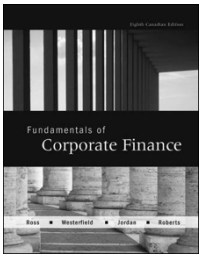
Finance for Management and Organizational Studies

MOS 2310

Chapter 12

Capital Market History



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Lessons from Capital Market History

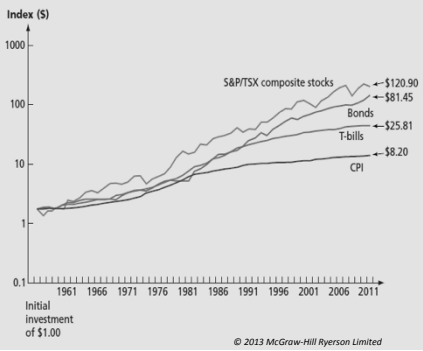
- Returns
- The Historical Record
- Average Returns: The First Lesson
- The Variability of Returns: The Second Lesson
- More on Average Returns
- Capital Market Efficiency

What are investment returns?

- Investment returns measure the financial results of an investment with the scale and timing effect
- Returns may be historical or prospective (anticipated)
- Returns can be expressed in:
  - Dollar terms ($)
  - Percentage terms (%)

FIGURE 12.4

Returns to a $1 investment, 1957–2011



LO1

Risk-return Trade-off

Lesson from capital market history

- There is a reward for bearing risk
- The greater the potential reward, the greater the risk
- This is called the risk-return trade-off

Risk Premium

- The "extra" return earned for taking on risk
- Treasury bills are considered to be risk-free
- The risk premium is the return over and above the risk-free rate

Capital Market History

Average returns on T-bills, government bonds and common stocks (1957-2011) :

Portfolio	Average Annual Rate of Return	Average Risk Premium
Treasury Bills	6.15 %	
Long-term government bonds	8.74 %	2.58 %
Common Stocks	10.45 %	4.3 %

Lesson 1: Risky assets, on average, earn a risk premium

Measures of Location (Middle)

- Mean (average) = $\bar{r} = \frac{\sum_{i=1}^{n} r_i}{n}$ 72 / 8 = 9
- Mode: value or class that appears most frequently 10
- Median: numeric value found such that half the points lie above it

  5, 7, 8, 9, 9.5, 10, 10, 11, 12

Measures of Dispersion, or Spread

- Range: Largest value minus smallest value 12-5=7
- Variance (s^2) = $\sigma^2 = \frac{\sum_{i=1}^{n} (r_i - \bar{r})^2}{n-1}$

$[(5-9)^2 + (8-9)^2 + (10-9)^2 + (7-9)^2 + (11-9)^2 + (9-9)^2 + (10-9)^2 + (12-9)^2] / 8 - 1$

$= [16 + 1 + 1 + 4 + 4 + 0 + 1 + 9] / 7 = 5.142857143$

Measures of Dispersion, or Spread

Standard deviation = s =

$$Estimated\ \sigma = S = \sqrt{\frac{\sum_{i=1}^{n}(r_i - \bar{r})^2}{n-1}}$$

(5.142857143)$^{0.5}$= 2.267786838

Coefficient of Variation

Measuring Stand-alone risk: Shows the risk per unit of return, and it provides a more meaningful basis for comparison when the expected returns on two alternatives are not the same

$$CV = \frac{\sigma}{\hat{r}}$$

Standard deviation "Sigma"

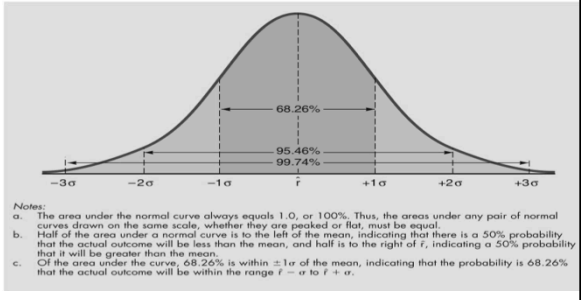
Expected rate "r hat"

