consider living expenses of loved ones, desire to provide for college education of children, and so on).

2(a). $10,000 invested in 9 percent tax-exempt IRA (assuming annual compounding)

in 5 years: $10,000(FVIF @ 9%) = $10,000(1.5386) = $15,386
in 10 years: $10,000(FVIF @ 9%) = $10,000(2.3674) = $23,674
in 20 years: $10,000(FVIF @ 9%) = $10,000(5.6044) = $56,044

2(b). After-tax yield = Before-tax yield (1 - Tax rate)
= 9% (1 - .36)
= 5.76%

$10,000 invested at 5.76 percent (assuming annual compounding)

in 5 years: $10,000(FVIF @ 5.76%) = $13,231
in 10 years: $10,000(FVIF @ 5.76%) = $17,507
in 20 years: $10,000(FVIF @ 5.76%) = $30,650

3(a). $10,000 invested in 10 percent tax-exempt IRA (assuming annual compounding)

in 5 years: $10,000(FVIF @ 10%) = $10,000(1.6105) = $16,105
in 10 years: $10,000(FVIF @ 10%) = $10,000(2.5937) = $25,937
in 20 years: $10,000(FVIF @ 10%) = $10,000(6.7275) = $67,275

3(b). After-tax yield = Before-tax yield (1 - Tax rate)
= 10% (1 - .15)
= 8.50%

$10,000 invested at 8.50 percent (assuming annual compounding)

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in 5 years: $10,000(FVIF @ 8.50%) = $15,037
in 10 years: $10,000(FVIF @ 8.50%) = $22,610
in 20 years: $10,000(FVIF @ 8.50%) = $51,120

4. With inflation growing at 3% annually, the above figures need to be deflated by the following factors:
in 5 years: (1.03)5 = 1.1593
in 10 years: (1.03)5 = 1.3439
in 20 years: (1.03)5 = 1.8061

The real values of the answers from 4(a) are: $10,000 invested in 9 percent tax-exempt IRA (assuming annual compounding)

in 5 years: $15,386/1.1593 = $13,271.80
in 10 years: $23,674/ 1.3439 = $17,615.89
in 20 years: $56,044/ 1.8061 = $31,030.40

The real values of the answers from 5(a) are: $10,000 invested in 10 percent tax-exempt IRA (assuming annual compounding)

in 5 years: $16,105/ 1.1593= $13,892.00
in 10 years: $25,937/ 1.3439 = $19,299.80
in 20 years: $67,275/ 1.8061 = $37,248.77

5. Student Exercise

6. Student Exercise

7. Student Exercise

8.

8(a). The arithmetic average assumes the presence of simple interest, while the geometric average assumes compounding or interest-on-interest. The geometric mean internal rate of return is a critical concept in security and portfolio selection as well as performance measurement in a multi-period framework.

8(b). Ranking is best accomplished by using the coefficient of variation (standard deviation/ arithmetic mean, multiplied by 100):

1 - Real Estate	36.88
2 - Treasury Bills	48.93
3 - Long Gov't Bonds	104.92

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4 - Common Stocks 164.40
5 - Long Corp. Bond 166.96

8(c) Expected mean plus or minus two standard deviations:
Arithmetic: 10.28% +/-16.9%(2) = -23.52% to +44.08%

9. If inflation is 3%,
real rate of return = (1 + return)/ (1+ inflation rate) -1

T-bills: real return = 1.035/1.03 -1 = 0.0048
Large-cap common stock: real return = 1.1175/1.03 -1 = 0.0850
Long-term corporate bond: real return = 1.0550/1.03 -1 = 0.0243
Long-term government bond: real return = 1.0490/1.03 -1 = 0.0184
Small cap common stock: real return = 1.1310/1.03 – 1 = 0.0981

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APPENDIX 2

Answers to Problems

1. Lauren's average return

$$\bar{L} = \frac{(5+12-11+10+12)}{5}$$

$$= 28/5 = 5.6$$

Kayleigh's average return

$$\bar{K} = \frac{(5+15+5+7-10)}{5}$$

$$= 22/5 = 4.4$$

$L - \bar{L}$	
5 - 5.6 =	-0.6
12 - 5.6 =	6.4
-11 - 5.6 =	-16.6
10 - 5.6 =	4.4
12 - 5.6 =	6.4

$K - \bar{K}$	
5 - 4.4 =	0.6
15 - 4.4 =	10.6
5 - 4.4 =	0.6
7 - 4.4 =	2.6
-10 - 4.4 =	-14.4

$$COV_{LK} = \frac{\Sigma(L - \bar{L})(K - \bar{K})}{N}$$

$$= \frac{(-.6)(.6) + (6.4)(10.6) + (-16.6)(.6) + (4.4)(2.6) + (6.4)(-14.4)}{5}$$

$$= \frac{-23.2}{5} = -4.64$$

2. Calculation of Correlation Coefficient

Observation	$L - \bar{L}$	$(L - \bar{L})^2$	$(K - \bar{K})$	$(K - \bar{K})^2$
1	-0.6	.36	0.6	.36
2	6.4	40.96	10.6	112.36
3	-16.6	275.56	2.6	6.76
4	4.4	19.36	0.6	0.36
5	6.4	40.96	-14.4	207.36
		377.20		327.20

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$$\sigma_L^2 = \frac{377.2}{5} = 75.44 \qquad \sigma_K^2 = \frac{327.2}{5} = 65.44$$

$$\sigma_L = \sqrt{75.44} = 8.69 \qquad \sigma_K = \sqrt{65.44} = 8.09$$

$$r_{LK} = \frac{COV_{LK}}{\sigma_{:L}\sigma_K} = \frac{-4.64}{(8.69)(8.09)} = -.066$$

While there is a slight negative correlation, the two securities are essentially uncorrelated. Thus, even though the two companies produce similar products, their historical returns suggest that holding both of these securities would help reduce risk through diversification.

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CHAPTER 2

ASSET ALLOCATION AND SECURITY SELECTION

2.1 Individual Investor Life Cycle

2.1.1 The Preliminaries

1. **Insurance**
   - *Life insurance* – provides lump-sum benefit to the heirs upon death of the insured person. Could provide cash value also depending on the type of plan
   - *Health insurance* – helps pay medical bills
   - *Disability insurance* – provides continuing income should the insured become unable to work
   - *Automobile and home/rental insurance* – provides protection against accidents and damage to cars or residences
2. **Cash Reserve**
   - Includes cash equivalents such as money market mutual funds
   - Experts recommend an amount equal to six months' living expenses.

2.1.2 Investment Strategies over an Investor's Lifetime (Exhibit 2.1)

1. **Accumulation Phase** – early to middle years of working career (Exhibit 2.2)
2. **Consolidation Phase** – past midpoint of careers. Earnings exceed expenses
3. **Spending Phase** – begins after retirement
4. **Gifting Phase** – may be concurrent with the spending phase

2.1.3 Life Cycle Investment Goals

1. **Near-term, high-priority goals** – shorter-term financial objectives that individuals set to fund purchases that are personally important to them
2. **Long-term, high-priority goals** – include some form of financial independence, such as the **ability to retire at a certain age**
3. **Lower-priority goals** – these are not critical

2.2 The Portfolio Management Process (Exhibit 2.3)

- Construct a **policy statement** after determining the investor's short-term and long-term needs as well as risk tolerance
- Examine current financial and economic conditions and forecast future trends
- **Construct the portfolio**
- **Continual monitoring** of investor's needs and market conditions and update policy statement as needed

2.3 The Need for a Policy Statement

2.3.1 Understanding and Articulating Realistic Investor Goals

- Helps investors understand their own needs, objectives, and investment constraints
- Sets standards for evaluating portfolio performance

2.3.2 Standards for Evaluating Portfolio Performance

- Assists in judging the performance of a portfolio manager
- Typically includes a **benchmark portfolio**, or comparison standard

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2.3.3 Other Benefits

- Protects the client against a portfolio manager's inappropriate investments or unethical behavior
- Prevents delays in monitoring and rebalancing your portfolio and contributes to a seamless transition between money managers

2.4 Input to the Policy Statement

2.4.1 Investment Objectives

- Objectives are investment goals expressed in terms of both risk and returns.
- *A careful analysis of the client's risk tolerance should precede any discussion of return objectives*.
- Return objective may be stated in terms of an absolute or relative percentage return. It may be also be stated in terms of general goals such as:
  - **Capital preservation** – minimize risk of loss
  - **Capital appreciation** – growth of the portfolio in real terms to meet future need
  - **Current income** – focus is on generating income rather than capital gains
  - **Total return** – increase portfolio value by capital gains and by reinvesting current income
- Examples
  - Investment Objective: 25-year-old – Given the young age and income growth potential, a total return or capital appreciation objective would be most appropriate.
  - Investment Objective: 65-year-old – Given the fact that employment will be ceasing soon, a current income and capital preservation or a current income and total return strategy would be most appropriate.

2.4.2 Investment Constraints

1. Liquidity Needs – vary between investors depending on age, employment, tax obligations, etc.
2. Time Horizon – influences liquidity needs and risk tolerance
3. Tax Concerns
   - Capital gains or losses – taxed differently from income
   - Marginal tax rate – tax rate on each additional dollar of income
4. Legal and Regulatory Factors
   - Both the investment process and the financial markets are highly regulated and subject to numerous laws.
   - Regulations can also constrain the investment choices available to someone in a fiduciary role. A *fiduciary*, or trustee, supervises an investment portfolio of a third party, such as a trust account or discretionary account.
5. Unique Needs and Preferences - could influence investment choice

2.5 Constructing the Policy Statement

2.5.1 General Guidelines

- Investors and advisors should consider the following questions:
  - What are the real risks of an adverse financial outcome, especially in the short run?
  - What probable emotional reactions will I have to an adverse financial outcome?
  - How knowledgeable am I about investments and financial markets?
  - What other capital or income sources do I have? How important is this particular portfolio to my overall financial position?

