Chapter 12
Some Lessons from Capital Market History

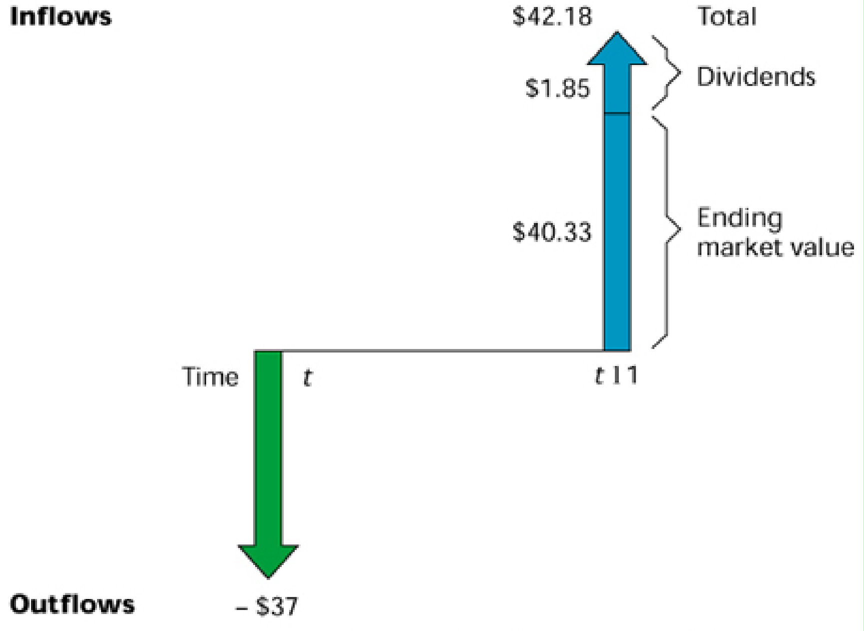
Chapter Organization

T12.2 Risk, Return, and Financial Markets

"... Wall Street shapes Main Street. Financial markets transform factories, department stores, banking assets, film companies, machinery, soft-drink bottlers, and power lines from parts of the production process . . . into something easily convertible into money. Financial markets . . . not only make a hard asset liquid, they price that asset so as to promote its most productive use."

Peter Bernstein, in his book, Capital Ideas

T12.3 Percentage Returns (Figure 12.2)



$$\text{Percentage return} = \frac{\text{Dividends paid at end of period} \ 1 \ \text{Change in market value over period}}{\text{Beginning market value}}$$

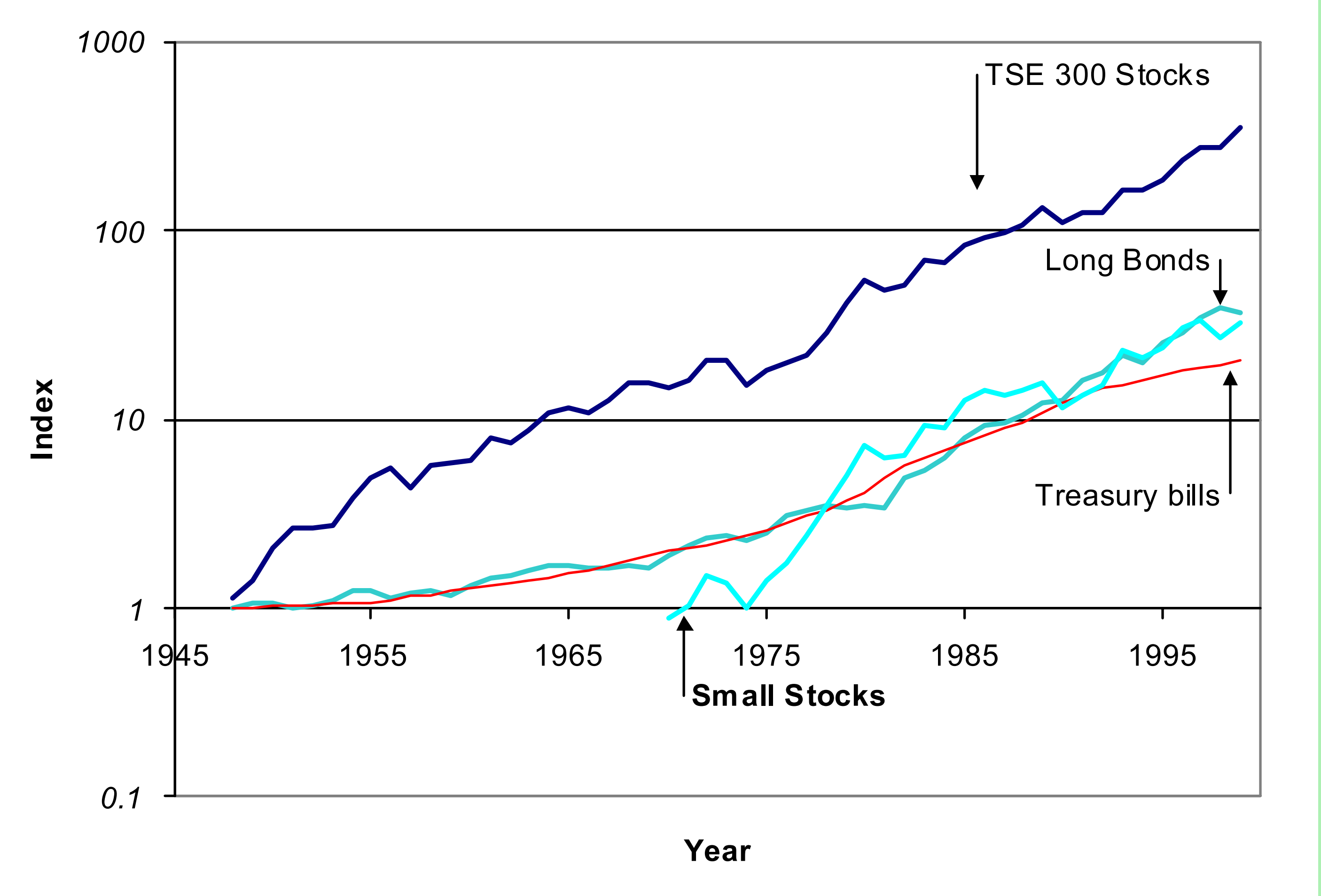
$$1 \ 1 \ \text{Percentage return} = \frac{\text{Dividends paid at end of period} \ 1 \ \text{Market value at end of period}}{\text{Beginning market value}}$$

T12.3 Percentage Returns (Figure 12.2) (concluded)

