# Chapter 7
# Valuing Stocks

Financial Management (MGCM10018)

# Preview

- This chapters introduces valuations techniques for equity (stocks).
  - The dividend discount model provides an excellent measure of a stock's intrinsic value.

# Outline

- Stocks and the Stock Market
- Market Values, Book Values, and Liquidation Values
- Valuing Common Stocks
- Simplifying the Dividend Discount Model
- Valuing a Business
- No Free Lunches on Wall Street
- Market Anomalies and Behavioral Finance

# Stocks and the Stock Market (7.1)

- Corporations sell shares of common stock to the public for the first time is called initial public offering (IPO).
  - Common stock: ownership shares in a publicly held corporation.
  - The corporations can continue to sell additional shares, and this is called primary offering in the primary market.
  - The stocks then are traded between investors in the secondary markets.

# Stock Market

- The two principal stock exchanges in the U.S. are the New York Stock Exchange & NASDAQ.
  - In Taiwan, it is the 台灣證券交易所 (Taiwan Stock Exchange, TWSE).
  - There are many computer networks called electronic communication networks (ECNs) that connect traders with each other.

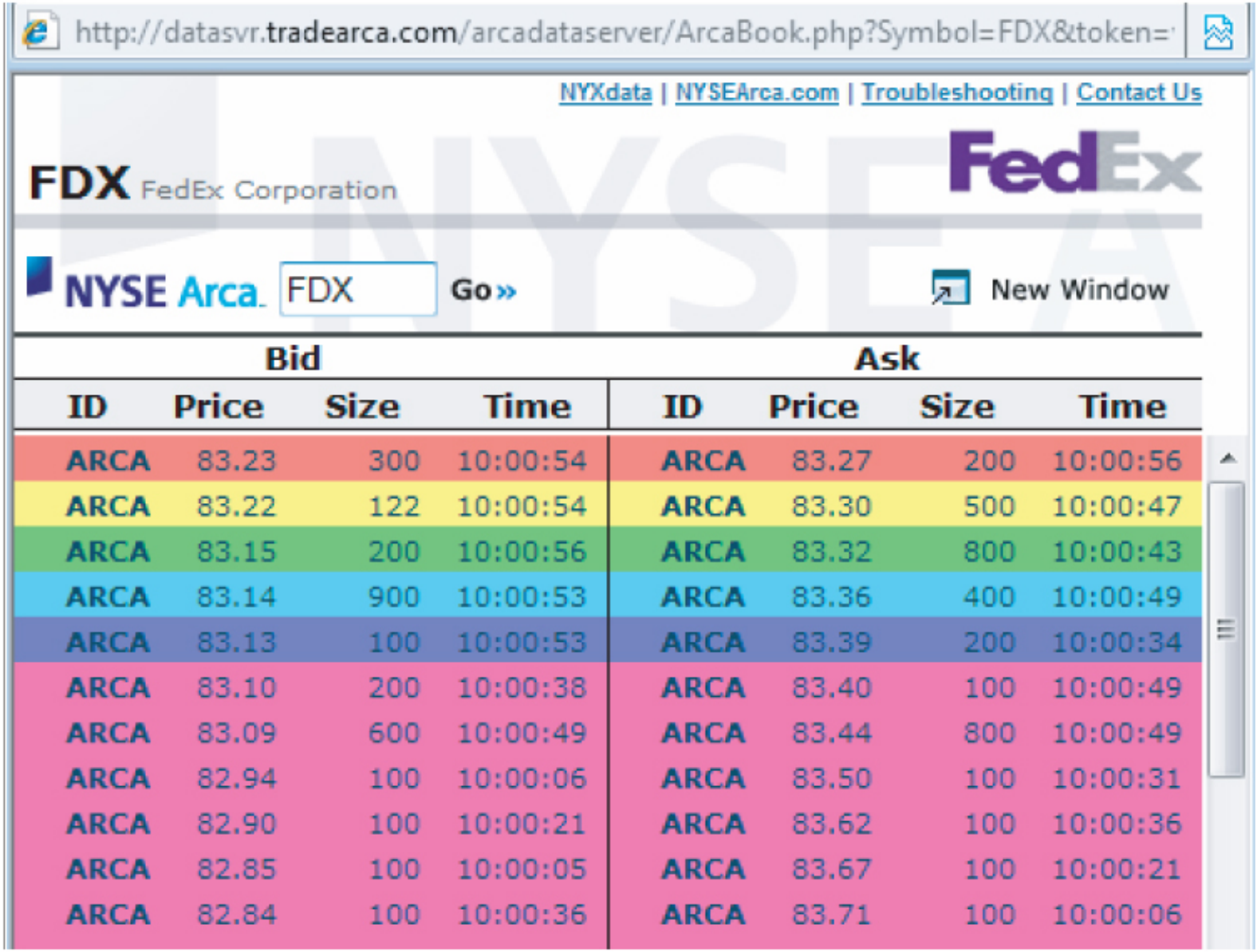
# Stock Market (continued)

- Investors often trade the stock through their brokers.
  - They can place either market order or limit order when trading the stocks.
  - Stocks are quoted with bid and ask prices.
    - Bid price: the prices at which investors are willing to buy shares.
    - Ask price: the prices at which current shareholders are willing to sell their shares.
    - The difference between the two is called bid-ask spread.

# Example

- Shannon sells 100 shares of Google stock from her portfolio for $500 per share to help pay for her son Domenic's college education.
  - How much does Google receive from the sale of its shares?
  - Does this transaction occur on the primary or secondary market?

# Stock price quotes (FedEx, NYSE)




| Bid | | | | Ask | | | |
|---|---|---|---|---|---|---|---|
| ID | Price | Size | Time | ID | Price | Size | Time |
| ARCA | 83.23 | 300 | 10:00:54 | ARCA | 83.27 | 200 | 10:00:56 |
| ARCA | 83.22 | 122 | 10:00:54 | ARCA | 83.30 | 500 | 10:00:47 |
| ARCA | 83.15 | 200 | 10:00:56 | ARCA | 83.32 | 800 | 10:00:43 |
| ARCA | 83.14 | 900 | 10:00:53 | ARCA | 83.36 | 400 | 10:00:49 |
| ARCA | 83.13 | 100 | 10:00:53 | ARCA | 83.39 | 200 | 10:00:34 |
| ARCA | 83.10 | 200 | 10:00:38 | ARCA | 83.40 | 100 | 10:00:49 |
| ARCA | 83.09 | 600 | 10:00:49 | ARCA | 83.44 | 800 | 10:00:49 |
| ARCA | 82.94 | 100 | 10:00:06 | ARCA | 83.50 | 100 | 10:00:31 |
| ARCA | 82.90 | 100 | 10:00:21 | ARCA | 83.62 | 100 | 10:00:36 |
| ARCA | 82.85 | 100 | 10:00:05 | ARCA | 83.67 | 100 | 10:00:21 |
| ARCA | 82.84 | 100 | 10:00:36 | ARCA | 83.71 | 100 | 10:00:06 |

# Trading information on FedEx

**FedEx Corporation Common Stock** (NYSE: FDX)

| | | | |
|---|---|---|---|
| Last Trade: | **83.75** | Day's Range: | **83.61 – 84.46** |
| Trade Time: | **9:47AM EDT** | 52wk Range: | **63.54 – 97.75** |
| Change: | **↓0.85 (1.00%)** | Volume: | **177,228** |
| Prev Close: | **84.60** | Avg Vol (3m) | **3,821,760** |
| Open: | **84.46** | Market Cap: 總市值 | **26.34B** |
| Bid: | **83.73** × 200 | P/E (ttm): 83.75/3.76 = | **22.24** |
| Ask: | **83.77** × 100 | EPS (ttm): | **3.76** |
| 1y Target Est: | **98.82** | Div & Yield: 0.48/83.75 | **0.48 (0.60%)** |

=0.6%

# Stock Market (continued)

- Investors use a number of methods to determine the quality of a company's shares.
  - For examples, the market cap (market capitalization) of FedEx was $26.34 billion.
    - Traders often refer to large-cap or small-cap firms.
  - The P/E (price-earnings) ratio is 22.24.
    - The ratio of stock price to earnings per share.
  - The dividend yield is 0.48.
    - It tells how much dividend income shareholders will receive for every $100 invested in the stock.