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- What, if any, legal restrictions may affect my investment needs?
- How would any unanticipated fluctuations in my portfolio value affect my investment policy?

2.5.2 Some Common Mistakes

- Having too much money invested in the employer's stock
- Trading stocks too often
- Selling stocks too soon

2.6 The Importance of Asset Allocation (Exhibits 2.4, 2.5, 2.6)

2.6.1 Investment Returns after Taxes and Costs

- Taxes and inflation can significantly lower returns.

2.6.2 Returns and Risks of Different Asset Classes

- Small company stocks have generated the highest returns historically, but the volatility of the returns have been the greatest as well.

2.6.3 Asset Allocation Summary

- A major portion of a portfolio's returns is explained by asset allocation.

2.6.4 Asset Allocation and Cultural Differences

- Asset allocations differ across countries.

2.7 The Case for Global Investments

2.7.1 Relative Size of U.S. Financial Markets (Exhibit 2.7)

- Overall value of all securities increased dramatically, and the composition has also changed.

2.7.2 Rates of Return on U.S. and Foreign Securities

1. Global Bond-Market Returns (Exhibit 2.8)
2. Global Bond-Market Returns (Exhibit 2.9)

2.7.3 Risk of Diversified Country Investments

1. Global Bond Portfolio Risk (Exhibits 2.10, 2.11)
2. Global Equity Portfolio Risk (Exhibits 2.12, 2.13)
3. Summary on Global Investing
   - Market for non-U.S. bonds and stocks, and found that this market has grown in size and importance.
   - Rates of return for foreign bond and stock investments were often superior to those in the U.S. market.
   - Diversification is important in reducing the variability of portfolio returns over time, which reduces the risk of the portfolio.
   - Adding foreign stocks and bonds to a U.S. portfolio will reduce the risk of the portfolio and can possibly increase its average return
   - Investors should develop a global investment perspective because it is clearly justified, and this trend toward global investing will continue.

2.8 Historical Risk-Returns on Alternative Investments

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2.8.1 World Portfolio Performance (Exhibit 2.14)

1. Asset Return and Total Risk
   - Riskier assets with higher standard deviations experienced higher returns.
2. Return and Systematic Risk (Exhibit 2.15)
   - The systematic risk measure (beta) did a better job of explaining the returns during the period than the total risk measure (standard deviation).
3. Correlations between Asset Returns (Exhibit 2.16)

2.8.2 Art and Antiques

- Study by Reilly (1992):
  - Correlations among alternative antique and art categories vary substantially.
  - Correlations between art/antiques and bonds were generally negative.
  - Correlations of art/antiques with stocks were typically small, positive values.
  - Correlation of art and antiques with the rate of inflation indicates that several of the categories were fairly good inflation hedges since they were positively correlated with inflation.
- Most art and antiques are quite illiquid, and the transaction costs are very high compared to those of financial assets.

2.8.3 Real Estate (Exhibits 2.17, 2.18)

- Studies by Eichholtz (1996), Mull and Socnen (1997), and Quan and Titman (1997):
  - Returns on real estate are equal to or slightly lower than returns on common stocks, but real estate possesses favorable risk and diversification results.
  - Individual real estate assets had much lower standard deviations and either low positive or negative correlations with other asset classes in a portfolio context.
  - All the real estate series had significant positive correlation with inflation, which implies strong potential as an inflation hedge.

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APPENDIX

Objectives and Constraints of Institutional Investors

I. Mutual Funds – pool investors funds and invest them in financial assets as per their investment objectives

II. Pension Funds – receive contributions from the firms, their employees, or both and invest those funds
   A. Defined Benefit – promise to pay retirees a specific income stream after retirement
   B. Defined Contribution – do not promise a set of benefits. Employees' retirement income is not an obligation of the firm

III. Endowment Funds – represent contributions made to charitable or educational institutions

IV. Insurance Companies
   1. Life Insurance Companies
   2. Nonlife Insurance Companies

V. Banks – a bank's success is primarily based on its ability to generate returns in excess of its cost of funds

VI. Institutional Investor Summary

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Investment Analysis & Portfolio Management

Eleventh Edition

CHAPTER 2

Asset Allocation and Security Decision

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2.1 Individual Investor Life Cycle

- Financial plans and investment needs are different for each individual, and they change over a person's life cycle
- How individuals structure their financial plan should be related to their age, financial status, future plans, risk aversion characteristics, and needs

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2.1.1 The Preliminaries

- **Insurance**
  - Life insurance
    - The death benefit paid by the insurance company can help pay medical bills and funeral expenses and provide cash that family members can use to maintain their lifestyle, retire debt, or invest for future needs
  - Health insurance
    - Helps to pay medical bills
  - Disability insurance
    - Provides continuing income should you become unable to work
  - Automobile and home (or rental) insurance
    - Provides protection against accidents and damage to cars or residences

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2.1.1 The Preliminaries (slide 2 of 2)

- **Cash Reserve**
  - Helps to meet events such as emergencies, job layoffs, unforeseen expenses, and good investment opportunities
  - Reduces the likelihood of being forced to sell investments at inopportune times
  - Experts recommend a cash reserve equal to about six months' living expenses
  - Funds should be in investments easily convertible to cash, such as money market or short-term bond mutual funds

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2.1.2 Investment Strategies over an Investor's Lifetime

- Life Cycle Phases
  - Accumulation phase
    - Early to middle years of working career
    - Long investment time horizon and future earning ability
    - Individuals typically willing to make relatively high-risk investments in the hopes of making above-average nominal returns over time
  - Consolidation phase
    - Past midpoint of careers
    - Earnings greater than expenses
    - Typical investment horizon for this phase is still long (20 to 30 years), so moderately high-risk investments are attractive
    - Individuals in this phase are concerned about capital preservation and do not want to take abnormally high risks

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2.1.2 Investment Strategies over an Investor's Lifetime (slide 2 of 4)

- Spending phase
  - Begins after retirement
  - Living expenses are covered by Social Security income and income from prior investments, including employer pension plans
  - The overall portfolio may be less risky than in the consolidation phase, but investors still need some risky growth investments, such as common stocks, for inflation protection
- Gifting phase
  - May be concurrent with the spending phase
  - Excess assets can be used to provide financial assistance to relatives or to establish charitable trusts as an estate planning tool to minimize estate taxes
- Exhibits 2.1, 2.2

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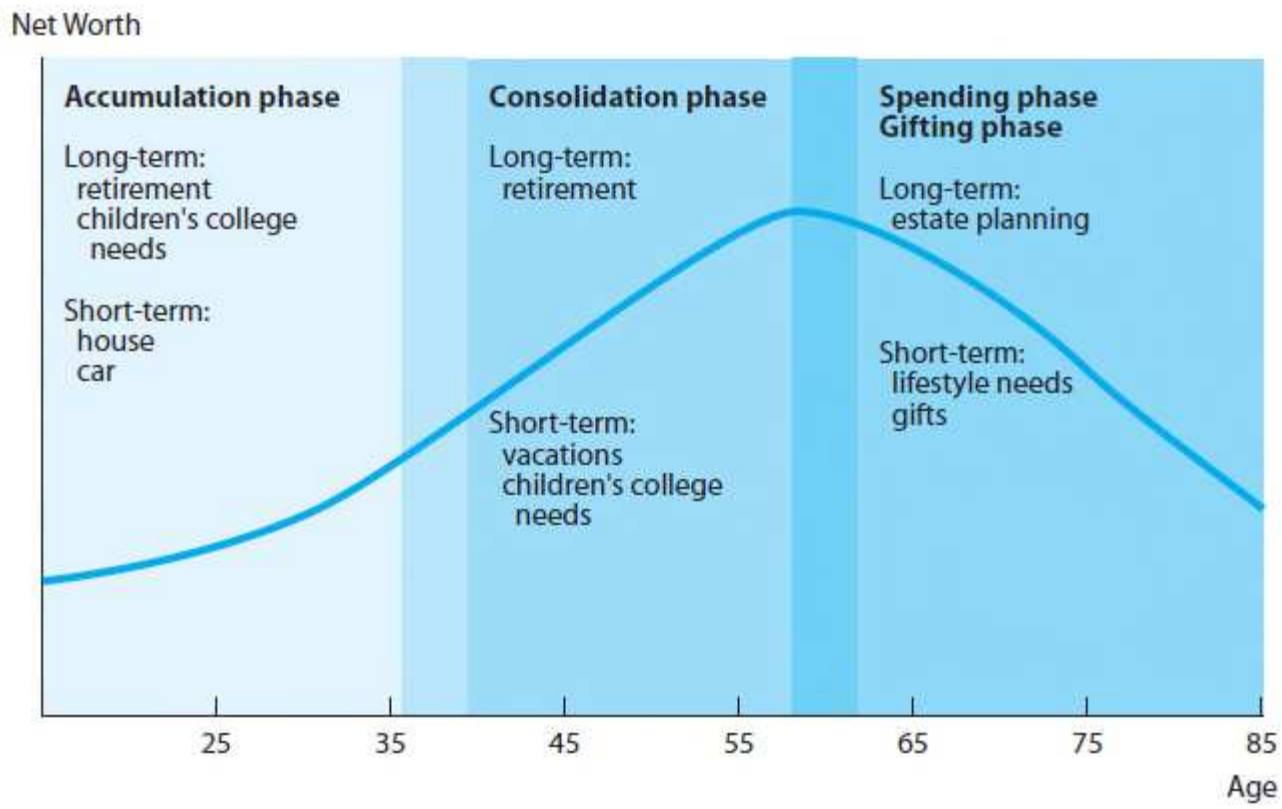
2.1.2 Investment Strategies over an Investor's Lifetime (slide 3 of 4)

Exhibit 2.1 Rise and Fall of Personal Net Worth over a Lifetime



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2.1.2 Investment Strategies over an Investor's Lifetime (slide 4 of 4)

Exhibit 2.2 Benefits of Investing Early

		The Future Value of an Initial $10,000 Investment	The Future Value of Investing $2,000 Annually	The Future Value of the Initial Investment Plus the Annual Investment
Interest rate	7.0%			
20 years		$ 38,696.84	$ 81,990.98	$120,687.83
30 years		$ 76,122.55	$188,921.57	$265,044.12
40 years		$149,744.58	$399,270.22	$549,014.80
Interest rate	8.0%			
20 years		$ 46,609.57	$ 91,523.93	$138,133.50
30 years		$100,626.57	$226,566.42	$327,192.99
40 years		$217,245.21	$518,113.04	$735,358.25

Source: Calculations by authors.