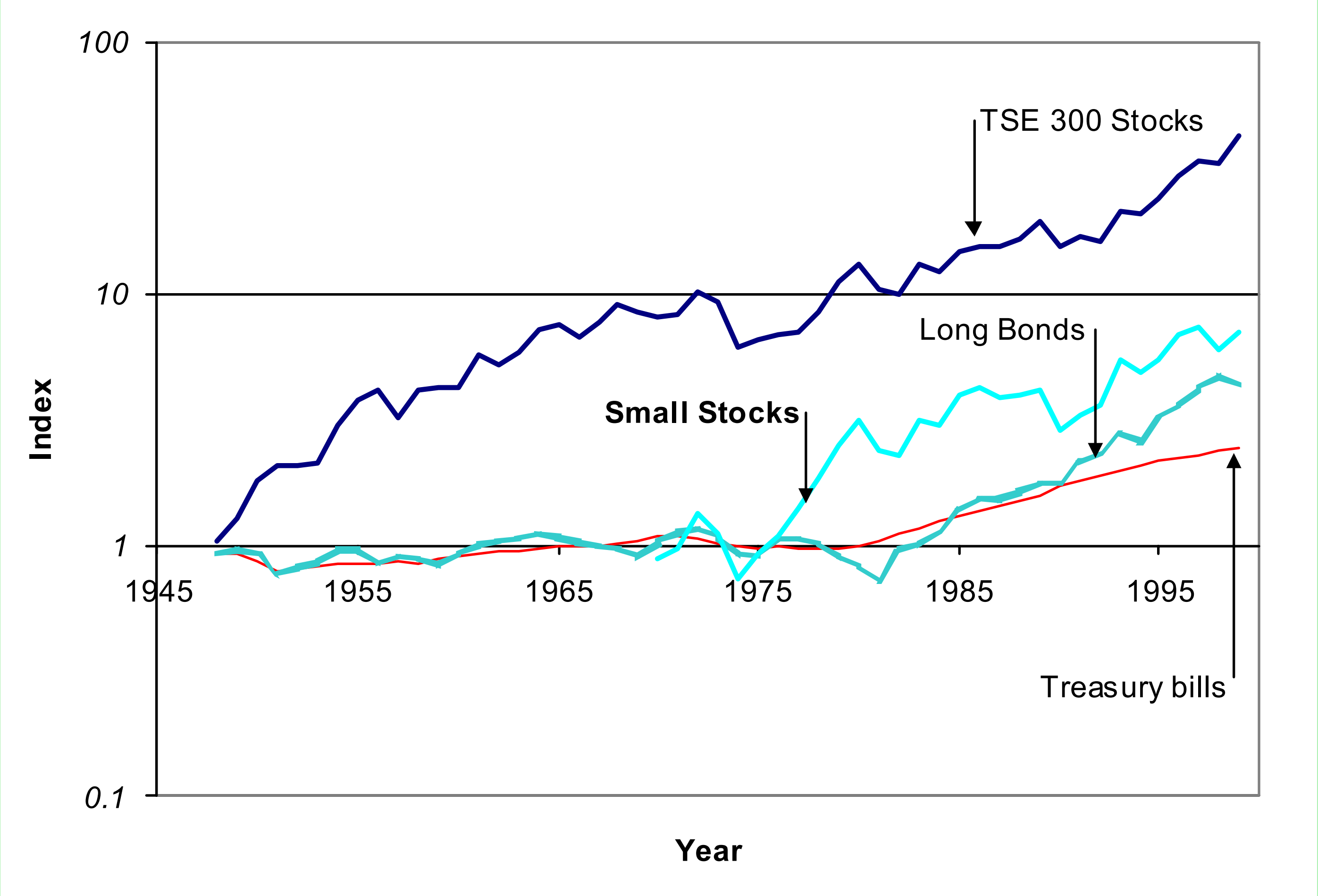
$$\text{Percentage return} = \frac{\text{Dividends paid at end of period} + \text{Change in market value over period}}{\text{Beginning market value}}$$

$$1 + \text{Percentage return} = \frac{\text{Dividends paid at end of period} + \text{Market value at end of period}}{\text{Beginning market value}}$$

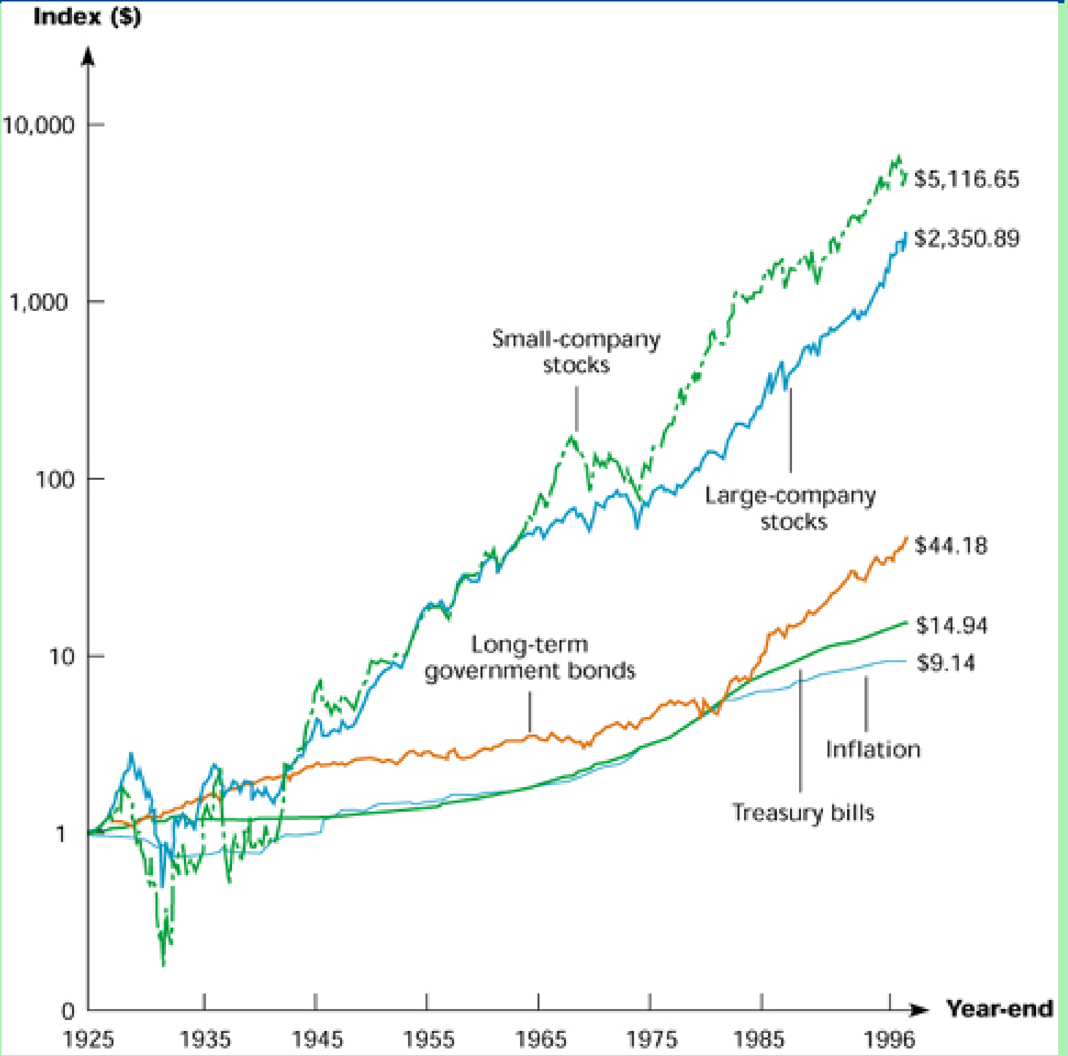
T12.4 A $1 Investment in Different Types of Portfolios: 1948-1999