# Example

- You are considering investing in a firm whose shares are currently selling for $50 per share with 1,000,000 shares outstanding. Expected dividends are $2/share and earnings are $6/share.
  - What is the firm's Market Cap? P/E Ratio? Dividend Yield?

# Market Values, Book Values, and Liquidation Values (7.2)

- There are 3 ways to value a firm.
  - Market Value: the value of the firm as determined by investors who would be willing to purchase the company.
  - Book Value: net worth of the firm according to the balance sheet. (Equity)
  - Liquidation Value: net proceeds that could be realized by selling the firm's assets and paying off its creditors.

The Tobin's Q = MV/Replacement cost

# Market Values, Book Values, and Liquidation Values (continued)

- Market value is simply the price × number of outstanding shares.
- Book value is based on firm's equity in balance sheet.

| SIMPLIFIED BALANCE SHEET FOR FEDEX, MAY 31, 2010 (Millions of dollars) | | | |
|---|---|---|---|
| Current assets | $ 7,284 | Current liabilities | $ 4,645 |
| Plant, equipment and other long-term assets | 17,618 | Debt and other long-term liabilities | 6,446 |
| | | Shareholders' equity | 13,811 |
| Total assets | $24,902 | Total liabilities and equity | $24,902 |

# Market values vs. Book values, August 2010

| | Stock Price | Book Value per Share | Market-to-Book-Value Ratio |
|---|---|---|---|
| FedEx | $83.75 | $43.98 | 1.9 |
| Johnson & Johnson | 58.29 | 19.19 | 3.0 |
| Campbell Soup | 36.97 | 3.23 | 11.4 |
| PepsiCo | 64.89 | 12.39 | 5.2 |
| Walmart | 51.20 | 17.49 | 2.9 |
| Dow Chemical | 25.59 | 14.22 | 1.8 |
| Amazon | 132.49 | 13.07 | 10.1 |
| McDonald's | 74.54 | 12.34 | 6.0 |
| American Electric Power | 36.11 | 27.70 | 1.3 |
| GE | 15.01 | 10.66 | 1.4 |

*Source:* Yahoo! Finance Web site, **finance.yahoo.com**.

# Market Values, Book Values, and Liquidation Values (continued)

- The difference between a company's actual value and its book or liquidation value is called its going-concern value with below 3 factors.
  - Extra earning power.
  - Intangible assets.
  - Value of future investments.

# Valuing Common Stocks (7.3)

- Valuation by comparables.
  - First identify a sample of similar firms.
  - Then examine how much investors are prepared to pay for each dollar of assets or earnings.
  - Market-to-book and P/E ratios are the most popular rules of thumbs for valuing common stocks.

for young firm, price-to-sales are looked by analysts

# Valuation by Comparables

| | Market-to-Book-Value Ratio | | Price-Earnings Ratio | |
|---|---|---|---|---|
| | Company | Competitors* | Company | Competitors* |
| FedEx | 1.9 | 5.2 | 22.2 | 29.8 |
| Johnson & Johnson | 3.0 | 3.0 | 11.8 | 10.5 |
| Campbell Soup | 11.4 | 4.7 | 16.1 | 14.0 |
| Pepsico | 5.2 | 4.1 | 16.6 | 17.5 |
| Walmart | 2.9 | 2.4 | 12.9 | 16.9 |
| Dow Chemical | 1.8 | 3.9 | 15.1 | 13.9 |
| Amazon | 10.1 | 2.8 | 54.9 | 20.5 |
| McDonald's | 6.0 | 2.5 | 16.7 | 18.8 |
| American Electric Power | 1.3 | 1.3 | 14.6 | 14.5 |
| GE | 1.4 | 2.5 | 15.1 | 17.6 |

# Valuing Common Stocks (continued)

- Intrinsic value is the present value of future cash payoffs from a stock or other security.
  - The future payoffs include dividend and selling price.

$$V_0 = \frac{DIV_1 + P_1}{1 + r}$$

  - $V_0$: the intrinsic value of the share.
  - $DIV_1$: the expected dividend per share over the year.
  - $P_1$: the predicted stock price in 1 year.
  - $r$: discount rate

# Example

What is the intrinsic value of a share of stock if expected dividends are $2/share and the expected price in 1 year is $35/share? Assume a discount rate of 10%.

$$V_0 = \frac{2+35}{1+0.1} = 33.64$$

# Valuing Common Stocks (continued)

- The expected return (ER) of a stock would be.

$$ER = \frac{DIV_1 + P_1 - P_0}{P_0}$$

  - It can be decomposed into two terms:
    - ER = Expected dividend yield + expected capital gain

$$ER = \frac{DIV_1}{P_0} + \frac{P_1 - P_0}{P_0}$$

# Example

What should be the price of a stock in one year if it sells for $40 today, has an expected dividend per share of $3, and an expected return of 12%?

$$0.12 = \frac{3 + X - 40}{40}$$

$$X = 41.8$$

# Dividend Discount Model

- The dividend discount model is a discounted cash-flow model which states that today's stock price equals the present value of all expected future dividends.

$$P_0 = \frac{DIV_1}{1+r} + \frac{DIV_2}{(1+r)^2} + \ldots + \frac{DIV_H + P_H}{(1+r)^H}$$

or $P_0 = \sum_{i=1}^{\infty} \frac{DIV_i}{(1+r)^i}$ $\left(\because i \to \infty, \frac{P_H}{(1+r)^\infty} = 0\right)$

  - $H$: time horizon
  - $DIV_i$ = expected dividend in $i$ period

# Dividend Discount Model (continued)

- There can be 3 cases to consider regarding expected dividend.
  - Constant dividend (no growth)
  - Constant growth
  - Nonconstant growth