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2.1.3 Life Cycle Investment Goals

- Life Cycle Investment Goals
  - Near-term, high-priority goals
    - Goals have short time horizons, such as funds for a vacation trip
    - High-risk investments are not suitable
  - Long-term, high-priority goals
    - Include financial independence, such as the ability to retire at a certain age
    - Higher-risk investments meet these objectives
  - Lower-priority goals
    - Not critical, such as redecorating the home

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2.2 The Portfolio Management Process

- Policy statement
  - Specifies risks, investment goals, and constraints
  - Should be reviewed and updated periodically
- Study current financial and economic conditions and forecast future trends
- The investor's needs, as reflected in the policy statement, and financial market expectations will jointly determine the **investment strategy**

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2.2 The Portfolio Management Process (slide 2 of 3)

- Construct the portfolio
  - Allocate available funds to minimize investor's risks and meet investment goals
- Continual monitoring
  - Evaluate portfolio performance
  - Monitor investor's needs and market conditions
  - Revise policy statement as needed
  - Modify investment strategy accordingly
- Exhibit 2.3

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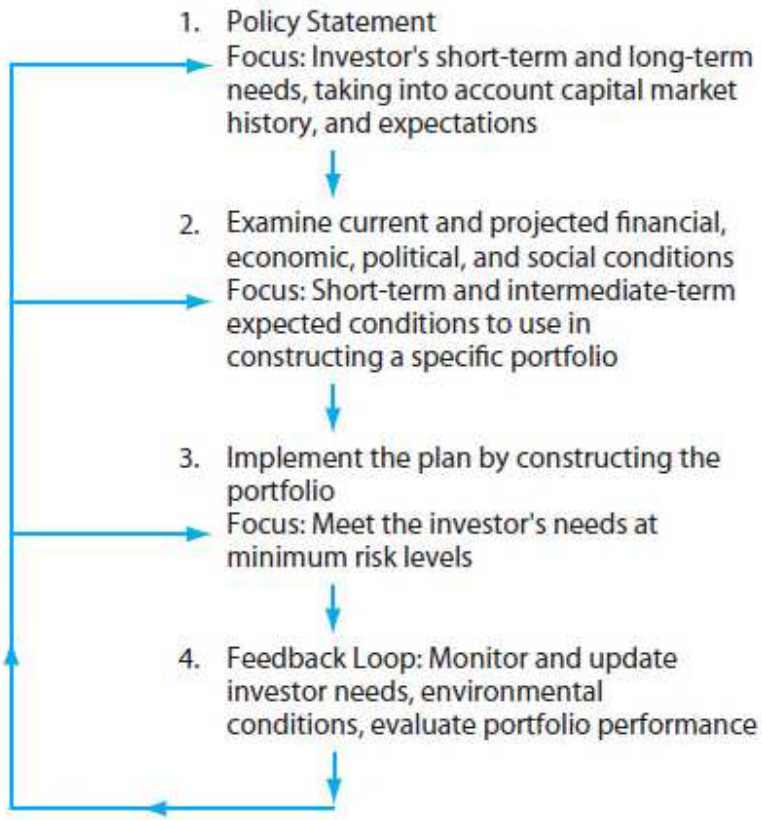
2.2 The Portfolio Management Process (slide 3 of 3)

Exhibit 2.3 The Portfolio Management Process



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2.3 The Need for a Policy Statement

- Important reasons for constructing a policy statement:
  1. It helps the investor decide on realistic investment goals after learning about the financial markets and the risks of investing
  2. It creates a standard by which to judge the performance of the portfolio manager

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2.3.1 Understanding and Articulating Realistic Investor Goals

- Constructing a policy statement is a process whereby investors articulate their realistic needs and goals and become familiar with financial markets and investing risks
- Without this information, investors cannot adequately communicate their needs to a portfolio manager who needs this input to construct a portfolio that will satisfy clients' needs

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2.3.1 Understanding and Articulating Realistic Investor Goals (slide 2 of 2)

One expert in the field recommends that investors should think about the following set of questions and explain their answers as part of the process of constructing a policy statement:

1. What are the real risks of an adverse financial outcome, especially in the short run?
2. What probable emotional reactions will I have to an adverse financial outcome?
3. How knowledgeable am I about investments and financial markets?
4. What other capital or income sources do I have? How important is this particular portfolio to my overall financial position?
5. What, if any, legal restrictions may affect my investment needs?
6. How would any unanticipated fluctuations in my portfolio value affect my investment policy?

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2.3.2 Standards for Evaluating Portfolio Performance

- A policy statement:
  - Assists in judging the performance of a portfolio manager, which requires an objective standard
  - A portfolio's performance should be compared to guidelines specified in the policy statement, not based on the portfolio's overall return
  - Typically includes a **benchmark portfolio**, or comparison standard
    - Both the client and the portfolio manager must agree that the benchmark portfolio reflects the risk preferences and appropriate return requirements of the client
    - The investment performance of the portfolio manager should be compared to this benchmark portfolio

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2.3.2 Standards for Evaluating Portfolio Performance (slide 2 of 2)

- A policy statement:
  - Acts as a starting point for periodic portfolio review and client communication with managers
  - Managers should be judged by whether they consistently followed the client's policy guidelines
  - Imposes an investment discipline on the client and the portfolio manager

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2.3.3 Other Benefits

- A policy statement:
  - Protects the client against a portfolio manager's inappropriate investments or unethical behavior
  - Contributes to a seamless transition between money managers
- The first step before beginning any investment program is to construct a comprehensive policy statement

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2.3.3 Other Benefits (slide 2 of 2)

Answering the following questions will help you evaluate a proposed policy statement:

1. Does the policy meet the specific needs and objectives of this particular investor?
2. Is the policy written so clearly that a competent stranger could use it to manage the portfolio in conformance with the client's needs? Given a manager transition, could the new manager use this policy statement to handle your portfolio in accordance with your needs?
3. Would the client have been able to remain committed to the policy during a variety of capital market experiences? Specifically, does the client fully understand investment risks and the need for a disciplined approach to the investment process?
4. Would the portfolio manager have been able to maintain the policy specified over the same period?
5. Would the policy, if implemented, have achieved the client's objectives and needs?

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2.4 Input to the Policy Statement

- Before an investor and advisor can construct a policy statement, they need to have an open and frank exchange of information regarding the client's investment objectives and constraints

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2.4.1 Investment Objectives

- The investor's objectives are his or her investment goals, expressed in terms of both risk and returns
- Risk tolerance:
  - A function of an individual's psychological makeup
  - Also affected by other factors, such as a person's current insurance coverage, cash reserves, family situation, and age
  - Influenced by one's current net worth and income expectations
- Return objectives
  - May be stated in terms of an absolute or a relative percentage return or a general goal, such as capital preservation, current income, capital appreciation, or total return

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2.4.1 Investment Objectives (slide 2 of 3)

- **Capital preservation**
  - Means that investors want to minimize their risk of loss, usually in real terms: They seek to maintain the purchasing power of their investment
  - The return needs to be no less than the rate of inflation
- **Capital appreciation**
  - Is an appropriate objective for investors who want the portfolio to grow in real terms over time to meet some future need
  - Under this strategy, growth mainly occurs through capital gains
- **Current income**
  - Investors want to generate income rather than capital gains
  - Retirees may favor this objective for part of their portfolio to help generate spendable funds
- **Total return strategy**
  - Investors want the portfolio to grow over time to meet a future need
  - Increase portfolio value by both capital gains and reinvesting current income

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2.4.1 Investment Objectives (slide 3 of 3)

- **Investment Objective: 25-Year-Old**
  - Given young age and income growth potential, a total return or capital appreciation objective is appropriate
- **Investment Objective: 65-Year-Old**
  - A risk-averse investor will choose a combination of current income and capital preservation strategies
  - A more risk-tolerant investor will choose a combination of current income and total return in an attempt to have principal growth outpace inflation

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2.4.2 Investment Constraints

- **Liquidity Needs**
  - An asset is liquid if it can be quickly converted to cash at a price close to fair market value
  - Examples include Treasury bills
- **Time Horizon**
  - Investors with long investment horizons generally require less liquidity and can tolerate greater portfolio risk
  - Investors with shorter time horizons generally favor more liquid and less risky investments because losses are harder to overcome in a short time frame

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2.4.2 Investment Constraints (slide 2 of 4)

