Chapter Eleven

The Efficient Market Hypothesis

Overview

- Maurice Kendall (1953) found no predictable pattern in stock price changes
  - Prices were as likely to go up as to go down on any particular day, regardless of past performance
  - How do we explain random stock price changes?

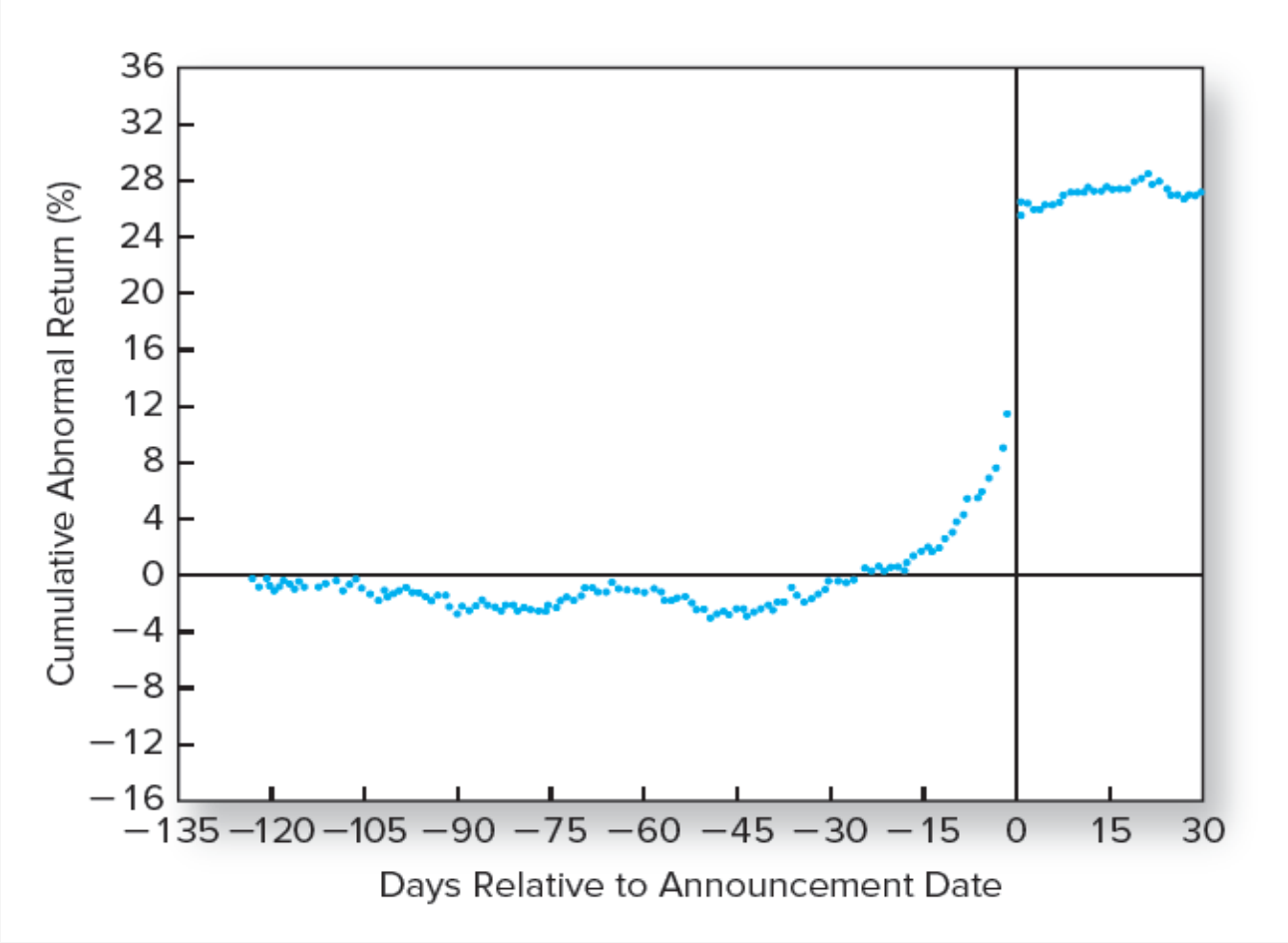
Efficient Markets

- **Efficient market hypothesis (EMH)**
  - Prices of securities fully reflect available information
  - Investors buying securities in an efficient market should expect to obtain an equilibrium rate of return

