

Corporate Finance

Some Lessons from Capital Market History

Chapter 10

Dr Erkan Yalcin

Risk & Return Trade-Off

- Two key lessons from capital market history:
 - There is a reward for bearing risk;
 - The greater the potential reward, the greater the risk.
- Dollar and Percent Returns
 - Total dollar return is the return on an investment measured in dollars.
 - $Dollar\ Return = Dividends + Capital\ Gains$
 - $Capital\ Gains = Price\ Received - Price\ Paid$
 - Total percent return is the return on an investment measured as a percentage of the original investment.
 - $Percent\ Return = \frac{Dollar\ Return}{Dollar\ Invested}$

Percent Return

- Dividend Yield

$$DY = \frac{D_{t+1}}{P_t}$$

- Capital Gains Yield

$$CGY = \frac{P_{t+1} - P_t}{P_t}$$

$$\% \text{ Return} = DY + CGY$$

$$= \frac{D_{t+1} + P_{t+1} - P_t}{P_t}$$

Percent Return Cont'd

Example

You invest in a stock with a share price of \$25. After one year, the stock price per share is \$35. Each share paid a \$2 dividend. What was your total return?

	Dollars	Percent
Dividend	2	$2/25 = 8\%$
Capital Gain	$35 - 25 = 10$	$10/25 = 40\%$
Total Return	$2 + 10 = 12$	$12/25 = 48\%$

Average Returns

Example (The First Lesson 1926-2017)

Investment	Average Return (%)
Large Stocks	12.1
Small Stocks	16.5
Long-Term Corporate Bonds	6.4
Long-Term Government Bonds	6.0
U.S. Treasury Bills	3.4
Inflation	3.0

Historical Average Return is the simple, or arithmetic average:

$$\text{Historical Average Return} = \frac{\sum_{i=1}^T \text{Yearly Return}}{T}$$

Using the data in Table 10.1: Sum the returns for large-company stocks from 1926 through 2014, you get about $10.77/89 \text{ years} = 12.1\%$. Your best guess about the size of the return for a year selected at random is 12.1%.

Risk Premiums

- Risk-free Rate
 - Rate of return on a riskless investment;
 - Treasury Bills are considered risk-free.
- Risk Premium
 - Excess return on a risky asset over the risk-free rate;
 - Reward for bearing risk.

Example (Historical Risk Premiums)

- Large Stocks: $12.1 - 3.4 = 8.7\%$
- Small Stocks: $16.5 - 3.4 = 13.1\%$
- L/T Corporate Bonds: $6.4 - 3.4 = 3.0\%$
- L/T Government Bonds: $6.0 - 3.4 = 2.6\%$
- U.S. Treasury Bills: $3.4 - 3.4 = 0$

- Risk is measured by the dispersion, spread, or volatility of returns.
- **Return Variability**
 - Variance is represented by $Var(R)$ or σ^2 .
 - Common measure of return dispersion;
 - Also called *variability*.
 - Standard deviation is represented by $Sd(R)$ or σ .
 - Square root of the variance;
 - Sometimes called *volatility*;
 - Same units as the average.

Return Variability

- Return Variance

- Let T be the number of returns, then

$$\text{Var}(R) = \sigma^2 = \frac{\sum_{i=1}^T (R_i - \bar{R})^2}{T - 1}$$

- Standard Deviation

$$\text{Sd}(R) = \sigma = \sqrt{\text{Var}(R)}$$

Return Variability Cont'd

Example (Calculating Historical Variance and Standard Deviation)

(1)	(2)	(3)	(4)	(5)
Year	Return	Average Return:	Difference: (2) - (3)	Squared: (4) x (4)
1926	11.14	11.48	-0.34	0.12
1927	37.13	11.48	25.65	657.82
1928	43.31	11.48	31.83	1013.02
1929	-8.91	11.48	-20.39	415.83
1930	-25.26	11.48	-36.74	1349.97
Sum:	57.41		Sum:	3436.77

Average: 11.48

Variance: 859.19

Standard Deviation: 29.31

Figure 1: Using Data from Table 10.1 for Large-company Stocks

Return Variability and Concepts

- Normal Distribution
 - A symmetric frequency distribution;
 - The 'bell-shaped curve';
 - Completely described by the mean and variance.