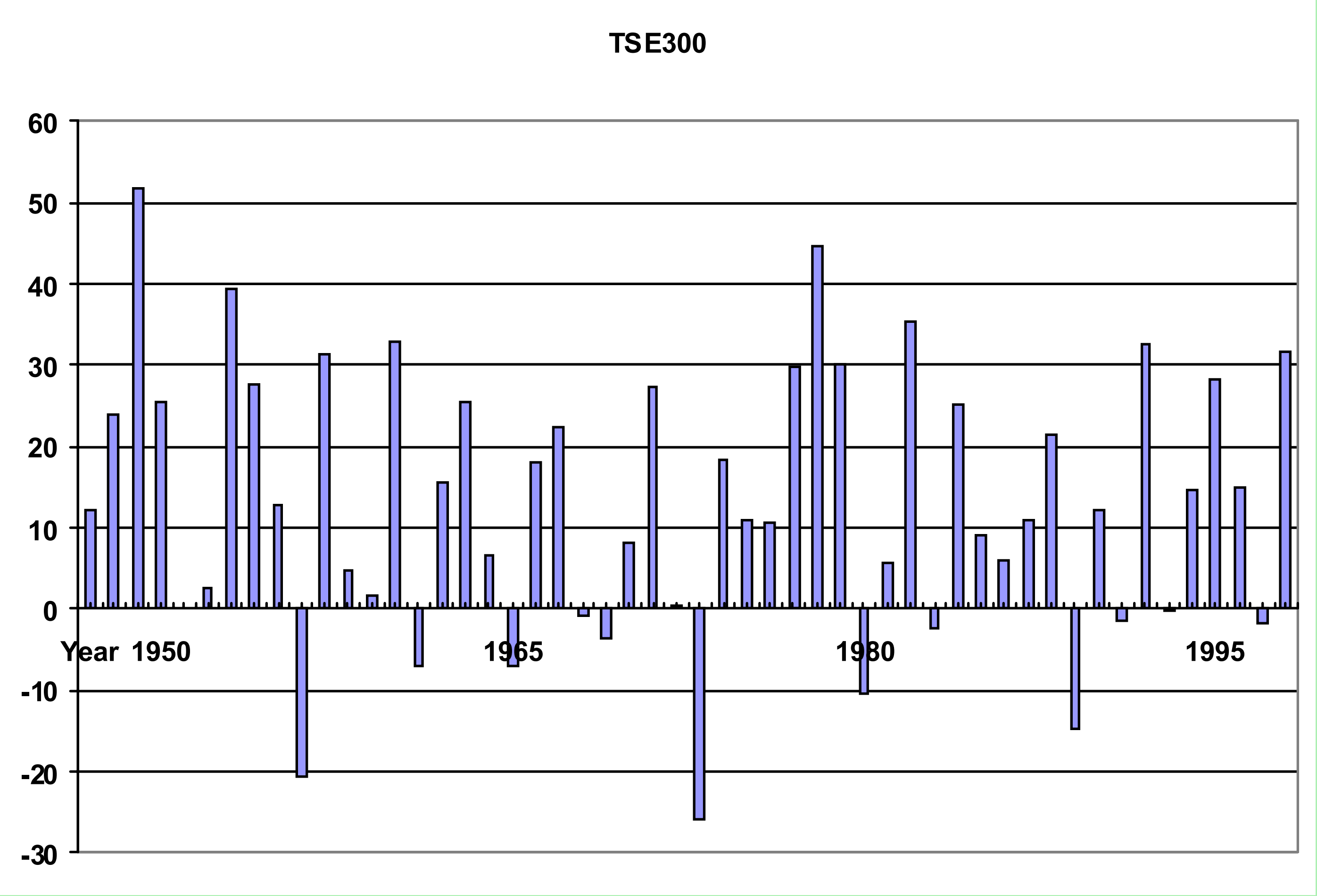
T12.5 A $1 Investment inflation adjusted: 1948-1999