Random Walks

- Stock prices should follow a **random walk**
  - Stock price changes are random and unpredictable
  - Necessary consequence of intelligent investors competing to discover relevant information on which to buy or sell stocks before the rest of the market becomes aware of that information

Cumulative Abnormal Returns Before Takeover Attempts



Stock Price Reaction to CNBC Reports

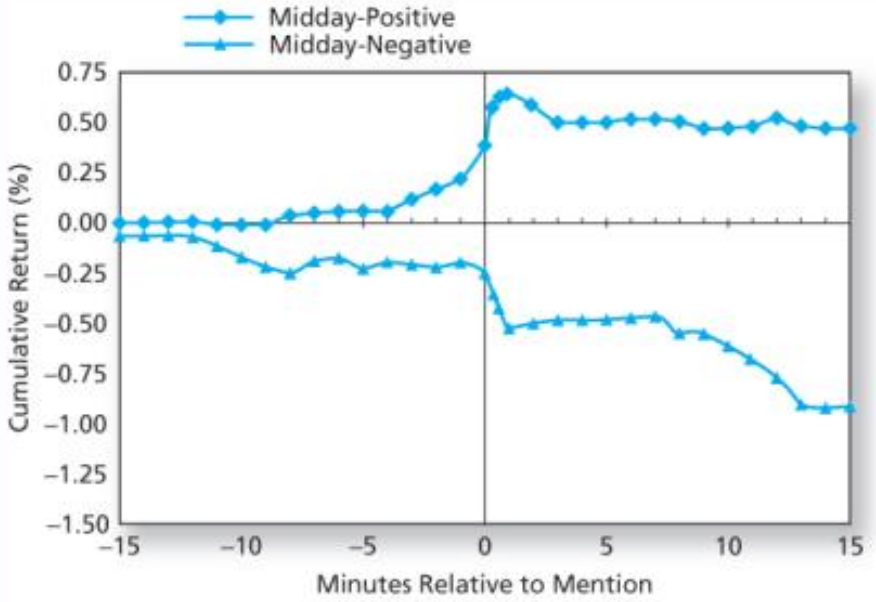


Figure 11.2 Stock Price Reaction to CNBC Reports. The figure shows the reaction of stock prices to on-air stock reports during the "Midday Call" segment on CNBC. The chart plots cumulative returns beginning 15 minutes before the stock report.

Source: Reprinted from J. A. Busse and T. C. Green, "Market Efficiency in Real Time," *Journal of Financial Economics* 65 (2002), p. 422. Copyright 2002 with permission from Elsevier Science.

Competition as the Source of Efficiency

- Information:
  - The most precious financial commodity
  - Strong competition assures prices reflect information
  - Higher investment returns motivates information-gathering
  - Diminutive marginal returns on research activity suggest only managers of the largest portfolios will find it useful pursuing

Versions of the EMH

1. **Weak-form** asserts that stock prices already reflect all information contained in the history of past prices
2. **Semistrong-form** asserts that stock prices already reflect all publicly available information
3. **Strong-form** asserts that stock prices reflect all relevant information, including insider information

- All versions assert that prices should reflect *available* information

Technical Analysis

- **Technical analysis** - Research to identify mispriced securities that focuses on recurrent and predictable stock price patterns and on proxies for buy or sell pressure in the market
  - Key to success is a sluggish response of stock prices to fundamental supply-and-demand factors
  - EMH implies technical analysis should be fruitless

Fundamental Analysis

- **Fundamental analysis**
  - Assessment of firm value that focuses on such determinants as earnings and dividends prospects, expectations for future interest rates, and risk evaluation
  - Seeks to find firms that are *mispriced*
    - Attempt to find firms that are better than everyone else's estimate or troubled firms that may be great bargains
- EMH predicts that *most* fundamental analysis is doomed to failure