- **Tax Concerns**
  - Investment planning is complicated by taxes that can seriously become overwhelming if international investments are part of the portfolio
  - Taxable income from interest, dividends, or rents is taxable at the investor's marginal tax rate
- **A Note Regarding Taxes**
  - The impact of taxes on investment strategy and final results is clearly very significant
  - Consult a tax accountant for advice regarding tax regulations

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2.4.2 Investment Constraints (slide 3 of 4)

- **Legal and Regulatory Factors**
  - The investment process and the financial markets are highly regulated and subject to numerous laws
  - Regulations can constrain the investment choices available to someone in a fiduciary role
  - A fiduciary, or trustee, supervises an investment portfolio of a third party, such as a trust account or discretionary account
  - All investors must respect certain laws, such as insider trading prohibitions

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2.4.2 Investment Constraints (slide 4 of 4)

- **Unique Needs and Preferences**
  - Covers the unique concerns of each investor
  - Because each investor is unique, the implications of this final constraint differ for each person
  - Each individual must decide on and then communicate these specific needs and preferences in their policy statement

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2.5 Constructing the Policy Statement

- A policy statement allows an investor to communicate his or her objectives (risk and return) and constraints (liquidity, time horizon, tax, legal and regulatory, and unique needs and preferences)
- Each investor needs to develop a financial plan to guide the investment strategy
- Constructing a policy statement is an investor's responsibility, but investment advisors often assist in the process

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2.5.1 General Guidelines

- In the process of constructing a policy statement, investors should think about the set of questions suggested previously
- When working with an investor to create a policy statement, an advisor should ensure that the policy statement satisfactorily answers those questions

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2.5.2 Some Common Mistakes

- Diversification
  - In employer-sponsored retirement plans retirement funds may be invested in their employer's stock
  - Having so much money invested in one asset violates diversification principles and could be costly
- Stock allocation
  - Average stock allocation in many retirement plans is lower than it should be—that is, investors tend to be too conservative
- Stock trading
  - Studies documented that individual investors typically trade stocks too often, sell stocks with gains too early, and hold on to losers too long
- Future planning
  - Most investors do not plan for the future

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2.6 The Importance of Asset Allocation

- There are four decisions involved in constructing an investment strategy:
  - What asset classes should be considered for investment?
  - What policy weights should be assigned to each eligible asset class?
  - What are the allowable allocation ranges based on policy weights?
  - What specific securities or funds should be purchased for the portfolio?
- Exhibit 2.4

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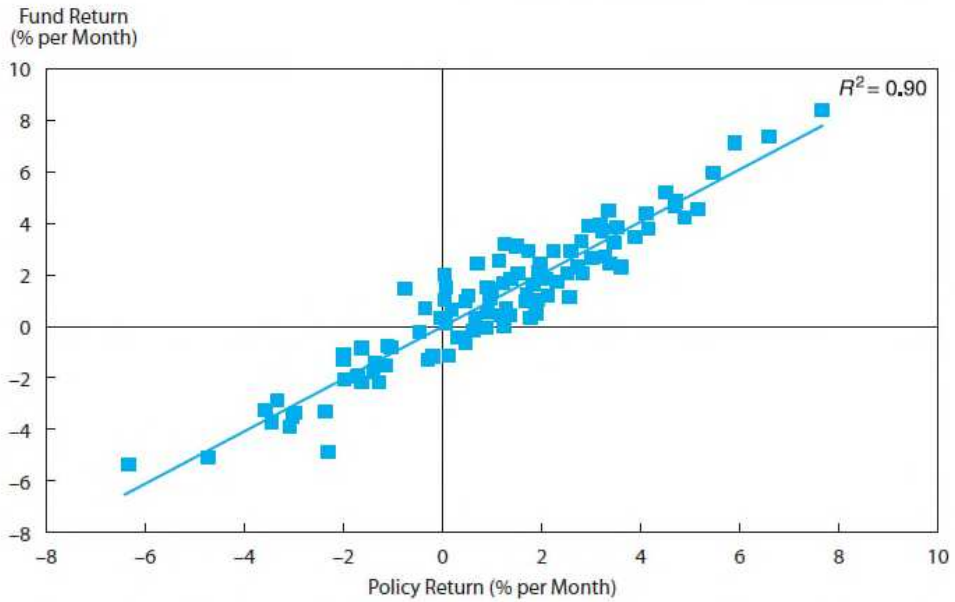
2.6 The Importance of Asset Allocation (slide 2 of 2)

Exhibit 2.4 Time-Series Regression of Monthly Fund Return versus Fund Policy Return: One Mutual Fund, April 1988–March 1998



Note: The sample fund's policy allocations among the general asset classes were 52.4 percent U.S. large-cap stocks, 9.8 percent U.S. small-cap stocks, 3.2 percent non-U.S. stocks, 20.9 percent U.S. bonds, and 13.7 percent cash.

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2.6.1 Investment Returns after Taxes and Inflation

- Stock funds invested in 1997 in the Standard & Poor's 500 stocks would have averaged a 7.68 percent annual return through 2016
  - Incorporating taxes lowers the after-tax average annual return to 5.98 percent
  - The inflation adjusted (real) after-tax average annual return was only 2.87 percent
- Exhibit 2.5

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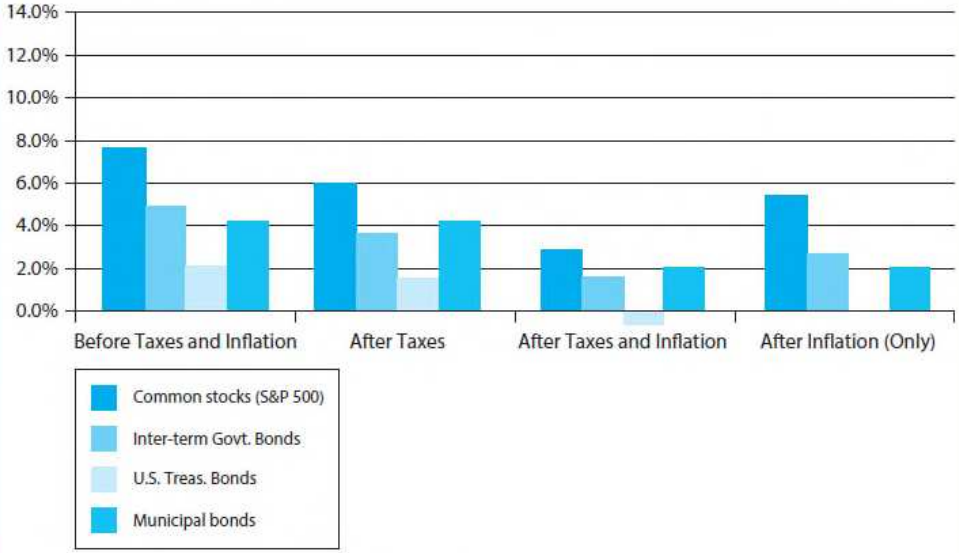
2.6.1 Investment Returns after Taxes and Inflation (slide 2 of 3)

Exhibit 2.5 The Effect of Taxes and Inflation on Investment Returns: 1997–2016

	Before Taxes and Inflation	After Taxes	After Taxes and Inflation	After Inflation (Only)
Common stocks (S&P 500)	7.68%	5.98%	2.87%	5.44%
Inter-term Govt. Bonds	4.90%	3.67%	1.64%	2.72%
U.S. Treas. Bonds	2.13%	1.53%	–0.59%	0.01%
Municipal bonds	4.20%	4.20%	2.04%	2.04%



Assumptions: 28 percent tax rate on income; 20 percent on price change. Compound inflation rate was 2.21 percent for full period.

Source: Computations by authors, using data indicated.

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2.6.2 Returns and Risks of Different Asset Classes

- If the investor has a long time horizon (that is, approaching 20 years), the risk of equities is small and that of T-bills is large because of their differences in long-term expected returns
- Exhibit 2.6

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2.6.1 Investment Returns after Taxes and Inflation (slide 3 of 3)

Exhibit 2.6 Summary Statistics of Annual Returns, 1997–2016, U.S. Securities

	Geometric Mean (%)	Arithmetic Mean (%)	Standard Deviation (%)
Large Company Stocks (S&P 500)	7.68	9.38	16.75
Small Company Stocks (Russell 2000)	10.52	11.61	19.90
Government Bonds (Barclays Capital)	7.16	7.69	5.55
Corporate Bonds (Barclays Capital)	7.29	7.82	6.19
High Yield Corp. Bonds (Barclays Capital)	8.50	9.05	15.43
30-day Treasury Bills (Fed. Reserve)	2.13	2.15	1.75
U.S. Inflation (Federal Reserve)	2.10	2.13	1.07

Source: Calculations by authors using data noted.

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2.6.3 Asset Allocation Summary

- The asset allocation decision dominates the portfolio's returns over time
- Investors seeking capital appreciation, income, or even capital preservation over long time periods should stipulate a sizable allocation to the equity portion in their portfolio
- A strategy's risk depends on the investor's goals and time horizon
- As an investor, you need to understand the differences among investments so you can build a properly diversified portfolio that conforms to your objectives
- Exhibit 2.7

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2.6.3 Asset Allocation Summary (slide 2 of 2)

Exhibit 2.7 Higher Returns Offered by Equities over Long Time Periods: 1934–2015

Length of Holding Period (calendar years)	Percentage of Periods That Stock Returns Trailed T-Bill Returns*
1	34.10%
5	15.20%
10	8.40%
20	0.00
30	0.00

*Price change plus reinvested income

Source: Author calculations.