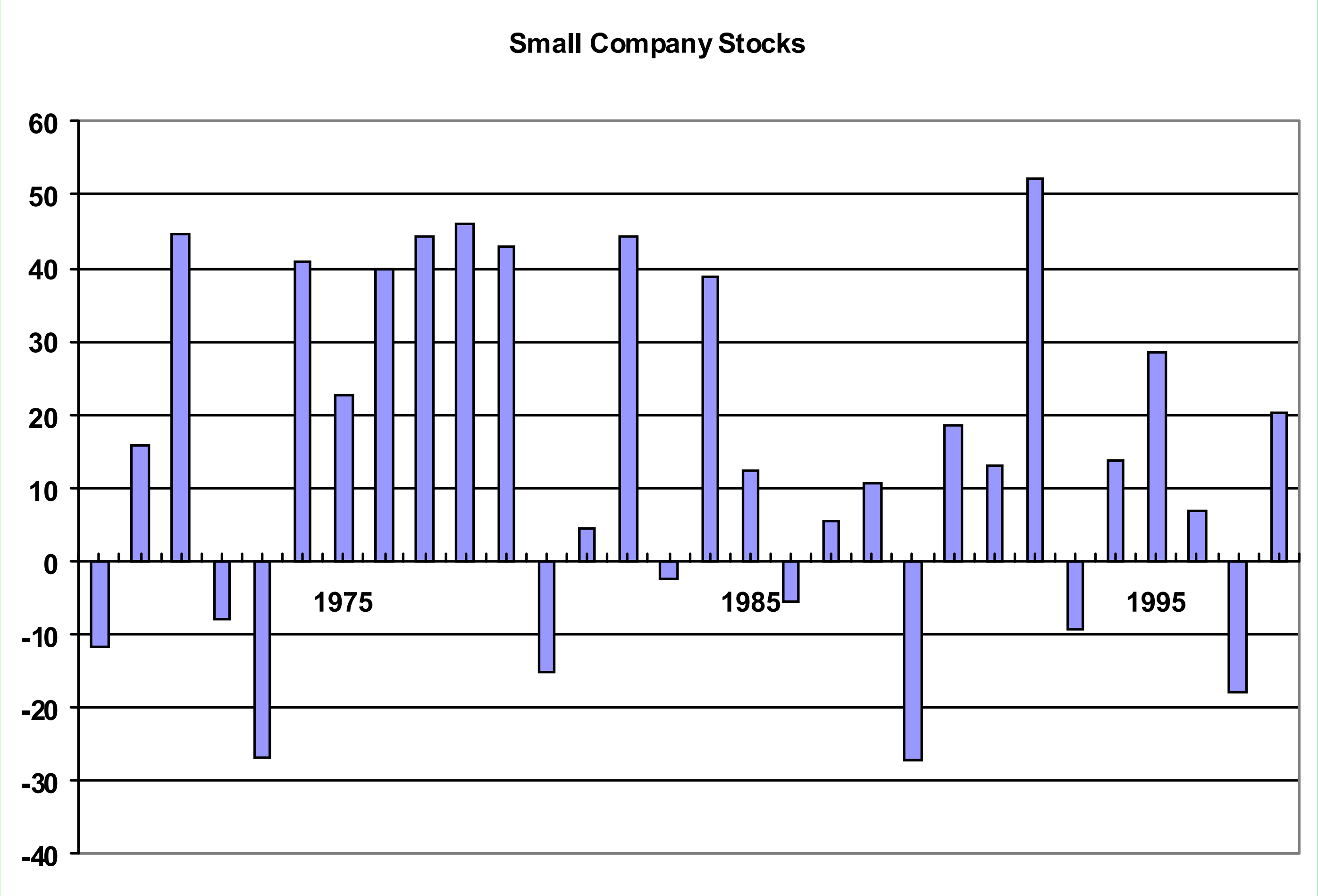
T12.6 A $1 Investment in Different Types of Portfolios: 1926-1998 (US Comparison)



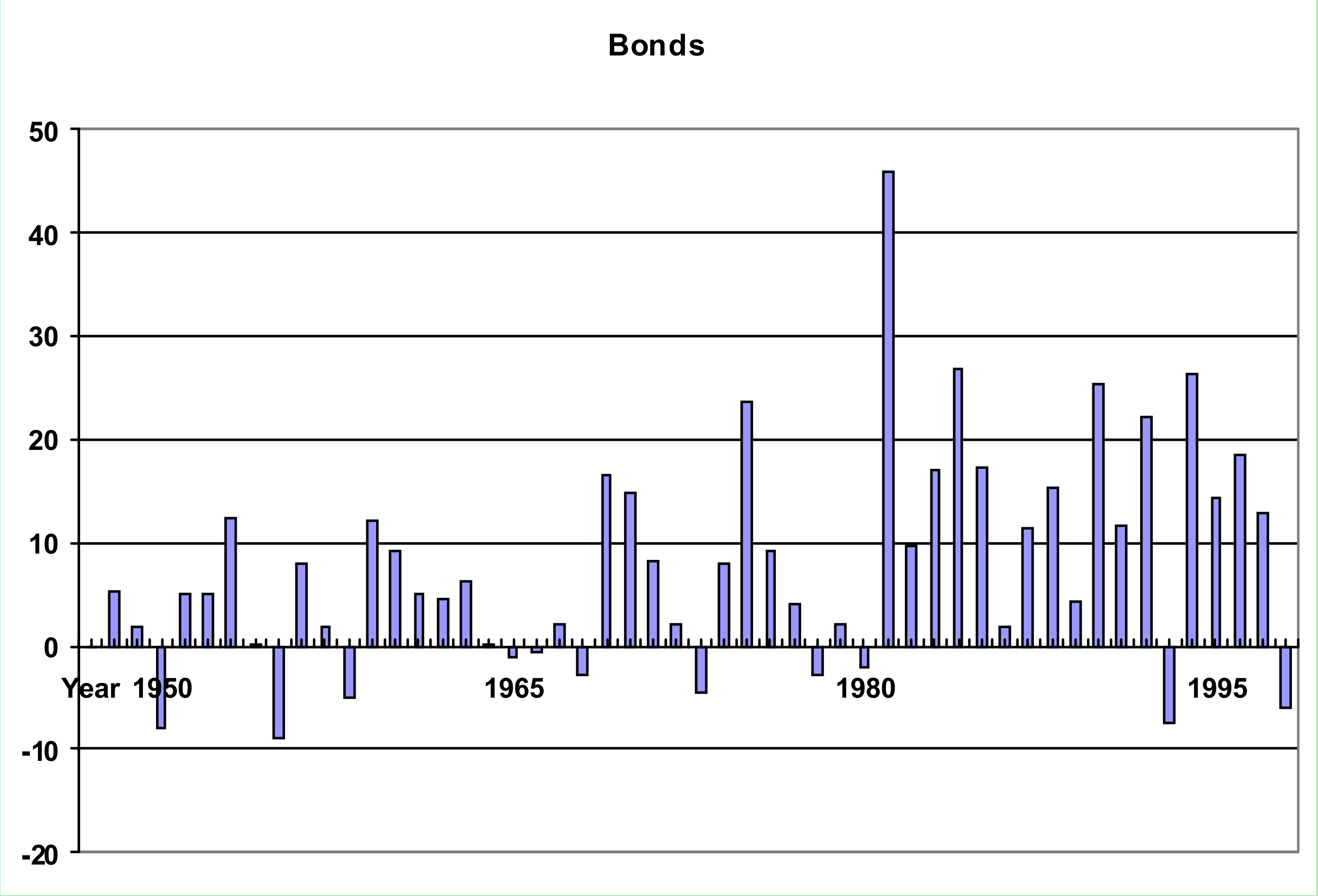
T12.7 Year-to-Year Total Returns on TSE300: 1948-1999