Active versus Passive Portfolio Management

- Active Management
  - An expensive strategy
  - Suitable for very large portfolios
- Passive Management
  - No attempt to outsmart the market
  - Accept EMH
  - Index Funds and ETFs
  - Low cost strategy

Portfolio Management in an Efficient Market

- Even if the market is efficient, a role exists for portfolio management:
  - Diversification
  - Tax considerations
  - Risk profile of investor
    - E.g., investors of different ages

Resource Allocation

- Inefficient markets result in systematic resource misallocation
  - Overvalued securities can raise capital too cheaply
  - Corporations with undervalued securities may pass up profitable opportunities because the cost of raising capital is too high
  - Efficient market ≠ perfect foresight market

Event Studies

- An **event study** is a methodological approach designed to measure the impact of an event of interest on stock returns

- The **abnormal return** due to the event is the difference between the stock's actual return and a proxy for the stock's return in the absence of the event

How Tests Are Structured

- Returns are adjusted to determine if they are abnormal
  - Market model approach:

    a. Expected Return: $r_t = \alpha + \beta r_{Mt} + e_t$

    b. Abnormal Return: $e_t = r_t - (\alpha + \beta r_{Mt})$

Are Markets Efficient?

- Magnitude issue
  - Only managers of large portfolios can earn enough trading profits to make the exploitation of minor mispricing worth the effort
- Selection bias issue
  - Only unsuccessful (or partially successful) investment schemes are made public; good schemes remain private
- Lucky event issue
  - For every big winner, there may be many big losers, but we never hear of these managers