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2.7 The Case for Global Investments

- Three interrelated reasons why U.S. investors should think of constructing global investment portfolios:
  1. Ignoring foreign markets reduces investment choices to less than 50 percent of available investment opportunities. Because more opportunities broaden risk-return choices, it makes sense to evaluate the full range of foreign securities when building a portfolio
  2. The rates of return available on non-U.S. securities often have substantially exceeded those for U.S.-only securities
  3. Diversification with foreign securities that have very low correlation with U.S. securities can substantially reduce portfolio risk

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2.7.1 Relative Size of U.S. Financial Markets

- The overall value of all securities increased dramatically, and the composition has also changed
- The U.S. securities markets now include a substantially smaller proportion of the total world capital market, and this trend is expected to continue
- The faster economic growth of many other countries compared to the United States (especially some emerging markets) will require foreign governments and individual companies to issue debt and equity securities to finance this growth
- U.S. investors should consider investing in foreign securities because of the growing importance of these foreign securities in world capital markets
- Exhibit 2.8

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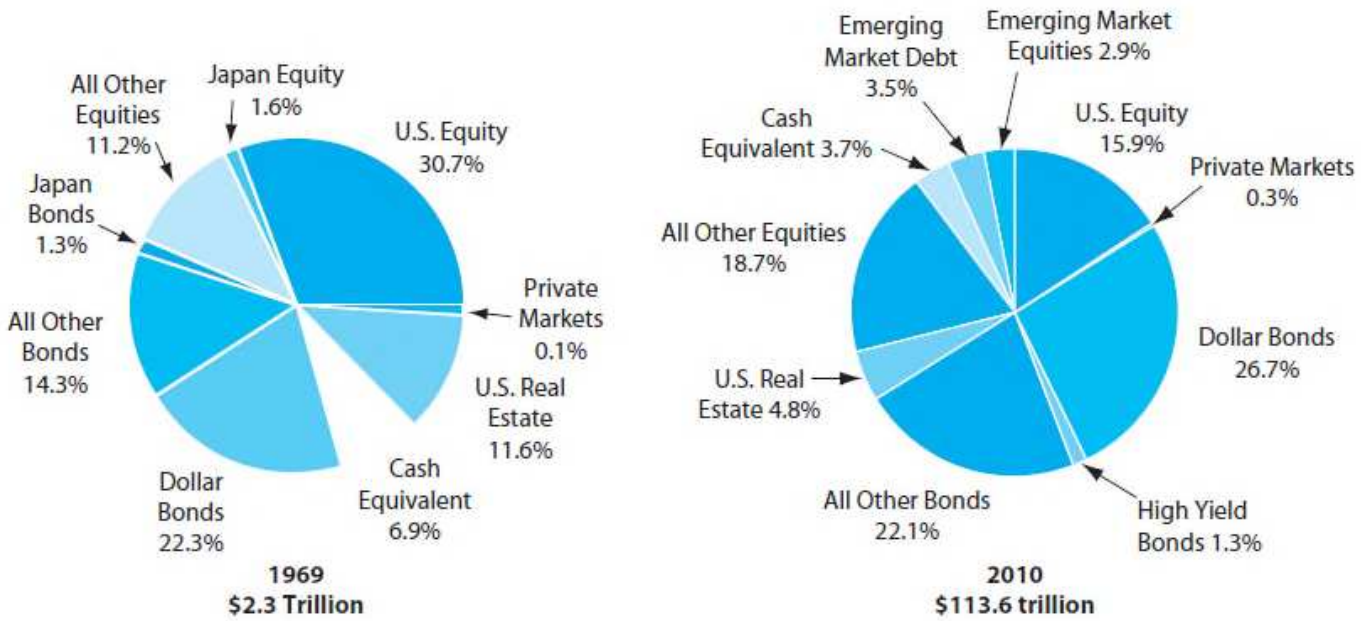
2.7.1 Relative Size of U.S. Financial Markets (slide 2 of 2)

Exhibit 2.8 Total Investable Assets in the Global Capital Market



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2.7.2 Rates of Return on U.S. and Foreign Securities

- **Global Bond-Market Returns**
  - The return performance (both geometric and arithmetic average) of the U.S. bond market ranked sixth out of the six countries
  - U.S. bonds had the lowest standard deviation of the six countries
- **Global Equity-Market Returns**
  - The United States' average rank in U.S. dollar returns in 2007–2010 was 17.5 out of 34 countries (and it was in the top 10 only once)
- Exhibits 2.9, 2.10

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2.7.2 Rates of Return on U.S. and Foreign Securities (slide 2 of 3)

Exhibit 2.9 Global Government Bond Annual Rates of Return in U.S. Dollars: 1986–2010

	Geometric Mean	Arithmetic Mean	Standard Deviation
Canada	9.89	10.32	9.77
France	9.65	10.39	12.86
Germany	8.48	9.28	13.49
Japan	8.20	9.14	14.75
United Kingdom	9.09	9.84	13.28
Unites States	7.20	7.37	6.09

Source: Bank of America-Merrill Lynch.

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2.7.2 Rates of Return on U.S. and Foreign Securities (slide 3 of 3)

Exhibit 2.10 Annual Equity Returns in U.S. Dollars

	Performance of Dow Jones Global Indexes							
	2010		2009		2008		2007	
	USD Returns	Rank	USD Returns	Rank	USD Returns	Rank	USD Returns	Rank
U.S.	15.30%	13	25.70%	27	−38.60%	3	3.80%	27
Australia	12.40%	17	70.90%	8	−54.50%	23	25.30%	14
Austria	NA		55.60%	15	−64.80%	30	1.60%	31
Belgium	4.70%	23	50.50%	17	−52.60%	18	5.60%	25
Brazil	5.70%	22	127.10%	2	−57.00%	28	71.10%	1
Canada	22.00%	12	56.90%	13	−49.10%	12	27.10%	12
Chile	49.60%	4	88.80%	4	−43.60%	7	23.00%	16
Denmark	26.60%	8	40.80%	21	−51.60%	15	17.60%	18
Finland	10.80%	19	17.50%	32	−56.40%	27	39.00%	4
France	−5.70%	26	28.60%	26	−45.50%	9	11.30%	22
Germany	7.10%	20	24.10%	29	−46.30%	10	30.50%	9
Greece	−46.50%	31	24.10%	29	−66.40%	32	29.80%	10
Hong Kong	14.20%	14	67.40%	10	−53.90%	22	44.50%	3
Iceland	57.20%	1	10.30%	33	−96.20%	34	13.10%	19
Indonesia	38.40%	5	129.30%	1	−63.00%	29	39.00%	4
Ireland	−11.00%	27	54.70%	16	−68.70%	33	−19.20%	34
Italy	−17.60%	29	23.20%	31	−52.50%	17	1.70%	30
Japan	13.80%	15	4.00%	34	−29.30%	1	−6.00%	33
Malaysia	35.90%	6	46.90%	19	−44.60%	8	44.60%	2
Mexico	26.40%	9	48.20%	18	−39.80%	4	10.80%	23
Netherlands	−0.30%	25	42.80%	20	−55.60%	25	12.00%	21
New Zealand	4.70%	23	38.80%	23	−52.40%	16	2.20%	29
Norway	13.40%	16	93.80%	3	−66.20%	31	26.80%	13
Philippines	55.90%	3	70.40%	9	−55.50%	24	36.70%	7
Portugal	−16.30%	28	35.40%	24	−53.80%	21	24.50%	15
Singapore	22.90%	11	74.00%	6	−53.10%	19	27.60%	11
South Africa	30.90%	7	56.00%	14	−42.80%	5	12.60%	20
South Korea	23.90%	10	65.30%	12	−55.60%	25	33.60%	8
Spain	−24.50%	30	32.60%	25	−43.40%	6	17.80%	17
Sweden	NA		65.50%	11	−53.20%	20	−3.10%	32
Switzerland	11.40%	18	25.10%	28	−31.00%	2	5.60%	25
Taiwan	NA		83.10%	5	−47.60%	11	6.50%	24
Thailand	56.70%	2	71.70%	7	−49.90%	13	39.00%	4
U.K.	7.00%	21	39.50%	22	−51.20%	14	3.80%	27

NA – not available (removed from sample)

Source: *The Wall Street Journal*, various issues, and author calculations.

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2.7.3 Risk of Diversified Country Investments

- A properly diversified portfolio, should provide a more stable rate of return for the total portfolio (that is, it will have a lower standard deviation and therefore less risk)
- To diversify a portfolio and reduce risk, you want an investment that has either low positive correlation, zero correlation, or, ideally, negative correlation with the other investments in the portfolio

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2.7.3 Risk of Diversified Country Investments (slide 2 of 8)

- **Global Bond Portfolio Risk**
  - Macroeconomic differences cause the correlation of bond returns between the United States and each country to differ, which makes it worthwhile to diversify with foreign bonds
  - The correlation of returns between a single pair of countries changes over time because the factors influencing the correlations—such as international trade, economic growth, fiscal policy, and monetary policy—change over time
  - A change in any of these variables will produce a change in how the economies are related and a change in the correlations between returns on bonds
- Exhibits 2.11, 2.12

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2.7.3 Risk of Diversified Country Investments (slide 3 of 8)

Exhibit 2.11 Correlation Coefficients Between U.S. Dollar Rates of Return on Bonds in the United States and in Major Foreign Markets: 1986–2016 (monthly data)

	Correlation Coefficient with U.S. Bonds
Canada	0.78
France	0.59
Germany	0.65
Japan	0.32
United Kingdom	0.62
Average	**0.59**

Source: Data from Barclays Capital; calculations by authors.