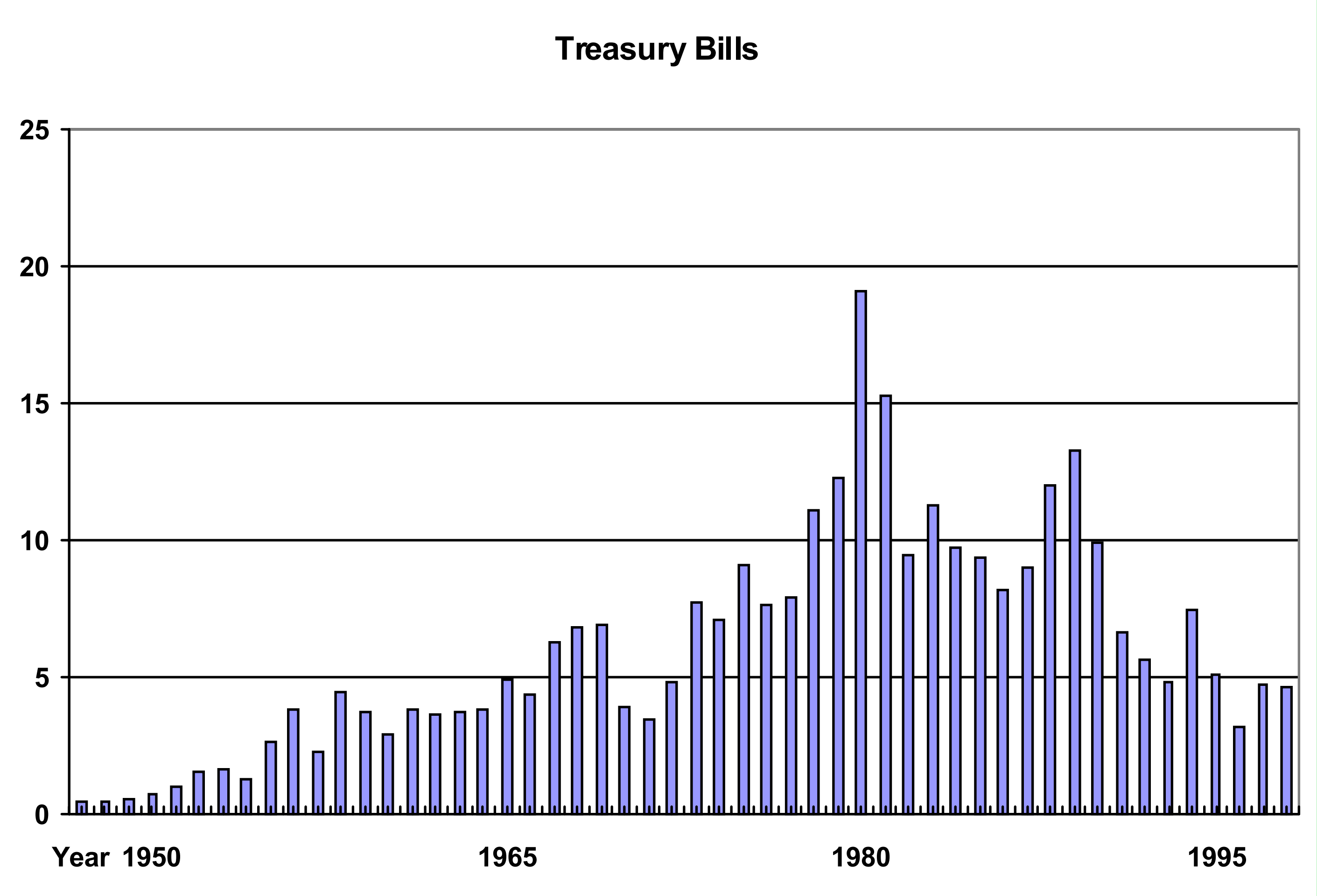
T12.8 Year-to-Year Total Returns on Small Company Common Stocks: 1970-1999



T12.9 Year-to-Year Total Returns on Bonds: 1926-1998



T12.10 Year-to-Year Total Returns on Treasury Bills: 1948-1999



T12.11 Using Capital Market History

- Now let's use our knowledge of capital market history to make some financial decisions. Consider these questions:
  - Suppose the current T-bill rate is 5%. An investment has "average" risk relative to a typical share of stock. It offers a 10% return. Is this a good investment?
  - Suppose an investment is similar in risk to buying small Canadian company equities. If the T-bill rate is 5%, what return would you demand?

T12.11 Using Capital Market History (continued)

- Risk premiums: First, we calculate risk premiums. The risk premium is the difference between a risky investment's return and that of a riskless asset. Based on historical data:

Investment	Average return	Standard deviation	Risk premium
Common stocks	13.2%	16.6%	____%
Small stocks	14.8%	23.7%	____%
LT Bonds	7.6%	10.6%	____%
U.S. Common (S&P 500 in C$)	15.6%	16.9%	____%
Treasury bills	3.8%	3.2%	____%

T12.11 Using Capital Market History (continued)

- Risk premiums: First, we calculate risk premiums. The risk premium is the difference between a risky investment's return and that of a riskless asset. Based on historical data:

Investment	Average return	Standard deviation	Risk premium
Common stocks	13.2%	16.6%	9.4%
Small stocks	14.8%	23.7%	11.0%
LT Bonds	7.6%	10.6%	3.8%
U.S. Common (S&P 500 in C$)	15.6%	16.9%	11.8%
Treasury bills	3.8%	3.2%	0%