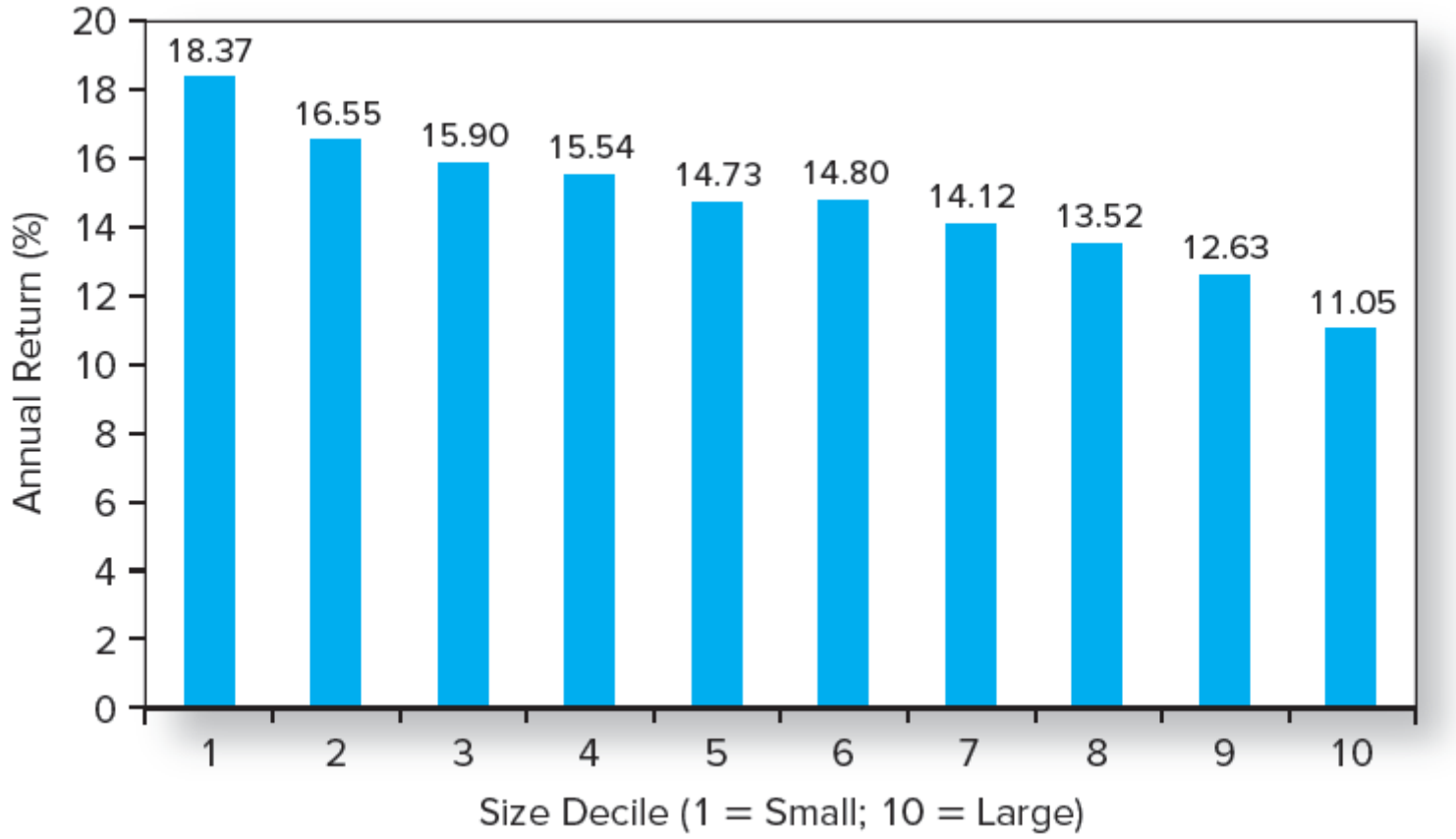
Weak-Form Tests

- Returns over *short* horizons
  - Tendency of poorly performing stocks and well-performing stocks in one period to continue that abnormal performance in following periods is the **momentum effect**
- Returns over *long* horizons
  - **Reversal effect** is the tendency of poorly performing stocks and well-performing stocks in one period to experience reversals in following periods