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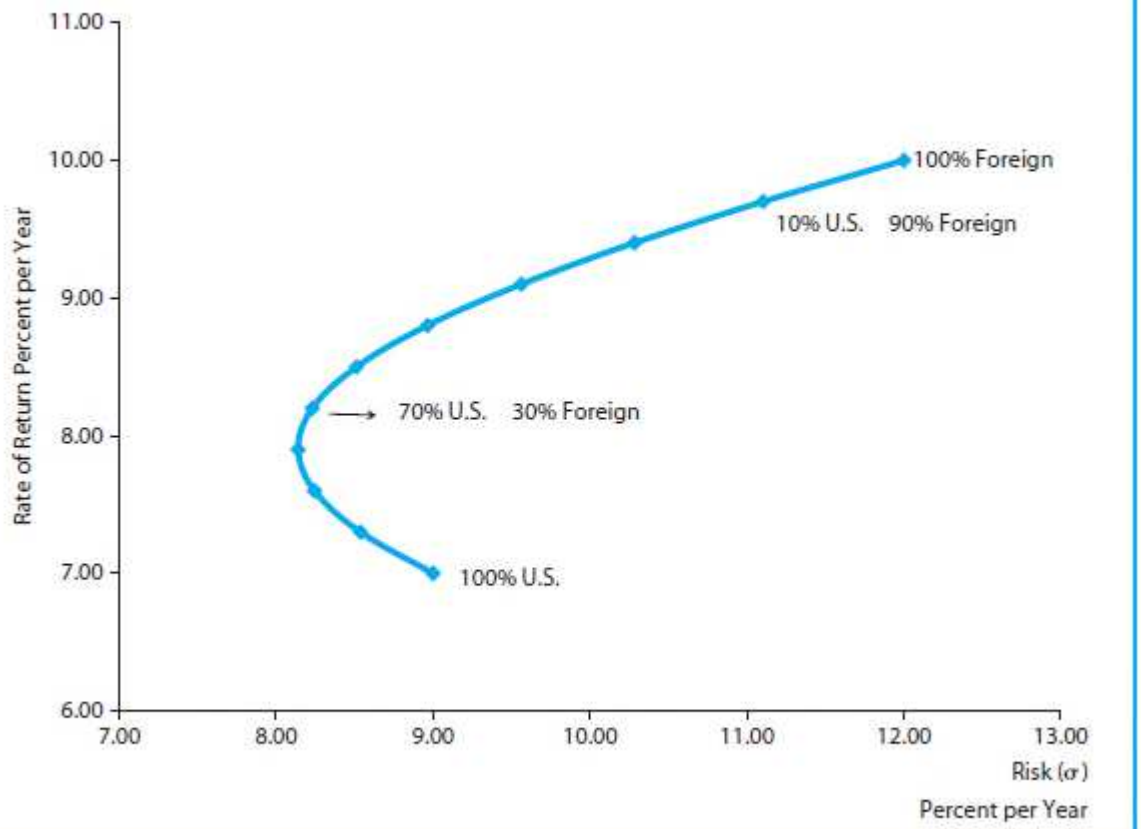
2.7.3 Risk of Diversified Country Investments (slide 4 of 8)

Exhibit 2.12 Risk-Return Trade-off for International Bond Portfolios



Source: Compiled by author.

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2.7.3 Risk of Diversified Country Investments (slide 5 of 8)

- **Global Equity Portfolio Risk**
  - Small, positive correlations between U.S. stocks and foreign stocks have similar implications to those derived for bonds
  - Investors can reduce the overall risk of their stock portfolios by including foreign stocks
  - The curves demonstrate that, as you increase the number of randomly selected securities in a portfolio, the standard deviation will decline due to the benefits of diversification within your own country
  - This is referred to as **domestic diversification**
- Exhibits 2.13, 2.14

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2.7.3 Risk of Diversified Country Investments (slide 6 of 8)

Exhibit 2.13 Correlation Coefficient Between Common Stock Returns in the United States and in Foreign Markets (monthly return data: 1988–2010)

	Correlation Coefficient with U.S. Stocks
Australia	0.63
Canada	0.76
France	0.72
Germany	0.70
Italy	0.54
Japan	0.42
Netherlands	0.74
Spain	0.64
Sweden	0.68
Switzerland	0.61
United Kingdom	0.73
Average	**0.65**

Source: Calculations by authors using monthly data from MSCI.

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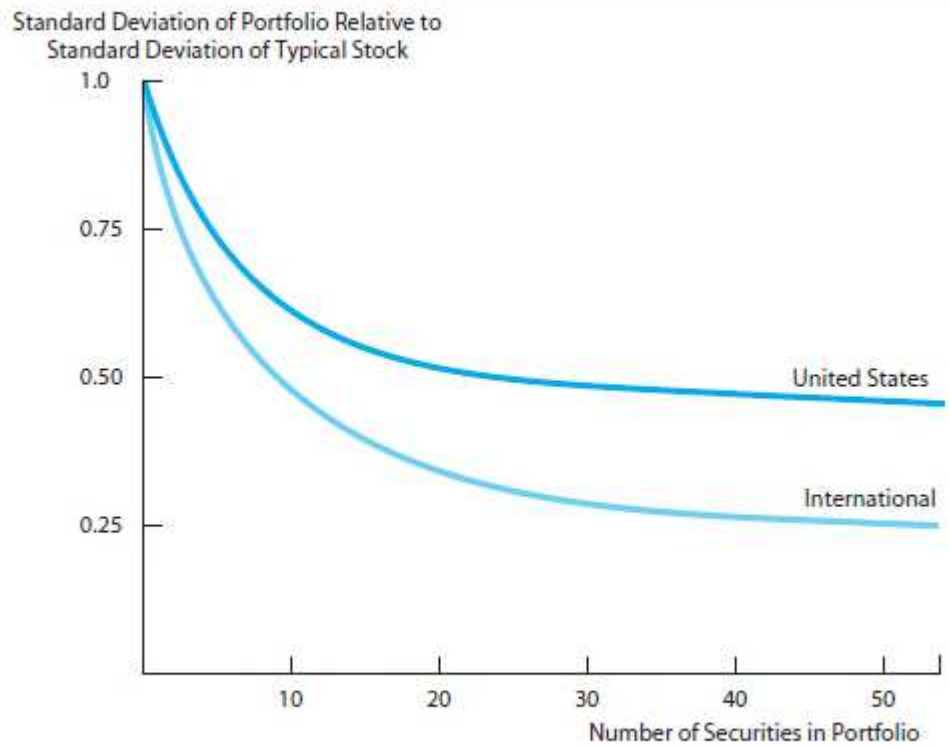
2.7.3 Risk of Diversified Country Investments (slide 7 of 8)

Exhibit 2.14 Risk Reduction through Domestic and International Diversification



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2.7.3 Risk of Diversified Country Investments (slide 8 of 8)

- Adding foreign stocks and bonds to a U.S. portfolio will almost certainly reduce the risk of the portfolio and can possibly increase its average return
- Investors should develop a global investment perspective because it is clearly justified, and this trend toward global investing will continue

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2.8 Historical Risk-Returns on Alternative Investments

- Financial theorists have provided extensive information on the return and risk characteristics of various investments and the correlations among them including:
  - The historical rates of return on common stocks
  - The performance of bonds
  - Nominal and real rates of return on investments
  - The performance of alternative assets such as real estate, foreign stocks, art, antiques, and commodities
- Exhibit 2.20

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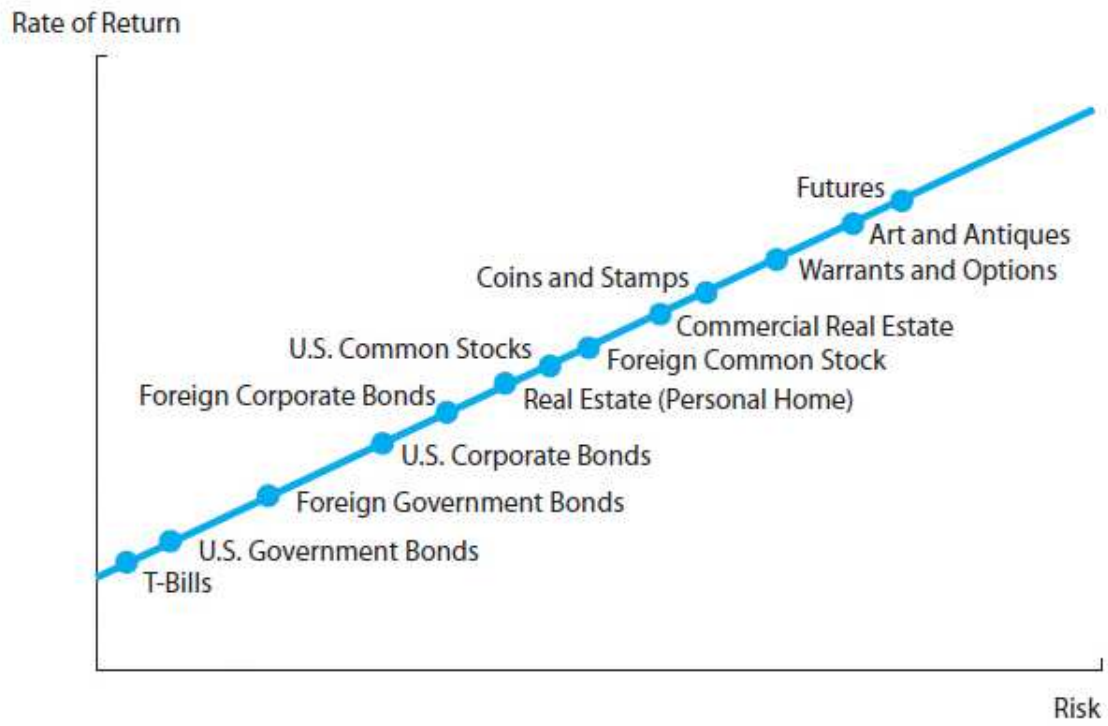
2.8 Historical Risk-Returns on Alternative Investments (slide 2 of 2)