# Example

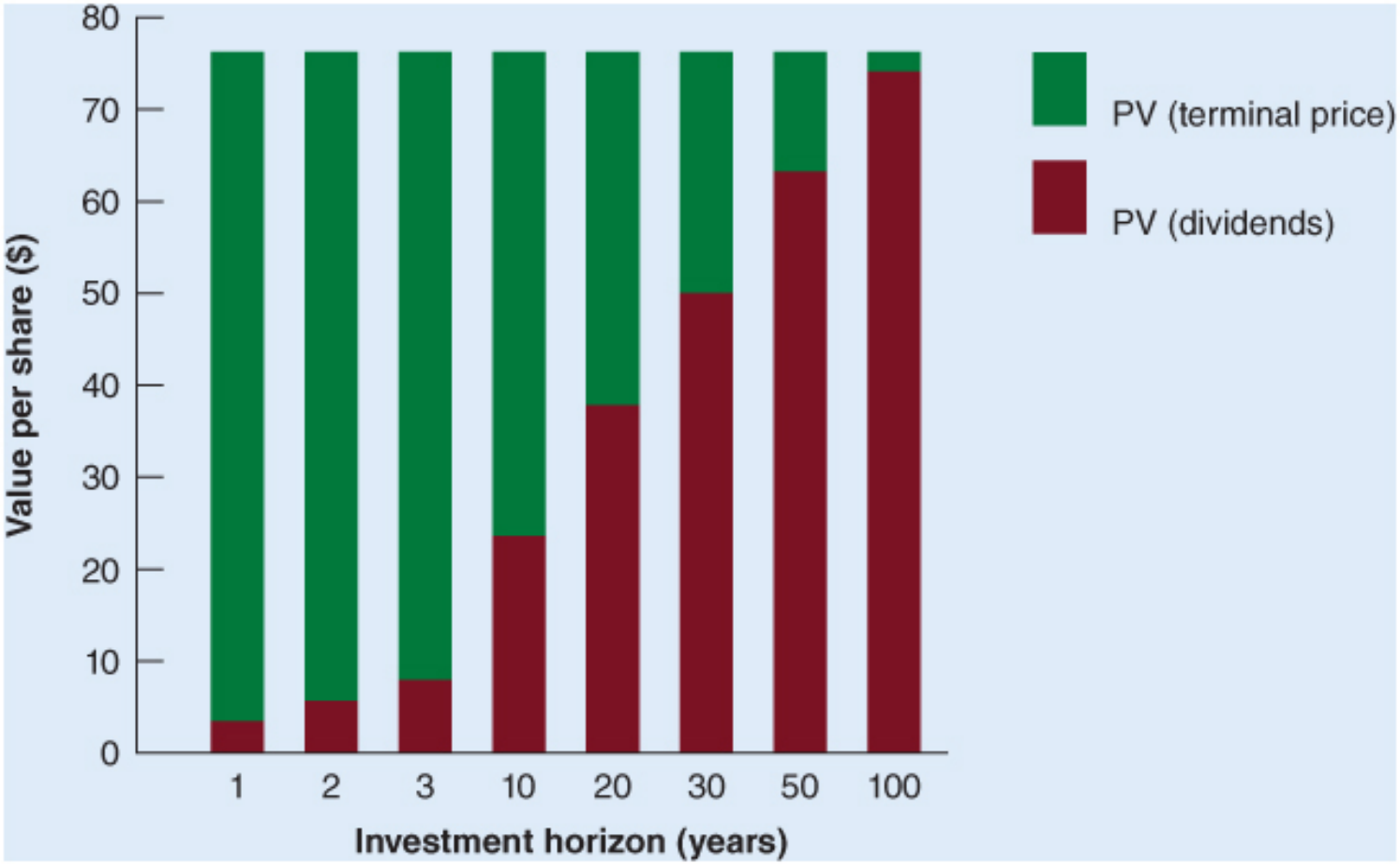
A firm is currently pay $3/share in dividends in next year. Investors expect both the stock price and the dividend to increase at 8% per year. Assuming the stock price would be $81 in one year, what would be the present value of stock when investing and holding the stock for 3 years (given 12% expected return)?

r

constant growth $P_0 = \frac{3}{1.12} + \frac{3 \times 1.08}{1.12^2} + \frac{3 \times 1.08^2 + 81 \times 1.08^2}{1.12^3} = 75$

hold for 1 year, 2 years, $P_0$ also equals to 75

| Horizon, Years | PV (Dividends) | + | PV (Terminal Price) | = | Value per Share |
|---|---|---|---|---|---|
| 1 | $ 2.68 | | $72.32 | | $75 |
| 2 | 5.26 | | 69.74 | | 75 |
| 3 | 7.75 | | 67.25 | | 75 |
| 10 | 22.87 | | 52.13 | | 75 |
| 20 | 38.76 | | 36.24 | | 75 |
| 30 | 49.81 | | 25.19 | | 75 |
| 50 | 62.83 | | 12.17 | | 75 |
| 100 | 73.02 | | 1.98 | | 75 |



# Simplifying Dividend Discount Model (7.4)

- When we have constant dividend, we know that $DIV_1 = DIV_2 = \ldots = DIV_t = \ldots$. The value of such no-growth stock would be:

$$P_0 = \frac{DIV_1}{r}$$

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  - What should the price of a share of stock be if dividends are projected at $5/share, the discount rate is 10%, and growth is 0%?

# Simplifying DDM (continued)

- If the dividend grows at a constant rate of $g$, the price of stock would be

$$P_0 = \frac{DIV_1}{1+r} + \frac{DIV_1(1+g)}{(1+r)^2} + \frac{DIV_1(1+g)^2}{(1+r)^3} + \ldots$$

$$P_0 = \frac{DIV_1}{r-g}$$

$r > g$

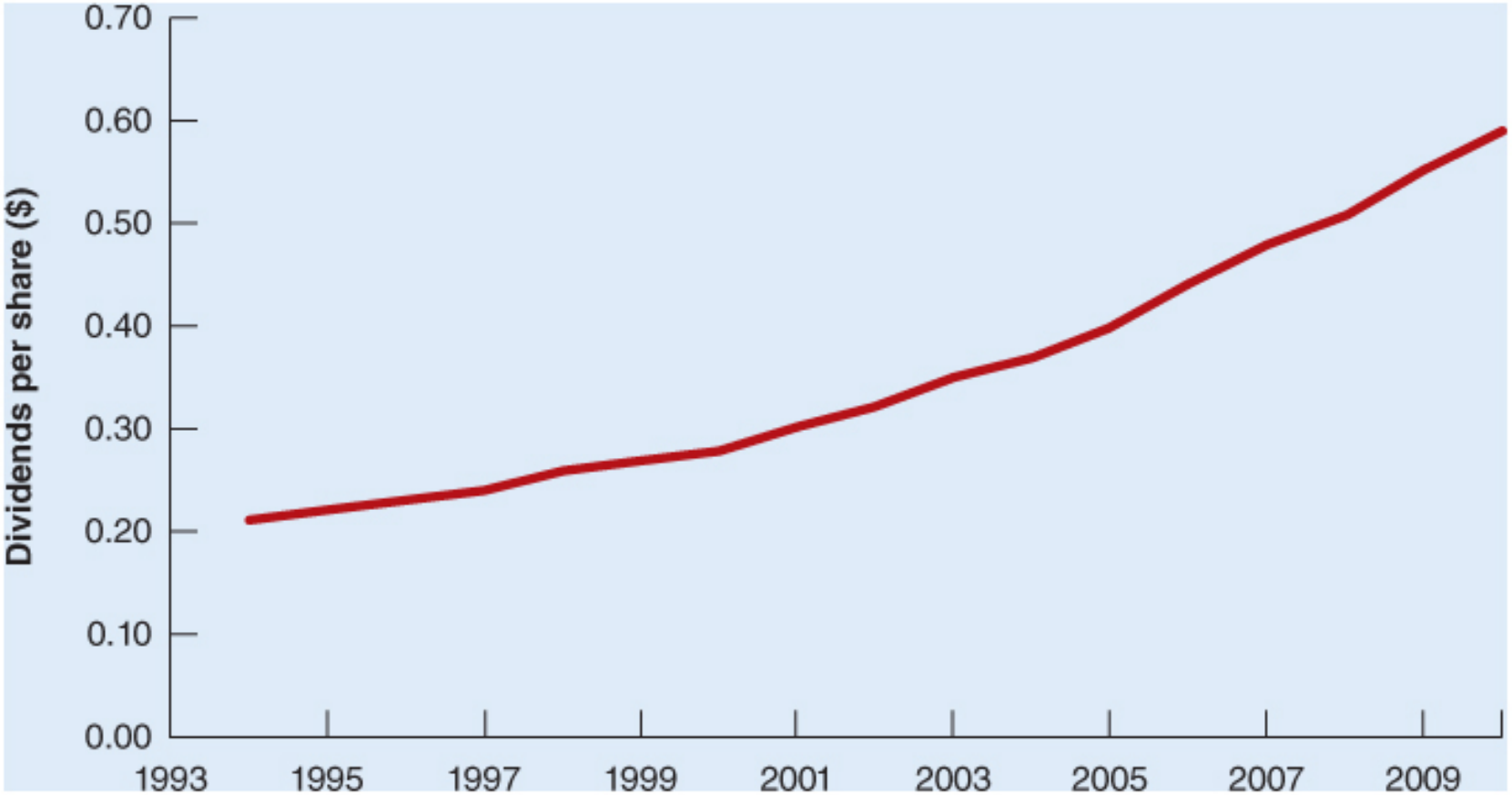
  - This is known as Gordon growth model.