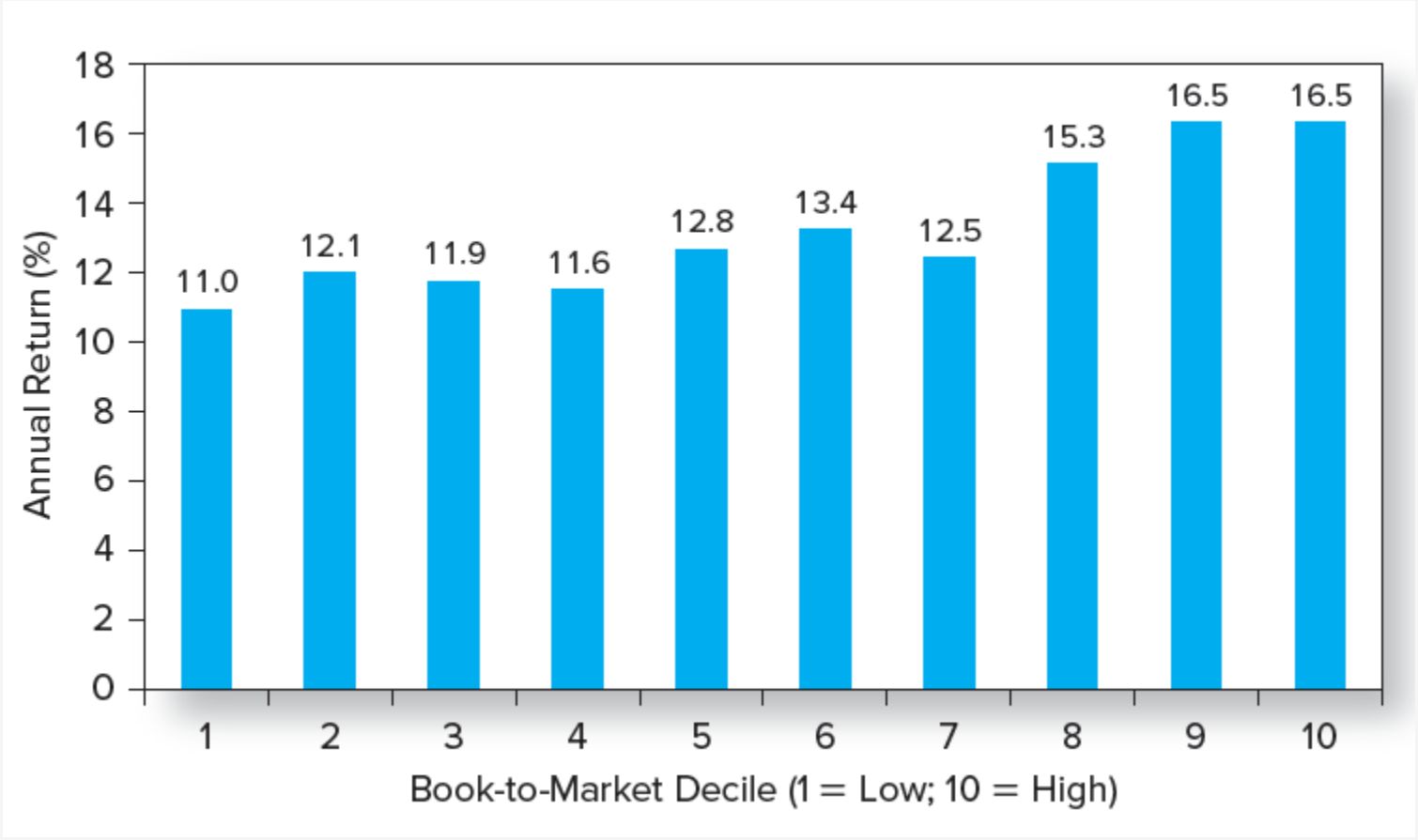
Predictors of Broad Market Returns

- Fama and French
  - Return on the aggregate stock market tends to be higher when the dividend yield is high
- Campbell and Shiller
  - Earnings yield can predict market returns
- Keim and Stambaugh
  - Bond spreads can help predict broad market returns

Semistrong Tests: Small-Firm Effect



Semistrong Tests: Book to Market Effects



Semistrong Tests: Post-Earnings-Announcement Price Drift

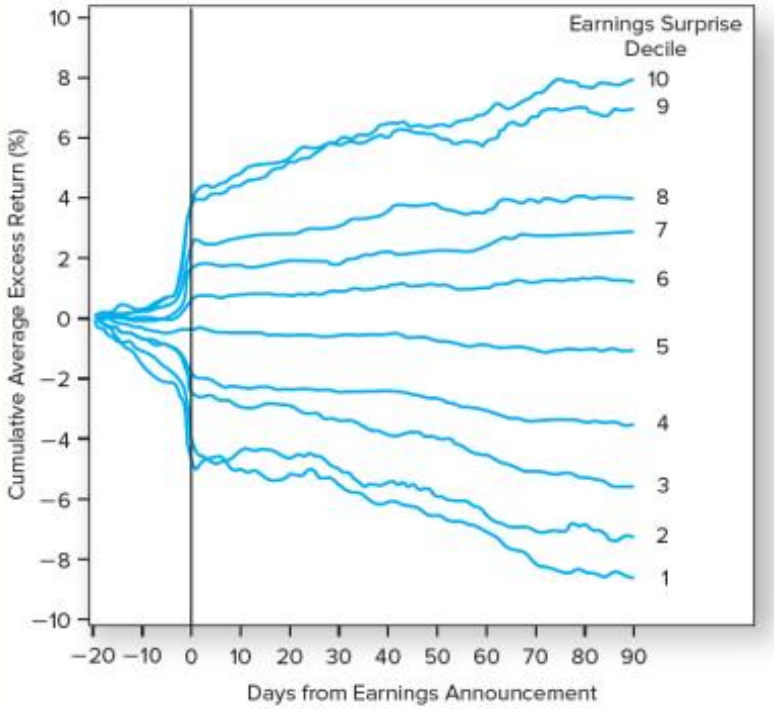


Figure 11.5 Cumulative abnormal returns in response to earnings announcements

Source: Reprinted from R. J. Rendleman Jr., C. P. Jones, and H. A. Latané, "Empirical Anomalies Based on Unexpected Earnings and the Importance of Risk Adjustments," *Journal of Financial Economics* 10 (1982), pp. 269–287.