Exhibit 2.20 Alternative Investment Risk and Return Characteristics



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2.8.1 World Portfolio Performance

- Financial theorists have provided extensive information on the return and risk characteristics of various investments and the correlations among them
- Alternative assets are real estate, foreign stocks, art, antiques, and commodities
- Exhibit 2.15

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2.8.1 World Portfolio Performance (slide 2 of 7)

Exhibit 2.15 Summary Risk-Return Results for Alternative Capital Market Assets: 1980–2010

Index	Arithmetic Mean Annual Return	Geometric Mean Return	Standard Deviation Annual Return (Based on Arithmetic Mean Return)	Beta With S&P 500	Beta With Brinson GSMI
S&P 500	12.04%	10.80%	15.60%	1.00	1.33
Ibbotson Small Cap Index	14.30%	12.18%	20.33%	0.99	1.44
Wilshire 5000 Equal Weighted	19.12%	16.94%	20.83%	1.02	1.48
Wilshire 5000 S&P Cap Weighted	12.02%	10.78%	15.61%	1.00	1.33
Russell 1000	12.06%	10.75%	15.76%	1.01	1.35
Russell 1000 Value	12.50%	11.31%	15.04%	0.92	1.22
Russell 1000 Growth	11.49%	9.81%	17.91%	1.10	1.48
Russell 2000	12.36%	10.35%	19.94%	1.06	1.52
Russell 2000 Value	13.86%	12.31%	17.54%	0.91	1.29
Russell 2000 Growth	10.79%	8.00%	23.44%	1.21	1.75
Russell 3000	12.02%	10.70%	15.89%	1.01	1.37
Russell 3000 Value	12.56%	11.38%	15.04%	0.91	1.23
Russell 3000 Growth	11.35%	9.63%	18.12%	1.11	1.50
IFC Emerging Markets	14.16%	11.57%	22.98%	0.80	1.26
FTSE All World	8.45%	7.09%	15.98%	0.96	1.42
FTSE All World Developed	8.18%	6.83%	15.65%	0.95	1.39
FTSE All World Emerging	10.44%	7.47%	24.92%	1.15	1.83
MSCI EAFE	8.90%	7.26%	17.71%	0.73	1.34
MSCI Europe	12.51%	10.81%	17.80%	0.83	1.39
MSCI Pacifc Basin	10.08%	7.89%	21.13%	0.63	1.26
MSCI Japan	8.59%	6.13%	22.39%	0.54	1.15
Tokyo Stock Exchange Index	4.11%	2.15%	19.51%	0.50	0.88
M-S World Index	11.24%	10.00%	15.37%	0.86	1.34
Brinson GSMI	10.60%	10.01%	10.86%	0.64	1.00
LB Government Bond	8.30%	8.15%	5.51%	0.04	0.11
LB Corporate Bond	9.07%	8.82%	7.23%	0.14	0.28
LB Aggregate Bond	8.55%	8.39%	5.76%	0.08	0.17
High Yield Corporate Bond	10.43%	10.00%	9.24%	0.33	0.54
ML World Government Bond[1]	8.12%	7.88%	7.04%	0.03	0.18
ML World Government Bond ex U.S.[1]	9.06%	8.58%	9.84%	0.03	0.24
FTSE North American Equity REIT	13.30%	11.62%	17.49%	0.62	0.95
GS Commodities Index[2]	8.38%	6.39%	19.52%	0.18	0.35
Treasury Bill–30-Day	4.96%	4.95%	0.90%	0.00	0.00
Treasury Bill–6 month[3]	5.63%	5.62%	0.98%	0.00	0.00
Treasury Note–2 year[3]	6.80%	6.76%	3.11%	0.01	0.04
Inflation	3.40%	3.39%	1.22%	0.00	–0.01

[1]ML World Government Bond Index based on 1986–2010 only.

[2]GS Commodity Index based on 1983–2010 only.

[3]Treasury Bill–6 month and Treasury Note–2 year based on 1981–2010 only.

Source: Updated and modified, Frank K. Reilly and David J. Wright, "An Analysis of Risk-Adjusted Performance for Global Market Assets," *Journal of Portfolio Management* (Spring 2004).

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2.8.1 World Portfolio Performance (slide 3 of 7)

- **Asset Return and Total Risk**
  - Riskier assets with higher standard deviations experienced higher returns
    - For example, the U.S. stock indexes had relatively high returns (10 to 17 percent) and large standard deviations (15 to 23 percent)

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2.8.1 World Portfolio Performance (slide 4 of 7)

- **Return and Systematic Risk**
  - Systematic risk, which is the volatility of an asset relative to a market portfolio of risky assets
  - One of the conclusions of a study was that the systematic risk measure (beta) did a better job of explaining the returns during the period than the total risk measure (standard deviation)
  - In addition, the systematic risk measure (beta) that used the Brinson Global Security Market Index (GSMI) as a market proxy was better than the beta that used the S&P 500 Index
- Exhibit 2.16

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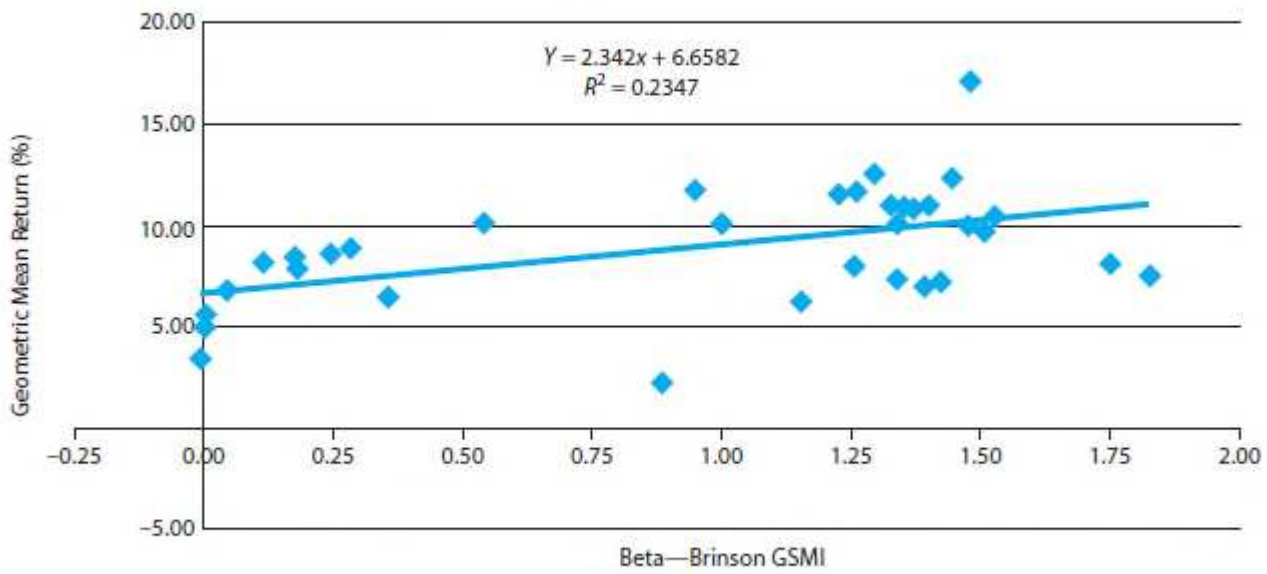
2.8.1 World Portfolio Performance (slide 5 of 7)

Exhibit 2.16 Geometric Mean Return versus Brinson GSMI Beta for Alternative Capital Market Assets: 1980–2010



Source: Updated and modified results from Frank K. Reilly and David J. Wright, "An Analysis of Risk-Adjusted Performance for Global Market Assets," *Journal of Portfolio Management*, 30, no. 3 (Spring 2004): 63–77.

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2.8.1 World Portfolio Performance (slide 6 of 7)

- **Correlations between Asset Returns**
  - U.S. equities have a reasonably high correlation with most developed countries but low correlation with emerging market stocks and Pacific Basin stocks (including Japan)
  - U.S. equities show almost zero correlation with world government bonds and with the commodities index
  - Most assets (including common stocks) have negative correlations with inflation, which implies that they are poor inflation hedges
- Exhibit 2.17

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2.8.1 World Portfolio Performance (slide 7 of 7)

Exhibit 2.17 Correlations among Global Capital Market Asset Monthly Returns: 1980–2010