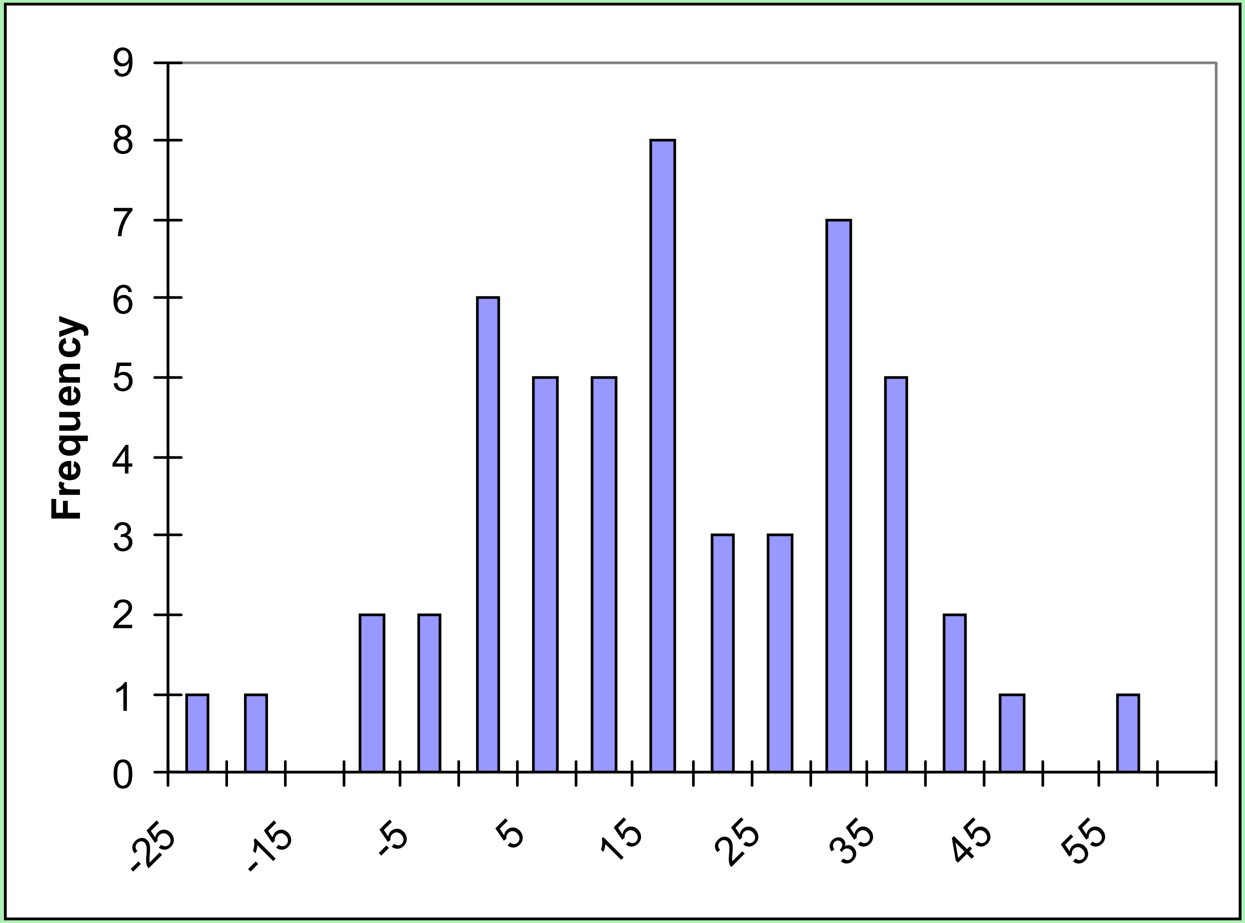
T12.11 Using Capital Market History (concluded)

Let's return to our earlier questions.

- Suppose the current T-bill rate is 5%. An investment has "average" risk relative to a typical share of stock. It offers a 10% return. Is this a good investment?
  No - the average risk premium is 9.4%; the risk premium of the stock above is only (9.4%-5%) = 4.4%. The stock will need to return 5%+9.4%=14.4%

- Suppose an investment is similar in risk to buying small Canadian company equities. If the T-bill rate is 5%, what return would you demand?
  Since the risk premium on small stocks has been 11%, we would demand 16%.

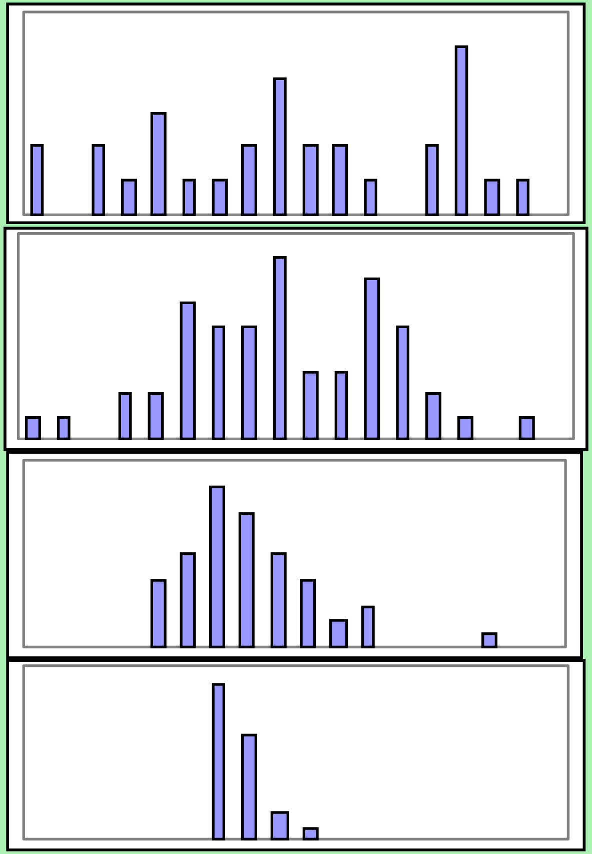
T12.12 TSE 300: Frequency of returns (1948-1999): Figure 12.5