$$CV = \frac{9.9\%}{15.7\%} = 0.6305$$

Normal Curve

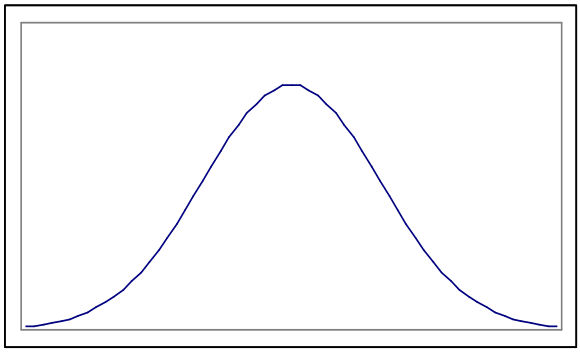
Figure 7-3

Probability Ranges for a Normal Distribution

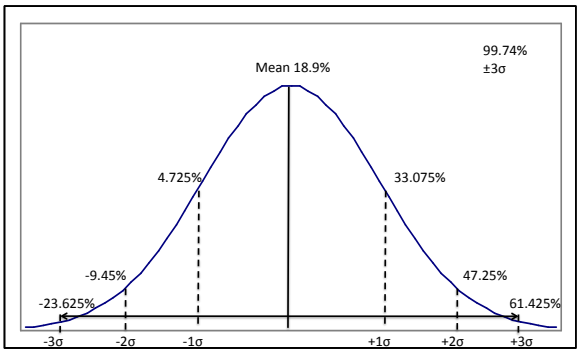


Notes:
a. The area under the normal curve always equals 1.0, or 100%. Thus, the areas under any pair of normal curves drawn on the same scale, whether they are peaked or flat, must be equal.
b. Half of the area under a normal curve is to the left of the mean, indicating that there is a 50% probability that the actual outcome will be less than the mean, and half is to the right of $\hat{r}$, indicating a 50% probability that it will be greater than the mean.
c. Of the area under the curve, 68.26% is within $\pm 1\sigma$ of the mean, indicating that the probability is 68.26% that the actual outcome will be within the range $\hat{r} - \sigma$ to $\hat{r} + \sigma$.

Illustrating the Normal Distribution



Illustrating the Normal Distribution



LO3

The Second Lesson

TABLE 12.4

Historical returns and standard deviations, 1957–2011

Investment	Arithmetic Average return (%)	Standard Deviation (%)
Canadian common stocks	10.45	16.93
U.S. common stocks (Cdn $)	11.07	16.95
Long bonds	8.74	9.75
Small stocks	13.71	26.65
TSX Venture stocks	15.68	47.65
Inflation	3.95	3.13
Treasury bills	6.15	3.75

Average returns on small stocks and TSX Venture stocks are based on data from 1970–2011 and 2002–2011 respectively.

The greater the potential reward, the greater the risk

Z-Score

We can find the number of standard errors the observed sample mean is away from the hypothesized value of the population mean (μ_0).

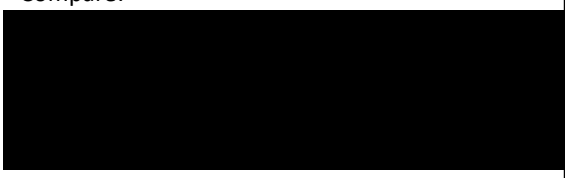
Here: $$z = \frac{\bar{x} - \mu_0}{\sigma} = \frac{39.94 - 35}{2.09} = 2.36$$

Where:
X bar = hypothesized value
μ_0 = population mean
σ = Standard deviation

The *t-distribution*

- The precise shape of the t-distribution depends on the sample size - 1, or (*n -1*), called degrees of freedom
- This distinction matters only where $n \leq 30$

Compare:



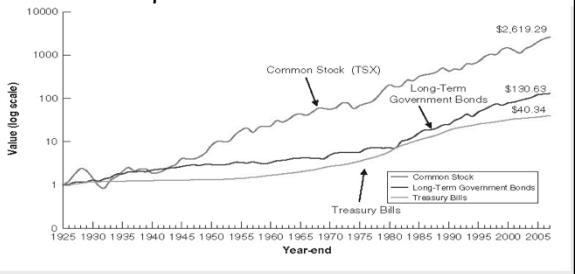
"Significance" of a Test

- We could use the normal tables or Excel to determine the area in the tail of the distribution below z = 2.36. The Excel command is

  = NORMSDIST(2.36) which gives a value of 0.9909 or 99.09%

Pr(R<2.36) ≈ 99.09%

Value of a $1 investment made in 1925



Source: Authors' calculations using data from Canadian Institute of Actuaries, *Report on Canadian Economic Statistics 1924–2003*, augmented with values for 2004–2007 calculated with data from Statistics Canada CANSIM database **http://cansim2.statcan.ca** (Series v122487, and v122541) and S&P/TSX Composite Total Return Index, retrieved from **www.globeinvestorgold.com**. Courtesy of the Bank of Canada.