- Price Drift
  - Ball and Brown find a sluggish response of stock prices to firms' earnings announcements
  - Market appears to adjust to the earnings information only gradually, resulting in a sustained period of abnormal returns

Semistrong Tests: Other Anomalies

- Efficient market **anomalies** are patterns of returns that seem to contradict the EMH
  - **P/E effect** – Basu discovered that portfolios of low-P/E ratio stocks have provided higher returns than high P/E portfolios
  - **Neglected-firm effect** – investments in stock of less well-known firm shave generated abnormal returns
  - Liquidity effect – Illiquid stocks have a strong tendency to exhibit abnormally high returns

Strong-Form Tests: Inside Information

- The ability of insiders to trade profitability in their own stock has been documented in studies by Jaffe, Seyhun, Givoly, and Palmon

- SEC requires all insiders to register their trading activity
  - Trades become public information

Interpreting the Anomalies

- Feature that small firms, low market-to-book firms, and recent "losers" seem to have in common is a stock price that has fallen considerably in recent months/years
  - Fama and French argue that these effects can be explained by risk premiums
  - Lakonishok, Shleifer, and Vishny argue that these effects are evidence of inefficient markets

Predictors of GDP Growth

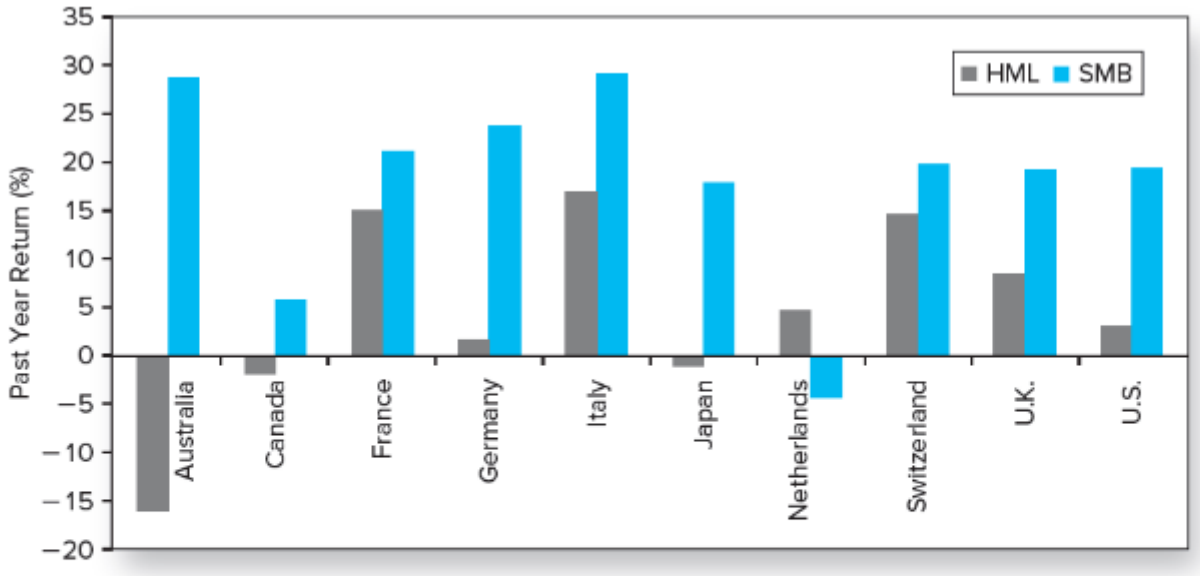


Figure 11.6 Return to style portfolios as predictors of GDP growth. Average difference in the return on the style portfolio in years before good GDP growth versus in years with bad GDP growth. Positive value means the style portfolio does better in years prior to good macroeconomic performance. HML = high-minus-low portfolio, sorted on ratio of book-to-market value. SMB = small-minus-big portfolio, sorted on firm size.

Source: Reprinted from J. Liew and M. Vassalou, "Can Book-to-Market, Size, and Momentum Be Risk Factors That Predict Economic Growth?" *Journal of Financial Economics* 57 (2000), pp. 221–45.