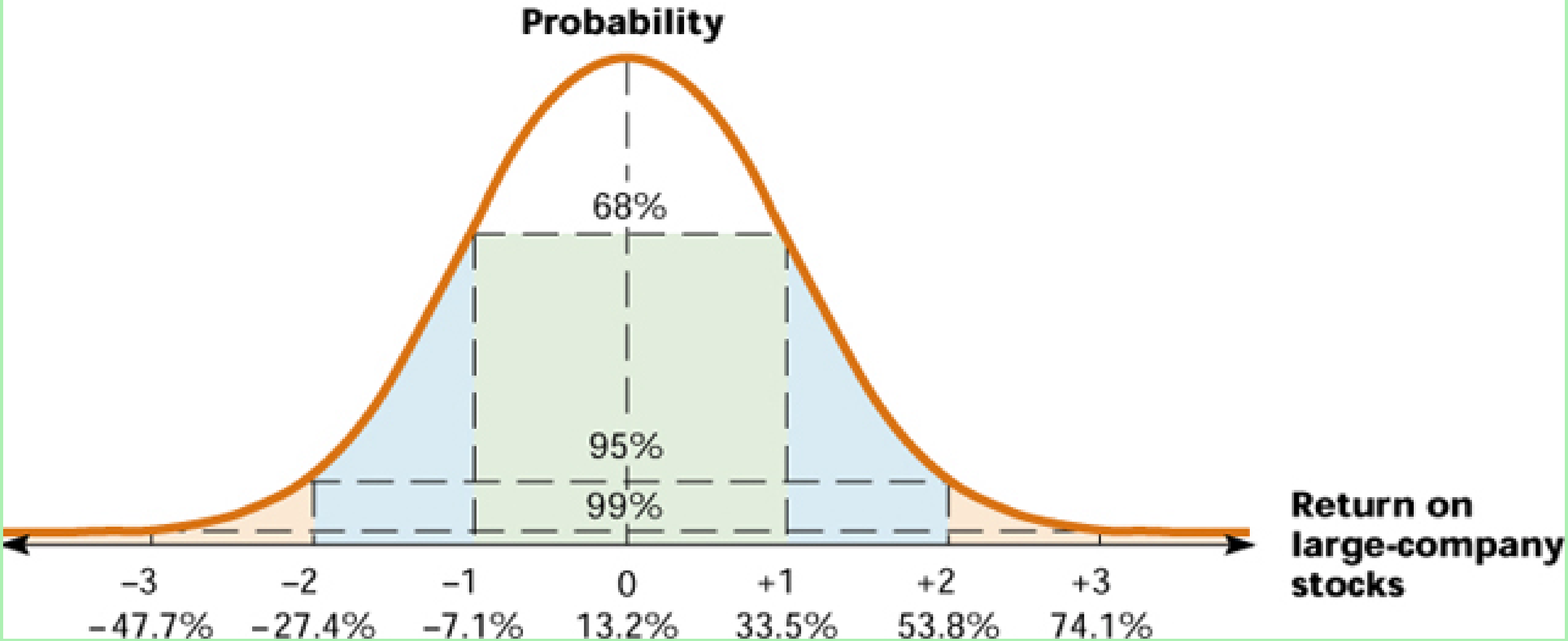
T12.13 Historical Returns and Standard Deviations:

Investment	Average return	Standard deviation
Small stocks	14.8%	23.7%
Common stocks	13.2%	16.6%
LT Bonds	7.6%	10.6%
Treasury bills	3.8%	3.2%

Frequency



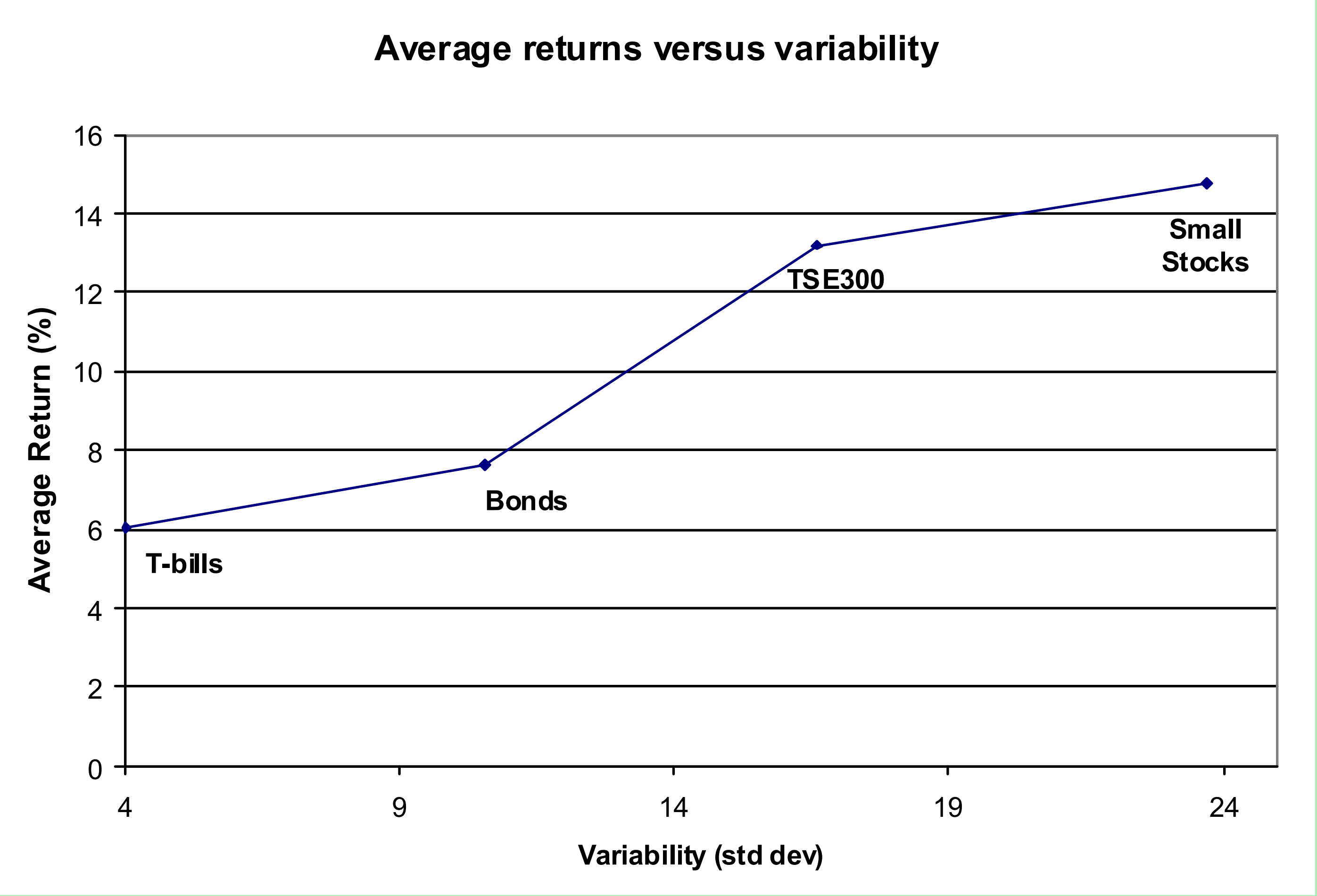
T12.14 The Normal Distribution (Figure 12.11)



T12.15 Asset mean returns versus variability: 1948-1999

	Mean	Standard Deviation
Inflation	4.25	3.51
T-bills	6.04	4.04
Bonds	7.64	10.57
TSE300	13.20	16.62
Small Stocks	14.79	23.68