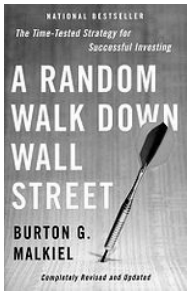
The expected return provides compensation to investors both for waiting (TVM) and for worrying (risk)

Investment Theories: Efficient Market Theory

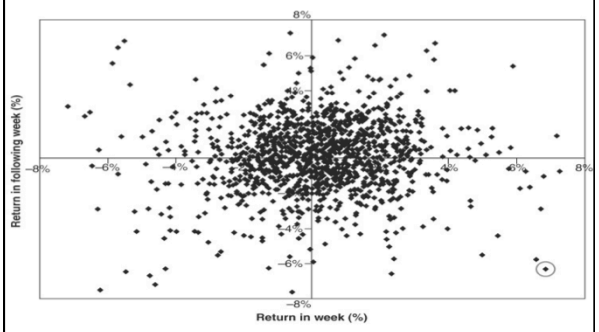
- Sometimes called the random walk theory
- Based on the assumption that stock price movements are purely random
- A stock's current market price reflects its true value
- It is impossible for an investor to outperform the average for the stock market as a whole over a period of time
- **Random Walk:** Security prices change randomly, with no predictable trends or patterns

A Random Walk

The random walk hypothesis is a financial theory stating that stock market prices evolve according to a random walk and thus the prices of the stock market cannot be predicted



Random Walk



Information and Price Movements

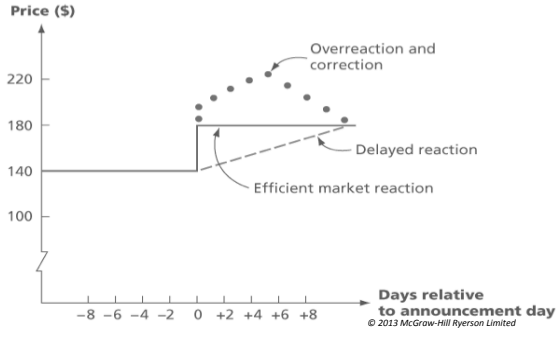
- In an efficient capital market, prices reflect all available information
- When new information arrives, prices react instantaneously and accurately to it
- Since new information is that which cannot be predicted, it would arrive at random points in time
- Price movements are random (i.e., cannot be predicted)

Efficient Market Theory

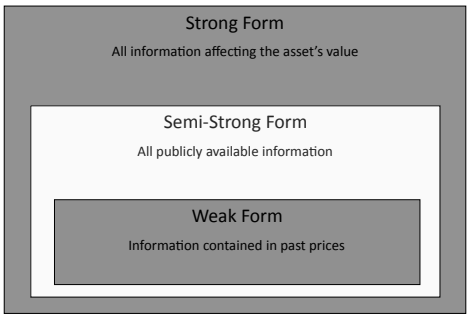
- This theory postulates that in an efficient market, the price of a share represents its true value, in that all information related assumed to be in equilibrium always
- This theory assumes a perfect market and that no individual or group trading the security has sole access to information (insider trading)
- An efficient market benefits the economy because in an efficient market the true worth of the company is known at all times

LO4

Figure 12.7 Reaction to New Information



Three Forms of Market Efficiency



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Strong Form Efficiency

- Prices reflect all information, including public and private
- If the market is strong form efficient, then investors could not earn abnormal returns regardless of the information they possessed
- Empirical evidence indicates that markets are NOT strong form efficient and that insiders could earn abnormal returns

Investment Theories

It is impossible to make superior returns by buying or selling after the announcement and inside information is illegal to use

Photos: Financial Post

LO4

Semistrong Form Efficiency

- Prices reflect all publicly available information including trading information, annual reports, press releases, etc.
- If the market is semistrong form efficient, then investors cannot earn abnormal returns by trading on public information
- Implies that fundamental analysis will not lead to abnormal returns

LO4

Weak Form Efficiency

- Prices reflect all past market information such as price and volume
- If the market is weak form efficient, then investors cannot earn abnormal returns by trading on market information
- Implies that technical analysis will not lead to abnormal returns
- Empirical evidence indicates that markets are generally weak form efficient

LO4

Market Efficiency Summary

Research on capital market history suggests:

1. Prices do appear to respond very rapidly to new information and the response is at least not grossly different from that of an efficient market
2. In the short-run market prices are very difficult to predict on publicly available information
3. If mispriced stocks do exist, there is no obvious means of identifying them