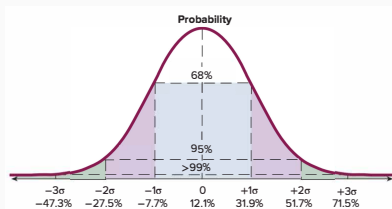


Figure 2: The Normal Distribution

- Illustrated returns are based on the historical return and standard deviation for a portfolio of large common stocks.

Arithmetic versus Geometric Mean

- Arithmetic Average:
 - Return earned in an average period over multiple periods.
- Geometric Average:
 - Average compound return per period over multiple periods.
- Geometric average is smaller than arithmetic average unless all the returns are equal.
- Geometric Average Return:

$$GAR = [(1 + R_1) \times (1 + R_2) \times \cdots \times (1 + R_N)]^{1/T} - 1$$

where, R_i is the return in each period and T is the number of periods.

Geometric Average Return Cont'd

- Let \prod be the product, then

$$GAR = \left[\prod_{i=1}^T (1 + R_i) \right]^{1/T} - 1$$

Example (Calculating a Geometric Average Return)

Year	Percent Return	One Plus Return	Compounded Return
1926	11.14	1.1114	1.1114
1927	37.13	1.3713	1.5241
1928	43.31	1.4331	2.1841
1929	-8.91	0.9109	1.9895
1930	-25.26	0.7474	1.4870
$(1.4870)^{(1/5)} =$			1.0826
Geometric Average Return:			8.26%

Figure 3: Geometric Average Return

Arithmetic versus Geometric Mean Cont'd

- The arithmetic average is overly optimistic for long horizons.
- The geometric average is overly pessimistic for short horizons.
- Depends on the planning period under consideration:
 - 15 to 20 years or less: use the arithmetic;
 - 20 to 40 years or so: split the difference between them;
 - 40 plus years: use the geometric.

- The Efficient Market Hypothesis
 - Stock prices are in equilibrium.
 - Stocks are 'fairly' priced.
 - Informational efficiency.
- If true, you should not be able to earn *abnormal* or *excess* returns.
- Efficient markets do not imply that investors cannot earn a positive return in the stock market.

Reaction of Stock Price to New Information in Efficient and Inefficient Markets

Example

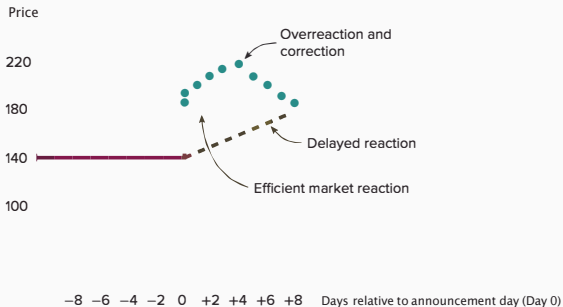


Figure 4: Reaction of Stock Price to New Information

Forms of Market Efficiency

- Strong Form Efficient Market
 - Information: Public or private;
 - Inside information is of little use.
- Semi-strong Form Efficient Market
 - Information: Publicly available information;
 - Fundamental analysis is of little use.
- Weak Form Efficient Market
 - Information: Past prices and volume data;
 - Technical analysis is of little use.

Strong Form Efficiency

- Prices reflect all information, including public and private.
- If true, then investors cannot earn abnormal returns regardless of the information they possess.
- Empirical evidence indicates that markets are not strong form efficient.
 - Insiders can earn abnormal returns (may be illegal).

Semi-strong Form Efficiency

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

Weak Form Efficiency

- Prices reflect all past market information such as price and volume.
- If true, 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

Efficient Market Hypotheses Cont'd

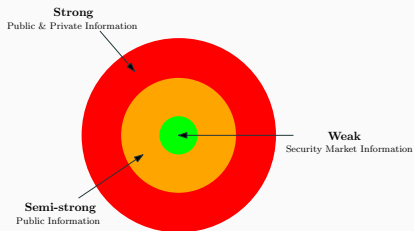


Figure 5: Efficient Market Hypotheses

- Common Misconceptions about EMH
 - EMH does not mean that you can't make money. EMH does mean that:
 - On average, you will earn a return appropriate for the risk undertaken.
 - There is no bias in prices that can be exploited to earn excess returns.
 - Market efficiency will not protect you from wrong choices if you do not diversify.