# Example

What should the price of a share of stock be if the firm will pay a $4 dividend in 1 year that is expected to grow at a constant rate of 5%? Assume a discount rate of 10%.

$$P_0 = \frac{4}{0.1-0.05} = 80$$

# Example of constant growth dividend Aqua America



# Simplifying DDM (continued)

- Note that the Gordon model provides a useful tool to determine the expected rates of return for a stock.

$$r = \frac{DIV_1}{P_0} + g$$

Dividend yield

Growth rate

# Example

Example: What rate of return should an investor expect on a share of stock with a $2 expected dividend and 8% growth rate that sells today for $60?

$$r = \frac{Div}{P} + g$$

$$= \frac{2}{60} + 0.08$$

$$= 11.33\ \%$$

# Simplifying DDM (continued)

- For nonconstant growth of dividend, the price of stock would be

$$P_0 = \frac{DIV_1}{1+r} + \frac{DIV_2}{(1+r)^2} + \ldots + \frac{DIV_H}{(1+r)^H} + \frac{P_H}{(1+r)^H}$$

PV of dividends from year 1 to horizon

PV of stock price at horizon

# Example

A firm is expected to pay $2/share in dividends next year. Those dividends are expected to grow by 8% for the next three years and 6% thereafter. If the discount rate is 10%, what is the current price of this security?

$$\frac{2}{1.1} + \frac{2 \times 1.08}{(1.1)^2} + \frac{2 \times 1.08^2}{(1.1)^3} + \frac{2 \times 1.08^3}{(1.1)^4} + \frac{\frac{2 \times 1.08^3 \times 1.06}{0.1 - 0.06}}{(1.1)^4}$$

$$= 52.68$$

# Growth Stocks & Income Stocks

- Investors buy growth stocks primarily in the expectation of capital gains. They buy income stocks principally for the cash dividends.
  - People are more interested in future growth of earnings for growth stock, rather than the dividends.
  - Note that a firm can determine the fraction of earnings paid out as dividends; this is called payout ratio.
    - The fraction of earnings retained by the firm is called plowback ratio.

# Growth Stocks & Income Stocks (continued)

- If a firm earns a constant return on its equity and plows back a constant proportion of earnings, then the growth rate g would also be constant.

$$g = ROE \times plowback\ ratio$$

  - Suppose a firm that pays out 35% of earnings as dividends and expects its return on equity to be 10%. What is the expected growth rate?
  - $g = 0.1 \times (1 - 0.35) = 6.5\%$
  - This is called sustainable growth rate.

# Growth Stocks & Income Stocks (continued)

- Plowing earnings back into new investments may result in growth in earnings and dividends.
  - But it does not add to the current stock price
    - If that money is expected to earn only the return that investors require.
- If the investors believe a firm has opportunity to earn on new investment with a rate above the required rate, additional value is generated.
  - There is the present value of growth opportunities (PVGO) to be added into current price.

# Valuing Growth Stocks

- The value per share of assets in place equals the firm's average future earnings if it does not grow.
  - That is, EPS / r.
- Thus, the value of a growth stock would be

$$P_0 = \frac{EPS}{r} + PVGO$$

  - Note that PVGO never appears on a book balance sheet but belongs on a market-value balance sheet.

# Valuing Growth Stocks (continued)

- The market-value balance sheet shows market values of assets, liabilities, and equity.
- Example

| Current Assets | Current Liabilities |
|---|---|
| Assets in place | Debt and other long-term liabilities |
| Plant, equipment, and other tangible assets | |
| Intangible assets | Shareholders' equity |
| Growth opportunities = PV of future investment opportunities (PVGO) | |
| Total value | Total value |

# Example

Suppose a stock is selling today for $55/share and there are 10,000,000 shares outstanding. If earnings are projected to be $20,000,000, how much value are investors assigning to growth per share? Assume a discount rate of 10%.