Interpreting the Evidence
(1 of 2)

- Anomalies or data mining?
  - Book-to-market, size, and momentum may be real anomalies
- Anomalies over time
  - Should self-destruct in well-functioning markets
  - Chordia, Subrahmanyam, and Tong find evidence that liquidity and low trading costs facilitate efficient price discovery

Interpreting the Evidence
(2 of 2)

- Bubbles and market efficiency
  - Bubbles occur when a rapid run-up in prices creates a widespread expectation that they will continue to rise
    - E.g., tulip mania in 17th-century Holland
  - Rush to "get in on the action"
  - Inevitably, the run-up stalls and the bubble ends in a crash

Stock Market Analysts

- Some analysts may add value, but:
  - Tend to be overwhelmingly positive in the assessment of the prospects of firms
  - Difficult to separate effects of new information from changes in investor demand
  - Recommendations may lead to investing strategies that are too expensive to exploit

Mutual Fund Performance
(1 of 2)

- Casual evidence does not support the claim that professionally managed portfolios can consistently beat the market

- Conventional performance benchmark today is a four-factor model
  - Three Fama-French factors
  - Momentum factor

Estimates of Individual Mutual Fund Alphas

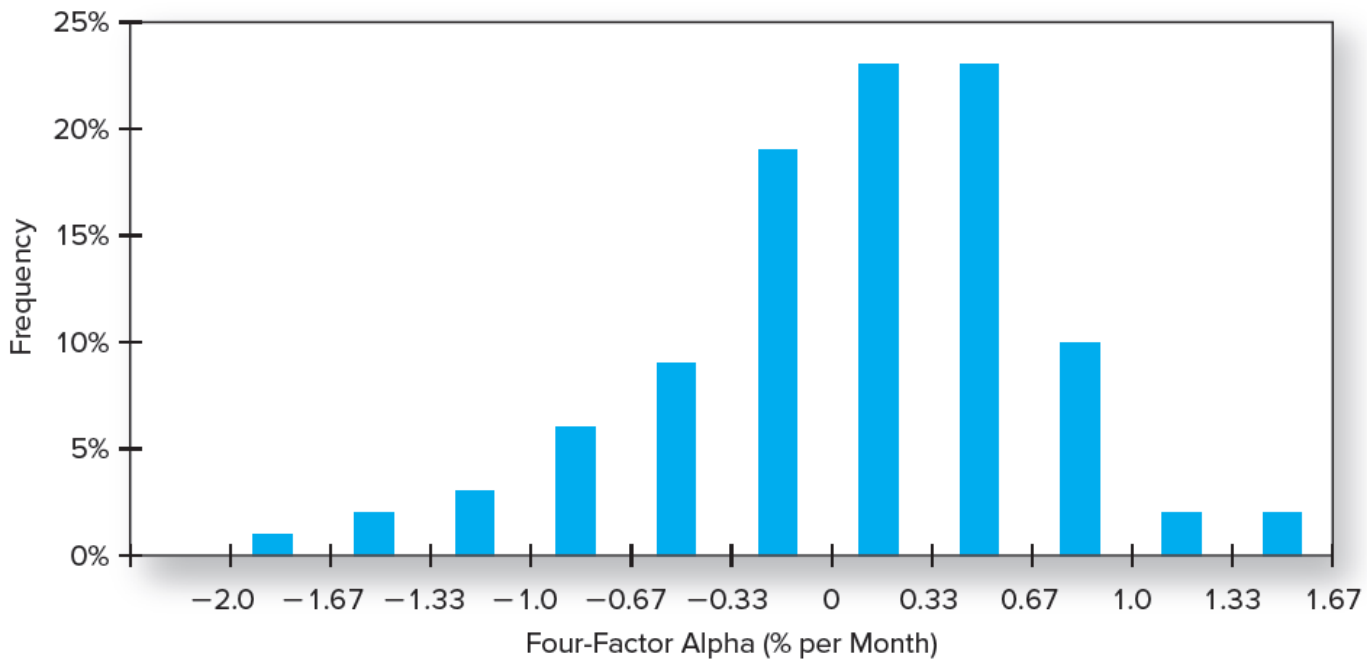


Figure 11.7 Mutual fund alphas computed using a four-factor model of expected return, 1993–2007. (The best and worst 2.5% of observations are excluded from this distribution.)