	Wilshire 5000 Equal Weighted	Wilshire 5000 S&P Cap Weighted	IFC Emerging Markets	MSCI EAFE	M-S World	Brinson GSMI	Inflation
S&P 500	0.763	1.000	0.543	0.645	0.873	0.926	−0.046
Ibbotson Small Cap Index	0.935	0.759	0.533	0.544	0.695	0.771	−0.032
Wilshire 5000 Equal Weighted	1.000	0.763	0.561	0.546	0.702	0.770	−0.014
Wilshire 5000 S&P Cap Weighted	0.763	1.000	0.542	0.645	0.873	0.926	−0.046
Russell 1000	0.786	0.997	0.550	0.645	0.871	0.931	−0.049
Russell 1000 Growth	0.768	0.961	0.526	0.609	0.835	0.898	−0.049
Russell 2000	0.905	0.828	0.540	0.582	0.750	0.829	−0.059
Russell 2000 Value	0.860	0.806	0.511	0.568	0.728	0.801	−0.067
Russell 2000 Growth	0.891	0.807	0.535	0.562	0.731	0.810	−0.049
Russell 3000	0.809	0.993	0.556	0.647	0.871	0.934	−0.051
Russell 3000 Value	0.755	0.949	0.532	0.629	0.836	0.888	−0.047
Russell 3000 Growth	0.791	0.958	0.533	0.613	0.835	0.901	−0.049
IFC Emerging Market	0.561	0.542	1.000	0.569	0.608	0.594	0.004
FTSE All World	0.755	0.943	0.826	0.958	0.998	0.977	0.030
FTSE All World Developed	0.751	0.950	0.801	0.955	0.999	0.976	0.028
FTSE All World Emerging	0.714	0.722	0.985	0.796	0.801	0.804	0.042
MSCI EAFE	0.548	0.645	0.569	1.000	0.929	0.819	−0.072
MSCI Europe	0.595	0.726	0.574	0.884	0.888	0.851	−0.082
MSCI Pacific Basin	0.409	0.462	0.466	0.894	0.780	0.645	−0.020
MSCI Japan	0.329	0.377	0.368	0.835	0.702	0.558	−0.020
Tokyo Stock Exchange Index	0.376	0.399	0.411	0.685	0.622	0.492	0.017
M-S World Index	0.702	0.873	0.608	0.929	1.000	0.945	−0.059
Brinson GSMI	0.770	0.926	0.594	0.819	0.945	1.000	−0.078
LB Government Bond	−0.031	0.112	−0.148	0.072	0.088	0.223	−0.139
LB Corporate Bond	0.209	0.297	0.058	0.242	0.285	0.421	−0.140
LB Aggregate Bond	0.081	0.209	−0.054	0.158	0.189	0.327	−0.123
High Yield Corporate Bond	0.640	0.552	0.404	0.472	0.554	0.633	−0.012
ML World Government Bond[1]	−0.049	0.064	−0.034	0.364	0.255	0.278	−0.107
ML World Government Bond ex U.S.[1]	−0.043	0.041	−0.011	0.431	0.296	0.268	−0.074
FTSE North American Equity REIT	0.598	0.553	0.379	0.461	0.545	0.588	−0.003
GS Commodities Index[2]	0.155	0.145	0.206	0.228	0.212	0.196	0.200
Treasury Bill–30 Day	−0.041	0.027	−0.080	−0.036	−0.014	−0.006	0.411
Treasury Bill–6 Month[3]	−0.022	0.043	−0.078	−0.007	0.013	0.030	0.371
Treasury Note–2 Year[3]	−0.058	0.047	−0.152	0.035	0.037	0.151	−0.021
Inflation	−0.014	−0.046	0.004	−0.072	−0.059	−0.078	1.000

[1]ML World Government Bond Index based on 1986–2010 only.

[2]GS Commodity Index based on 1983–2010 only.

[3]Treasury Bill–6 month and Treasury Note–2 year based on 1981–2010 only.

Source: Updated and modified, Frank K. Reilly and David J. Wright, "An Analysis of Risk Adjusted Performance for Global Market Assets," *Journal of Portfolio Management*, 30, no. 3 (Spring 2004); 63–77.

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2.8.2 Art and Antiques

- Art and antique markets are fragmented and lack any formal transaction reporting system, which makes it difficult to gather data
- The best-known series regarding the changing value of art and antiques were developed by Sotheby's, a major art auction firm
- There was a wide range of returns and risk, but a risk-return plot indicated a fairly consistent relationship between risk and return during this 16-year period
  - Analysis of the correlations among these assets using annual rates of return revealed several important relationships:
    - The correlations among alternative antique and art categories vary substantially from above 0.90 to negative correlations
    - The correlations between art/antiques and bonds were generally negative
    - The correlations of art/antiques with stocks were typically small positive values
    - The correlation of art and antiques with the rate of inflation indicates that several of the categories were fairly good inflation hedges because they were positively correlated with inflation
  - Most art and antiques are quite illiquid, and the transaction costs are very high compared to those of financial assets

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2.8.3 Real Estate

- Returns on real estate are difficult to derive
- A study on two commercial real estate series reflected different results:
  - The CREFs had lower returns and low volatility, while the REIT index had higher returns and risk
  - The REIT returns were higher than those of common stocks, but the risk measure for real estate was lower
  - The residential real estate series reflected lower returns and low risk
  - All the longer-term results indicated that the real estate series experienced lower returns and much lower risk than common stock

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2.8.3 Real Estate (slide 2 of 4)

- Returns on real estate are equal to or slightly lower than returns on common stocks, but real estate possesses favorable risk and diversification results
- Individual real estate assets had much lower standard deviations and either low positive or negative correlations with other asset classes in a portfolio context
- All the real estate series had significant positive correlation with inflation, which implies strong potential as an inflation hedge
- Exhibits 2.18, 2.19

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2.8.3 Real Estate (slide 3 of 4)

Exhibit 2.18 Summary Statistics of Commercial and Residential Real Estate Series Compared to Stocks, Bonds, T-Bills, and Inflation

Series	Date	Geometric Mean	Arithmetic Mean	Standard Deviation
Annual Returns 1969–1987				
CREF (Comm.)	1969–87	10.8%	10.9%	2.6%
REIT (Comm.)	1972–87	14.2	15.7	15.4
C&S (Res.)	1970–86	8.5	8.6	3.0
S&P (Stocks)	1969–87	9.2	10.5	18.2
LTG (Bonds)	1969–87	7.7	8.4	13.2
TBILL (Bills)	1969–87	7.6	7.6	1.4
CPI (Infl.)	1969–87	6.4	6.4	1.8
Annual Returns over the Long Term				
I&S (Comm.)	1960–87	8.9%	9.1%	5.0%
CPIHOME (Res.)	1947–86	8.1	8.2	5.2
USDA (Farm)	1947–87	9.6	9.9	8.2
S&P (Stocks)	1947–87	11.4	12.6	16.3
LTG (Bonds)	1947–87	4.2	4.6	9.8
TBILL (Bills)	1947–87	4.9	4.7	3.3
CPI (Infl.)	1947–87	4.5	4.6	3.9

Source: William N. Goetzmann and Roger G. Ibbotson, "The Performance of Real Estate as an Asset Class," *Journal of Applied Corporate Finance*, 3, no. 1 (Spring 1990): 65–76.

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2.8.3 Real Estate (slide 4 of 4)

Exhibit 2.19 Correlations of Annual Real Estate Returns with the Returns on Other Asset Classes

	I&S	CREF	CPI Home	C&S	Farm	S&P	20-Yr. Gvt.	1-Yr. Gvt.	Infl.
I&S	1								
CREF	0.79	1							
CPI Home	0.52	0.12	1						
C&S	0.26	0.16	0.82	1					
Farm	0.06	−0.06	0.51	0.49	1				
S&P	0.16	0.25	−0.13	−0.20	−0.10	1			
20-Yr. Gvt.	−0.04	0.01	−0.22	−0.54	−0.44	0.11	1		
1-Yr. Gvt.	0.53	0.42	0.13	−0.56	−0.32	−0.07	0.48	1	
Infl.	0.70	0.35	0.77	0.56	0.49	−0.02	−0.17	0.26	1

Note: Correlation coefficient for each pair of asset classes uses the maximum number of observations, that is, the minimum length of the two series in the pair.

Source: William N. Goetzmann and Roger G. Ibbotson, "The Performance of Real Estate as an Asset Class," *Journal of Applied Corporate Finance*, 3, no. 1 (Spring 1990): 65–76.

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Appendix Chapter 2

- **Covariance**
  - Covariance is an absolute measure of the extent to which two sets of numbers move together over time, that is, how often they move up or down together
  - In this regard, move together means they are generally above their means or below their means at the same time

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Appendix Chapter 2 (slide 2 of 6)

$$COV_{ij} = \frac{\sum (i - \bar{i})(j - \bar{j})}{n}$$

If we define $(i - \bar{i})$ *as* i' *and* $(j - \bar{j})$ *as* j', *then*

$$COV_{ij} = \frac{\sum i'j'}{n}$$

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Appendix Chapter 2 (slide 3 of 6)

- **Correlation**
  - To obtain a relative measure of a given relationship, we use the correlation coefficient (r_{ij})

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$$r_{ij} = \frac{COV_{ij}}{\sigma_i \sigma_j}$$

$$\sigma_i = \sqrt{\frac{\sum (i - \bar{i})^2}{N}}$$

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Appendix Chapter 2 (slide 5 of 6)

Exhibit 2A.1 Calculation of Correlation Covariance

Observation	i	j	$i - \bar{i}$	$j - \bar{j}$	$i' j'$
1	3	8	−4	−4	16
2	6	10	−1	−2	2
3	8	14	+1	+2	2
4	5	12	−2	0	0
5	9	13	+2	+1	2
6	11	15	+4	+3	12
Σ	42	72			34
Mean	7	12			

$$COV_{ij} = \frac{34}{6} = +5.67$$

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Exhibit 2A.2 Calculation of Correlation Coefficient

Observation	$i - \bar{i}$[a]	$(i - \bar{i})^2$	$j - \bar{j}$[a]	$(j - \bar{j})^2$
1	−4	16	−4	16
2	−1	1	−2	4
3	+4	1	+2	4
4	−2	4	0	0
5	+2	4	+1	1
6	+4	16	+3	9
		42		34

$$\sigma_i^2 = 42/6 = 7.00 \qquad \sigma_j^2 = 34/6 = 5.67$$

$$\sigma_i = \sqrt{7.00} = 2.65 \qquad \sigma_j = \sqrt{5.67} = 2.38$$

$$r_{ij} = COV_{ij}/\sigma_i\sigma_j = \frac{5.67}{(2.65)(2.38)} = \frac{5.67}{6.31} = 0.898$$

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