# Valuing a Business (7.5)

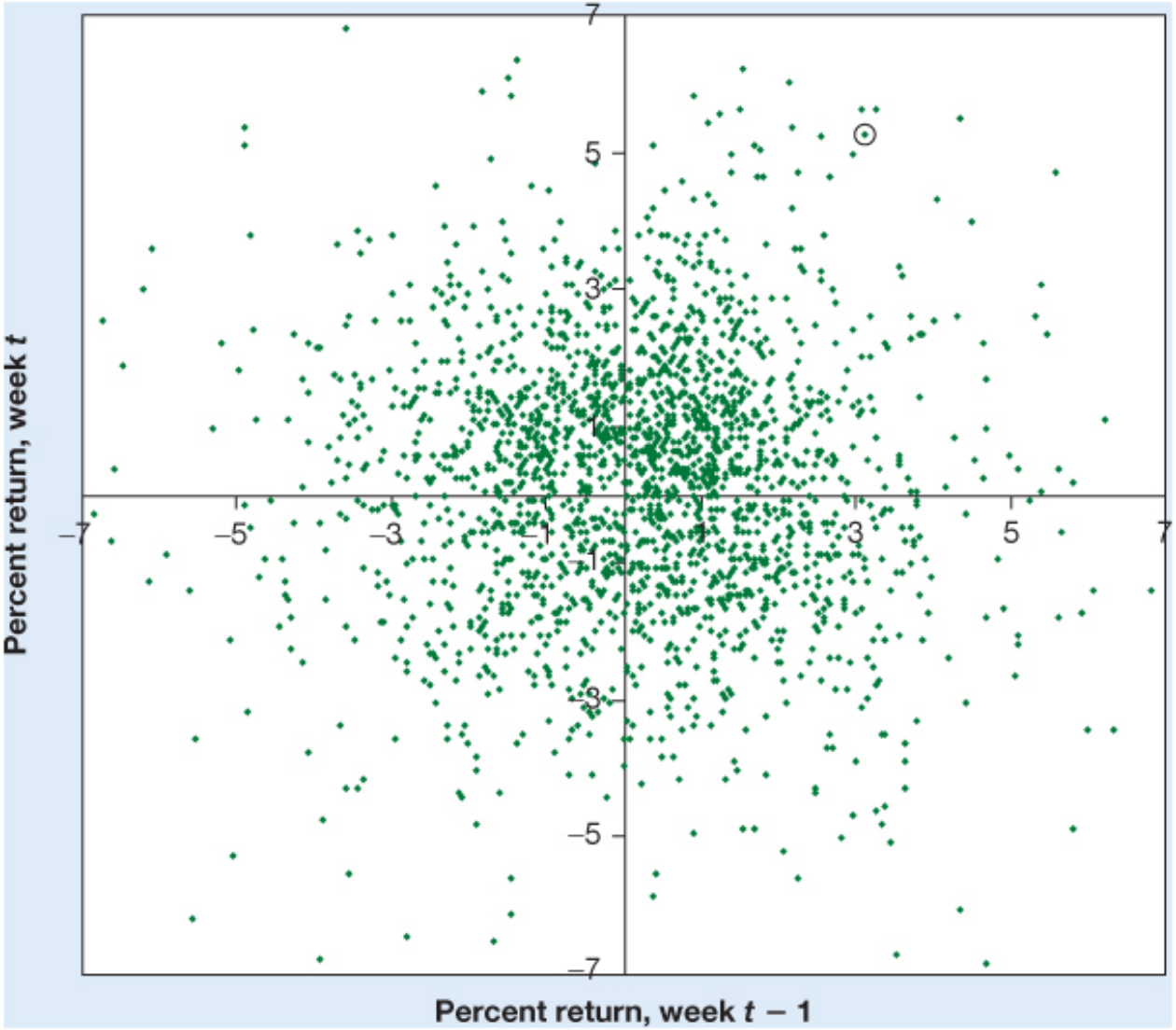
- In 2015, Johnson & Johnson announced that it had sold a medical device subsidiary for $2B.
  - The business was not a public company.
- Here, we discount the forecast of free cash flow (FCF) to find how much the business is worth.

$$\mathrm{PV} = \frac{\mathrm{FCF}_1}{1+r} + \frac{\mathrm{FCF}_2}{(1+r)^2} + \cdots + \frac{\mathrm{FCF}_H}{(1+r)^H} + \frac{\mathrm{PV}_H}{(1+r)^H}$$

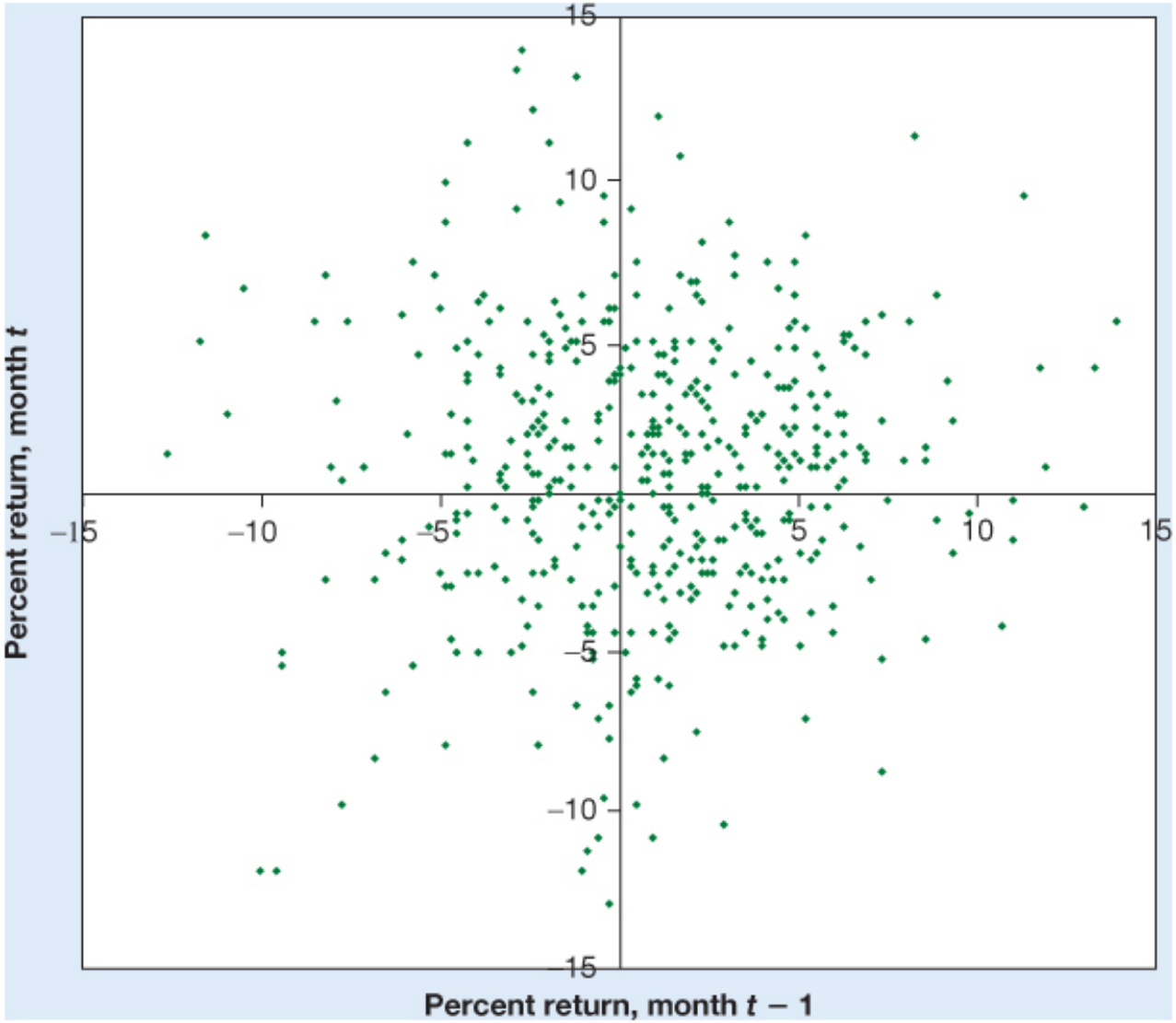
# No Free Lunches on Wall Street (7.6)

- It is not easy to beat the market.
  - In a consistent way.
- Some investors try to achieve superior returns by spotting and exploiting patterns in stock prices.
  - They are known as technical analysts.
  - It is not that simple.
    - A large price rise in one period may be followed by a further rise in next period, but it is just likely to be followed by a fall.

Relationship between this week's returns and next week's, correlation = -0.022.