T12.15 Asset mean returns versus variability: 1948-1999



T12.16 Two Views on Market Efficiency

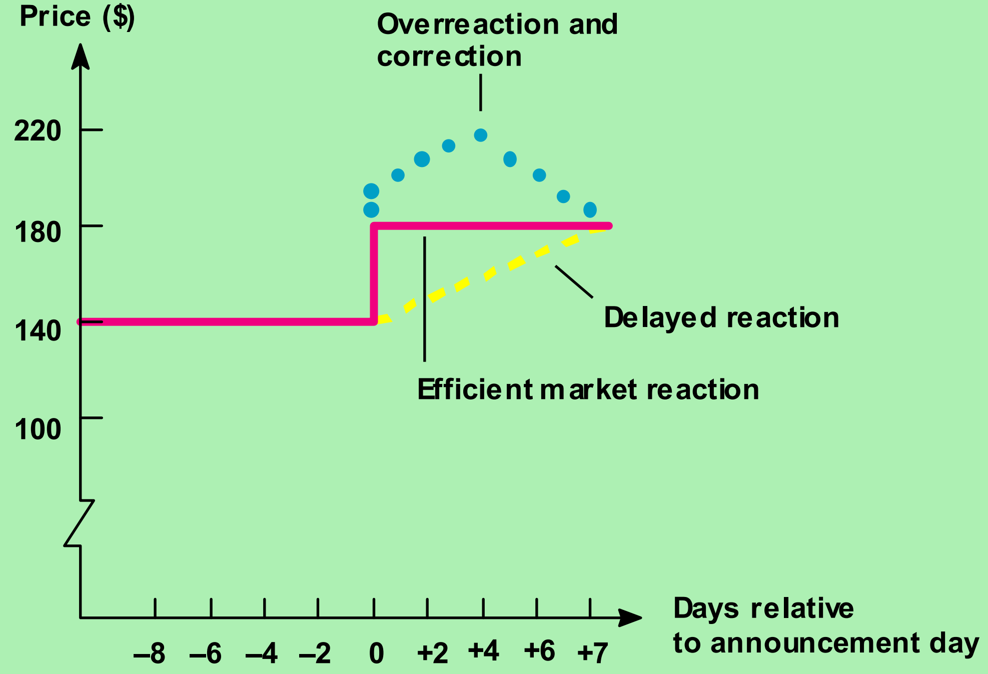
" . . . in price movements . . . the sum of every scrap of knowledge available to Wall Street is reflected as far as the clearest vision in Wall Street can see."

Charles Dow, founder of Dow-Jones, Inc. and first editor of The Wall Street Journal (1903)

"In an efficient market, prices 'fully reflect' available information."

Professor Eugene Fama, financial economist (1976)

T12.17 Reaction of Stock Price to New Information in Efficient and Inefficient Markets (Figure 12.7)



Efficient market reaction: The price instantaneously adjusts to and fully reflects new information; there is no tendency for subsequent increases and decreases.
Delayed reaction: The price partially adjusts to the new information; 8 days elapse before the price completely reflects the new information
Overreaction: The price overadjusts to the new information; it "overshoots" the new price and subsequently corrects.

T12.18 Chapter 12 Quick Quiz

Here are three questions that should be easy to answer (if you've been paying attention, that is).

1. How are average annual returns measured?

2. How is volatility measured?

3. Assume your portfolio has had returns of 11%, -8%, 20%, and -10% over the last four years. What is the average annual return?

T12.18 Chapter 12 Quick Quiz (continued)

1. How are average annual returns measured?

Annual returns are often measured as arithmetic averages.

An arithmetic average is found by summing the annual returns and dividing by the number of returns. It is most appropriate when you want to know the mean of the distribution of outcomes.

2. How is volatility measured?

Given a normal distribution, volatility is measured by the "spread" of the distribution, as indicated by its variance or standard deviation.

When using historical data, variance is equal to:

$$\frac{1}{T-1}\ [(R_1 - \bar{R})^2 + \ . \ . \ . \ [(R_T - \bar{R})^2]$$

And, of course, the standard deviation is the square root of the variance.

T12.18 Chapter 12 Quick Quiz (concluded)

3. Assume your portfolio has had returns of 11%, -8%, 20%, and -10% over the last four years. What is the average annual return?

Your *average annual return* is simply:

[.11 + (-.08) + .20 + (-.10)]/4 = .0325 = 3.25% per year.

T12.19 Solution to Problems 12.1 and 12.2

- Suppose a stock had an initial price of $58 per share, paid a dividend of $1.25 per share during the year, and had an ending price of $45. Compute the percentage total return.

- The percentage total return (R) =

  [$1.25 + ($45 - 58)]/$58 = - 20.26%

- The dividend yield = $1.25/$58 = 2.16%

- The capital gains yield = ($45 - 58)/$58 = -22.41%

T12.20 Solution to Problem 12.3

- Suppose a stock had an initial price of $58 per share, paid a dividend of $1.25 per share during the year, and had an ending price of $75. Compute the percentage total return.

- The percentage total return (R) =

  [$1.25 + ($75 - 58)]/$58 = 31.47%

- The dividend yield = $1.25/$58 = 2.16%

- The capital gains yield = ($75 - 58)/$58 = 29.31%

T12.21 Solution to Problem 12.7

- Using the following returns, calculate the average returns, the variances, and the standard deviations for stocks X and Y.

	Returns	
Year	X	Y
1	18%	28%
2	11	- 7
3	- 9	- 20
4	13	33
5	7	16

T12.21 Solution to Problem 12.7 (continued)

Mean return on X = (.18 + .11 - .09 + .13 + .07)/5 = _____.

Mean return on Y = (.28 - .07 - .20 + .33 + .16)/5 = _____.

Variance of X = $[(.18-.08)^2 + (.11-.08)^2 + (-.09-.08)^2 + (.13-.08)^2 + (.07-.08)^2]/(5-1)$ = _____.

Variance of Y = $[(.28-.10)^2 + (-.07-.10)^2 + (-.20-.10)^2 + (.33-.10)^2 + (.16-.10)^2]/(5-1)$ = _____.

Standard deviation of X = $(\_\_\_\_\_\_\_)^{1/2}$ = _______%.

Standard deviation of Y = $(\_\_\_\_\_\_\_)^{1/2}$ = _______%.

T12.21 Solution to Problem 12.7 (concluded)

Mean return on X = (.18 + .11 - .09 + .13 + .07)/5 = .08.

Mean return on Y = (.28 - .07 - .20 + .33 + .16)/5 = .10.

Variance of X = $[(.18-.08)^2 + (.11-.08)^2 + (-.09 -.08)^2$
$+ (.13-.08)^2 + (.07-.08)^2]/(5 - 1) = .0106$.

Variance of Y = $[(.28-.10)^2 + (-.07-.10)^2 + (-.20-.10)^2$
$+ (.33-.10)^2 + (.16-.10)^2]/(5 - 1) = .05195$.

Standard deviation of X = $(.0106)^{1/2}$ = 10.30%.

Standard deviation of Y = $(.05195)^{1/2}$ = 22.79%.