Source: Professor Richard Evans, University of Virginia, Darden School of Business.

Mutual Fund Performance
(2 of 2)

- Consistency
  - Carhart — finds minor persistence in relative performance across managers, but much of that persistence seems due to expenses and transaction costs
  - Bollen and Busse — support for performance persistence over short horizons
  - Berk and Green — skilled managers will attract new funds until the costs of managing those extra funds drive alphas down to zero

Risk-adjusted Performance in Ranking Quarter and Following Quarter

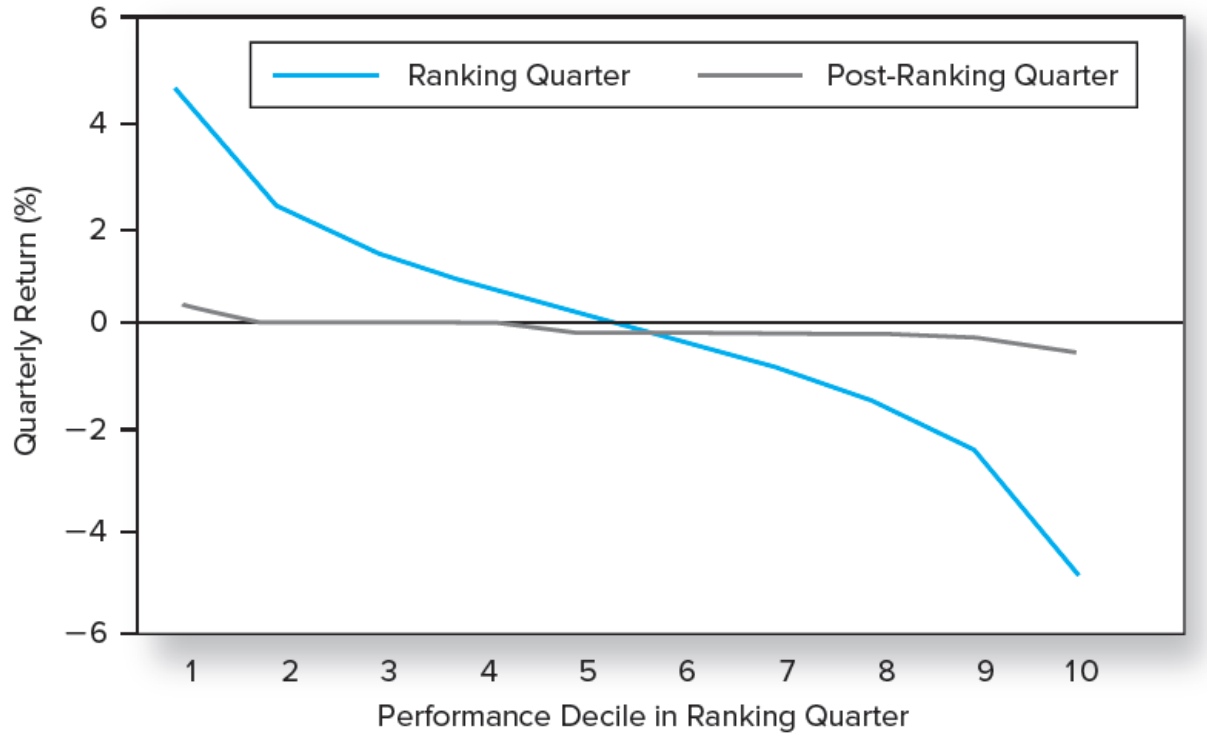


Figure 11.8 Risk-adjusted performance in ranking quarter and following quarter

So, Are Markets Efficient?

- Enough anomalies exist in the empirical evidence to justify the search for underpriced securities that clearly takes place
  - However, the market is competitive enough that only differentially superior information or insight will earn money
  - Margin of superiority that any professional manager can add is so slight that the statistician will not easily be able to detect it