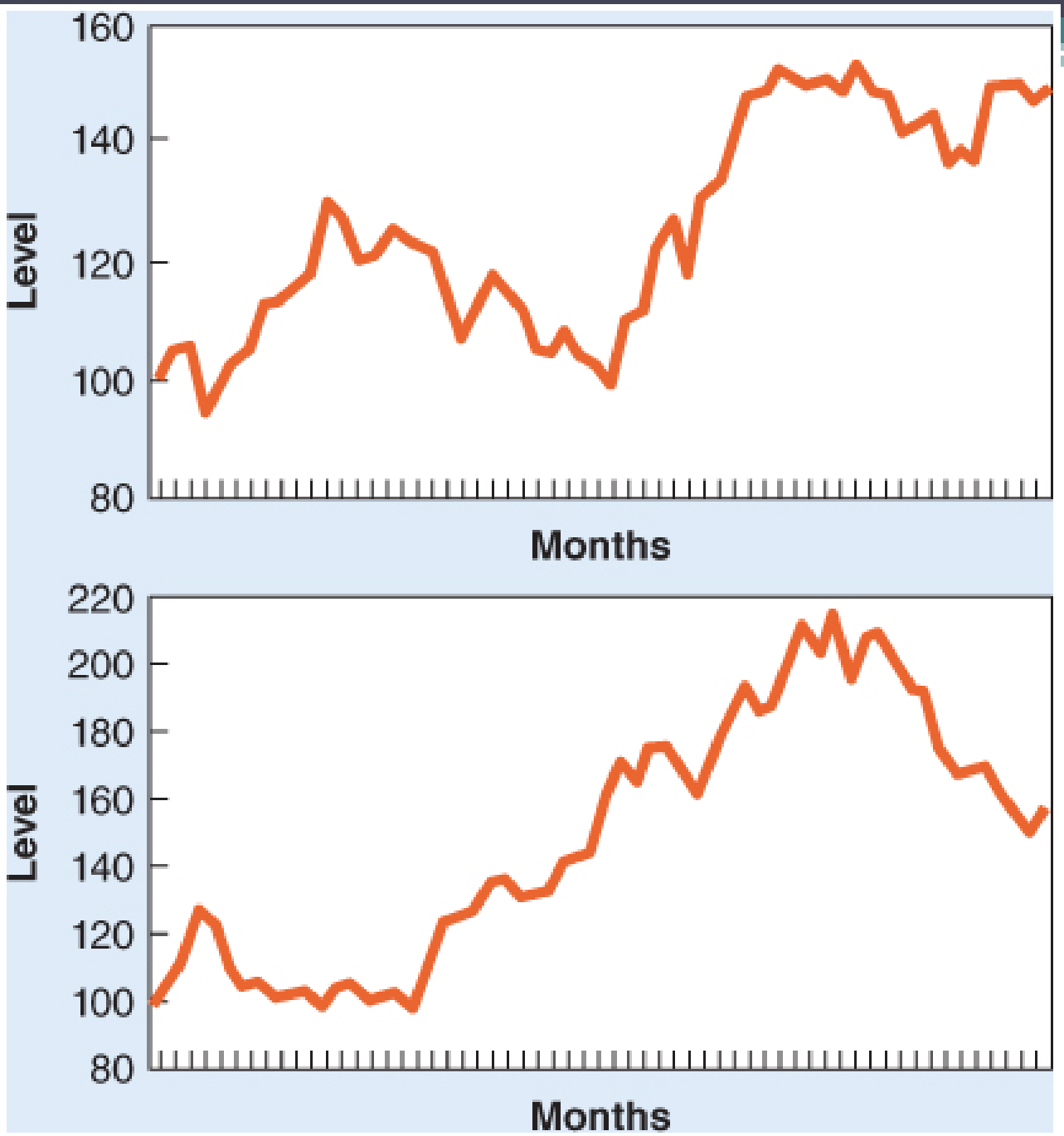
Relationship between this month's returns and next month's, correlation = -0.004.



# No Free Lunches (continued)

- Thus, the problem with technical analysis is that stock prices appear to wander randomly.
  - In another word, stock prices seem to follow a random walk with no predictable trends or patterns.

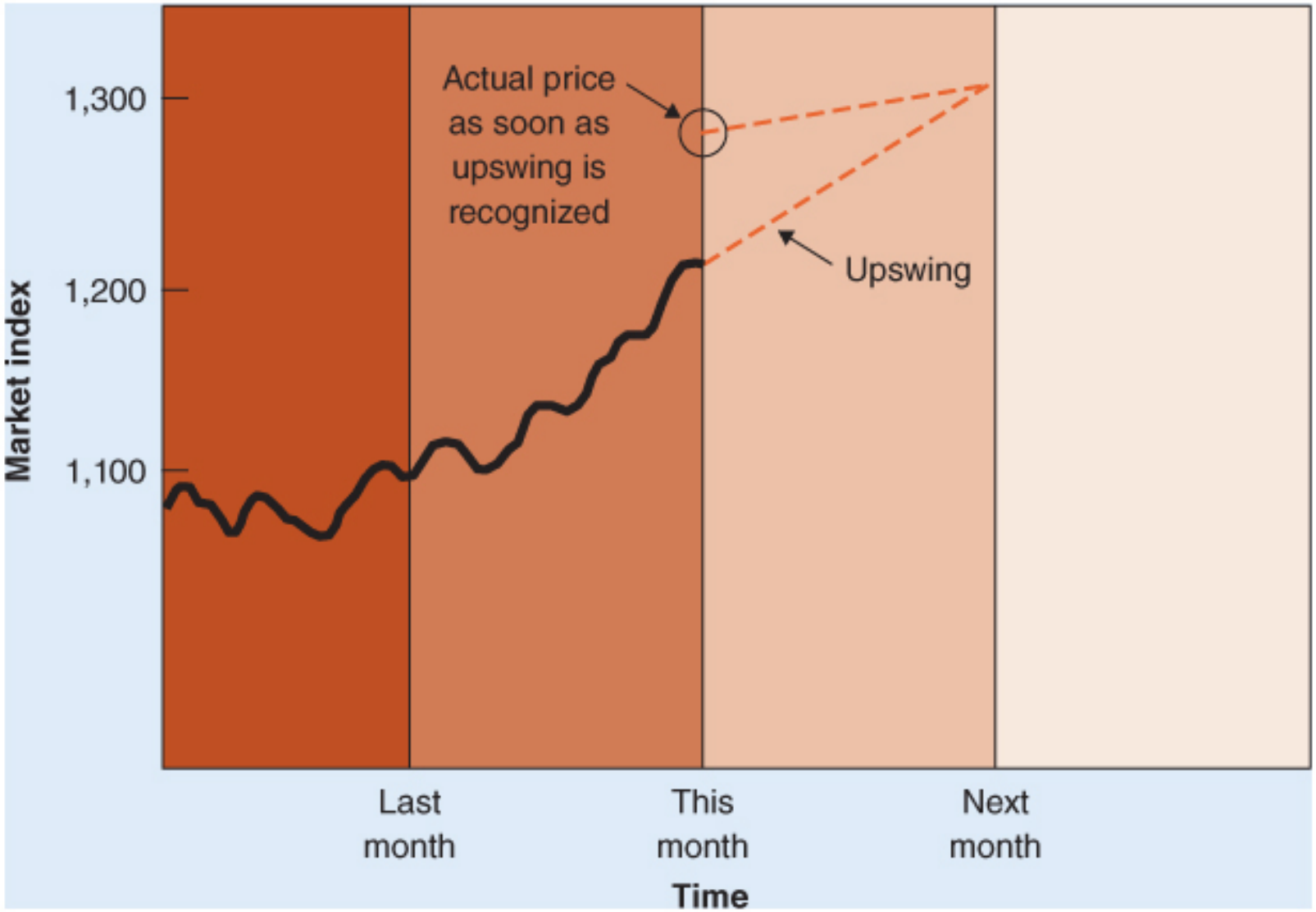
One of the chart shows S&P index for 5 years. Another one shows trend of a coin-toss game.



# No Free Lunches (continued)

- Assume that a predictable trend of prices is detected.
  - What would happen?
  - All investors would rush to trade the stock and stop to do so when the prices become fair.
  - Thus, as soon as a cycle of price becomes apparent to investors, they immediately eliminate it by their trading.

# Stock price would instantaneously jump if a trend is foreseeable



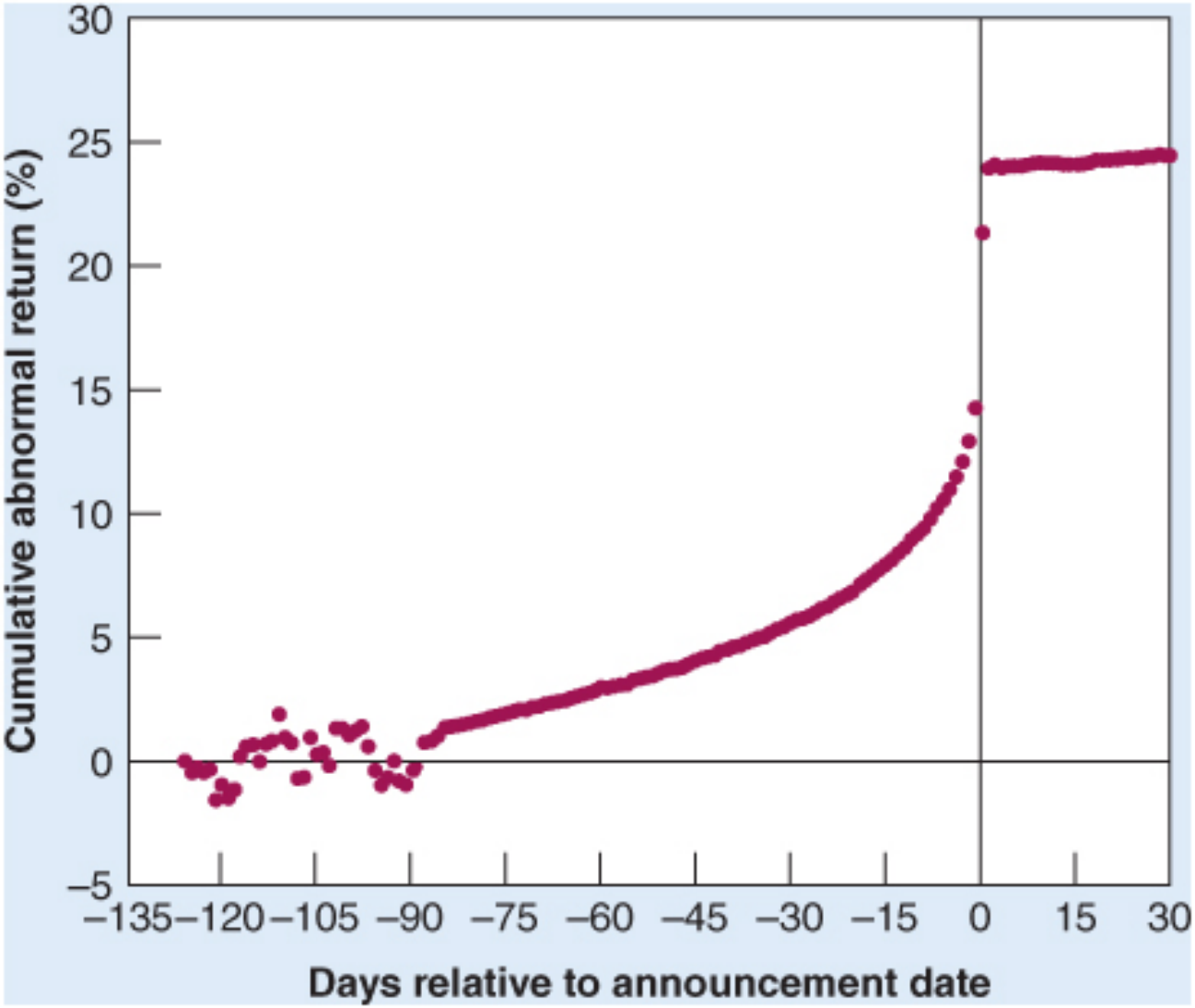
# No Free Lunches (continued)

- Some investors attempt to find mispriced securities by analyzing fundamental information, such as accounting performance and earnings prospects.
- This is called fundamental analysis of stocks.
  - There are fundamental analysts are paid to uncover stocks for which price does not equal intrinsic value.
    - What happens in a market with many such talented and competitive fundamental analysts?

# No Free Lunches (continued)

- Economists often refer to the stock market as an efficient market.
  - It is the market in which prices reflect all available information.
    - Thus, the competition to find misvalued stocks is intense.
    - There are weak-form efficiency, semistrong-form efficiency, and strong-form efficiency.
  - Even professional investors find it difficult to outperform the market.

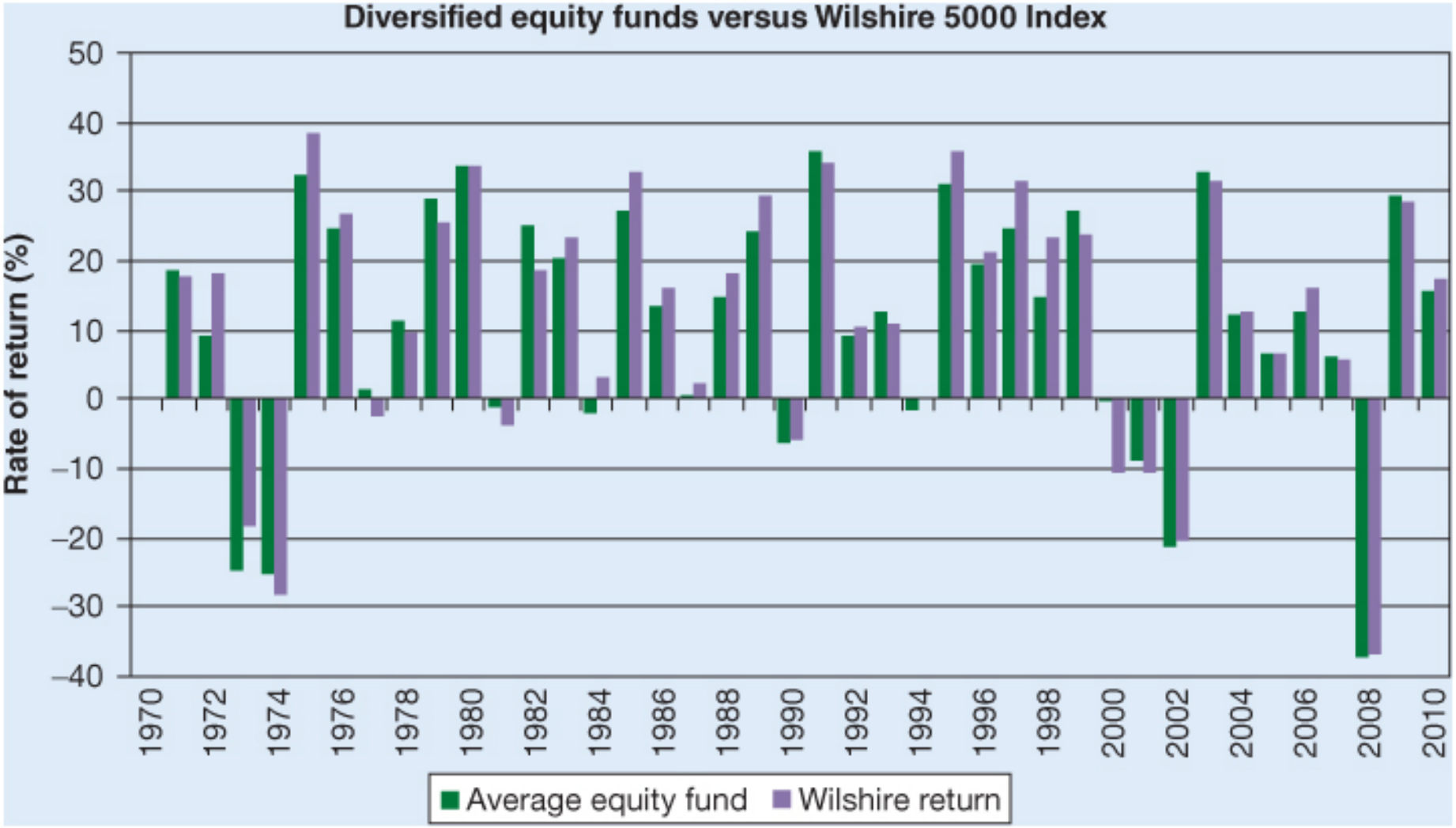
# Stock price change before and after the takeover announcements



# No Free Lunches (continued)

- Efficient market hypothesis
  - Weak-form efficiency
    - Prices already reflect all the information comtained in past prices.
  - Semistrong-form efficiency
    - Prices reflect not just past but all publicly available information.
  - Strong-form efficiency
    - Prices impound all available information.

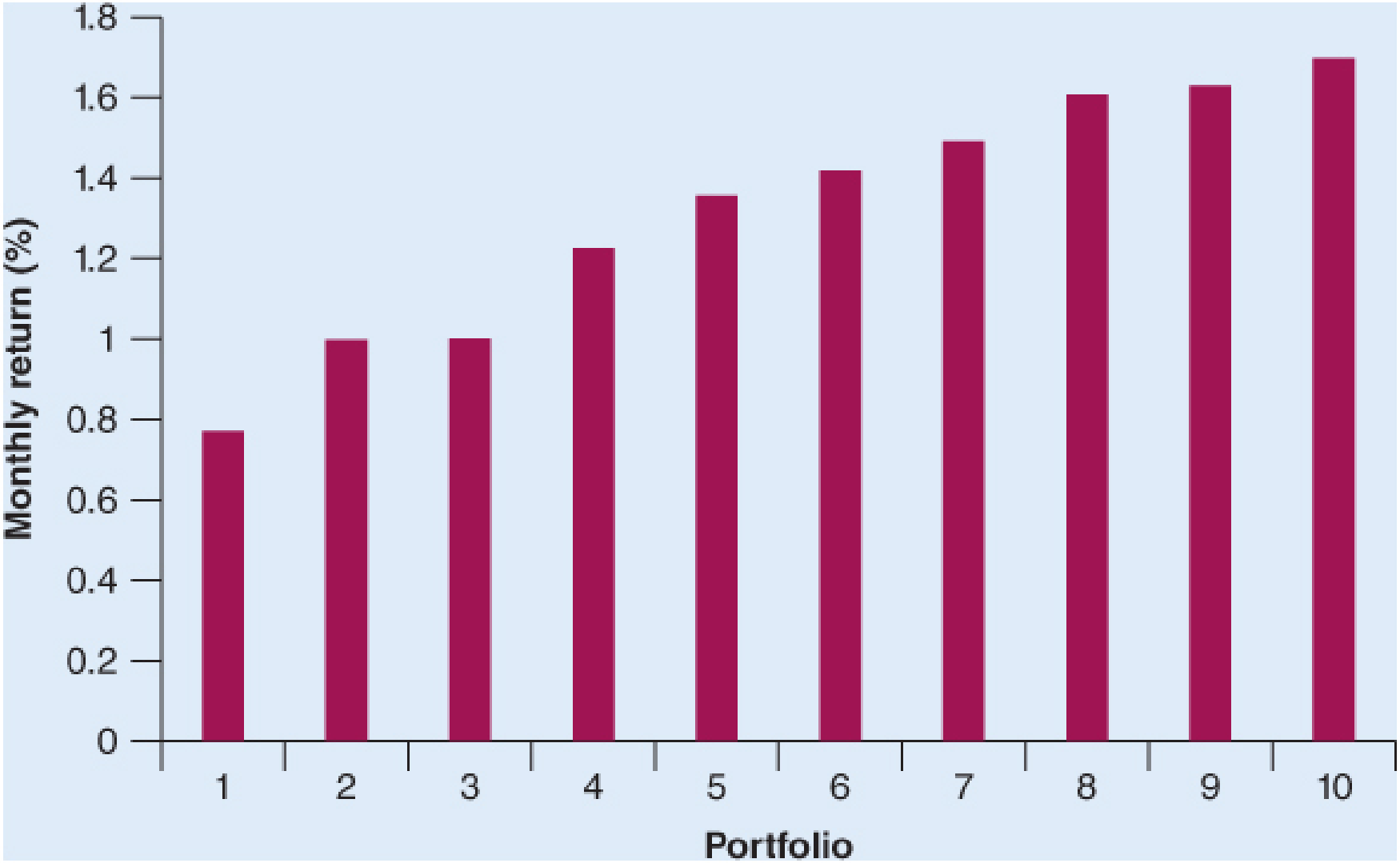
# Returns b/w index and mutual funds



# Market Anomalies & Behavioral Finance (7.7)

- There are a number of market anomalies that seem to puzzle efficient market theorists, including:
  - Earnings announcement puzzle
  - The new-issue puzzle
  - Bubbles

# Average returns in 6 months following earnings announcement



# Market Anomalies & Behavioral Finance (continued)

- Some believe that deviations in prices from intrinsic value can be explained by behavioral psychology, in three broad areas.
  - Attitudes toward risk: people generally dislike incurring losses, yet they are more apt to take bigger risks if they are experiencing a period of substantial gains.
  - Beliefs about probabilities: individuals commonly look back to what has happened in recent periods and assume this is representative of future outcomes.

# Market Anomalies & Behavioral Finance (continued)

- Some believe that deviations in prices from intrinsic value can be explained by behavioral psychology, in three broad areas.
  - Sentiment: investors are people, and they are subject to emotion. Sentiment can be interpreted as their general level of optimism or pessimism about the economy or firm.