Overview and Learning Objectives

Overview

This chapter defines informational efficient capital markets in which security prices fully and accurately reflect all available information quickly. Then, it discusses issues and evidence regarding the three forms of Efficient Market Hypothesis (EMH), and their implications on corporate financial decisions.

An important implication of efficient capital markets is that investments in financial securities are zero NPV projects. In such markets, investors can expect to earn a fair return consistent with the risk of the security, and companies can expect to receive a fair price when it issues securities.

Learning Objectives

After reading course materials on this chapter, students should be able to:

- Explain the definition and foundations of an informational efficient market and its implications for both investors and firms.
- Explain issues regarding the three forms of Efficient Market Hypothesis (EMH) – their definitions, interrelationships, implications, and evidence.
- Explain the specific implications of the EMH on corporate financial decisions.

NOTE - Given the nature of the materials covered in this chapter, you are strongly recommended to heavily rely on the text materials!

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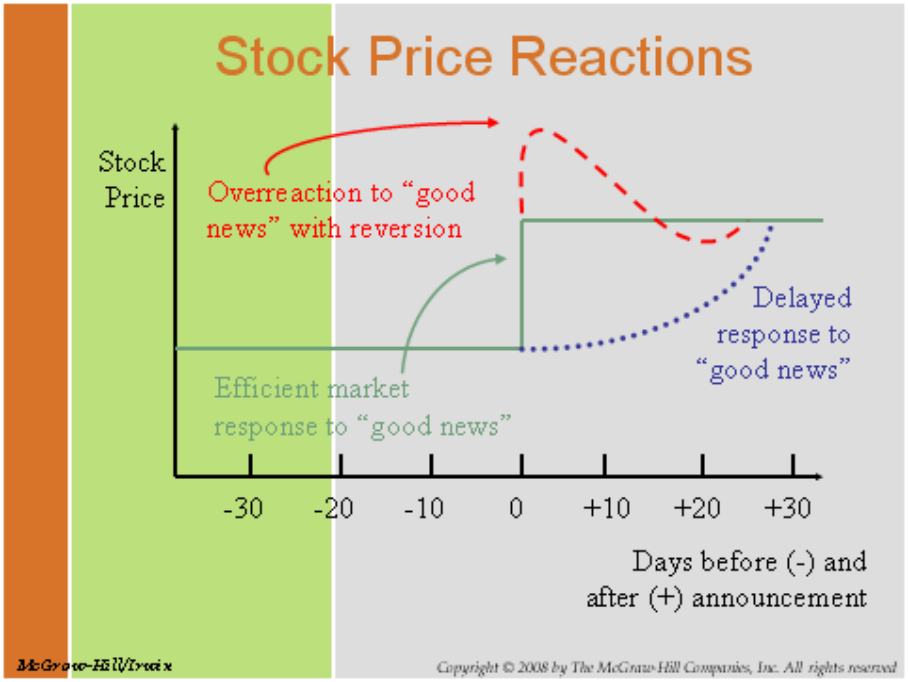
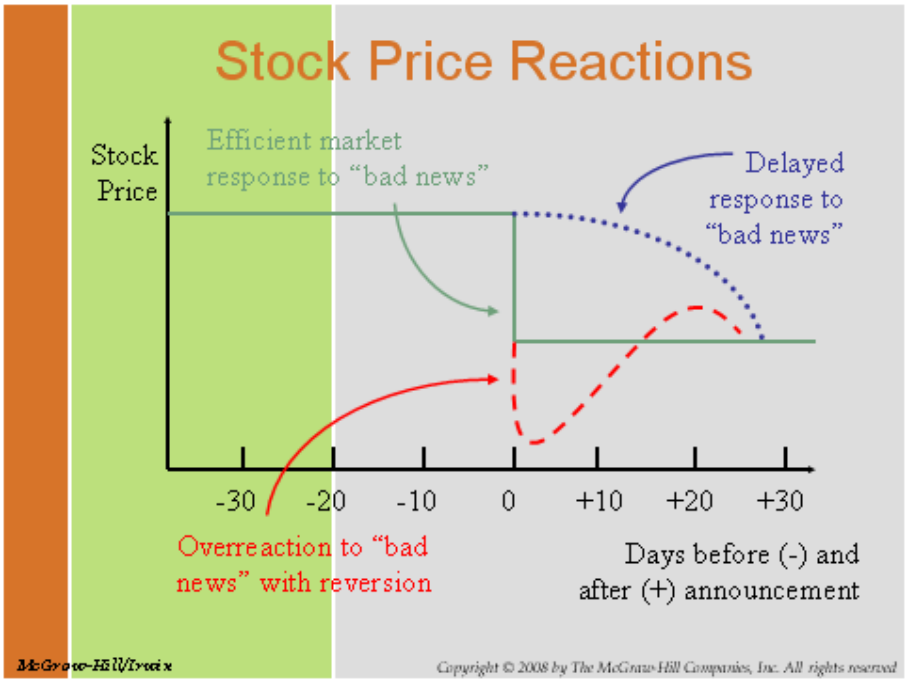
A Description of Efficient Capital Markets (Ref: Section 14.2)

An efficient capital market is one in which stock prices respond instantaneously to new information and fully reflect/incorporate that information. Delayed response (under-reaction) and overreaction to new information would suggest that markets are inefficient. Since the flow of new information is random, stock prices should follow a random walk process, i.e., stock price movements are also unpredictable.

A capital market is informational efficient when at least one of the following conditions holds:

- Investors are rational in their assessments of the impact of newly released information on stock prices, and they will react to the new information accordingly.
- If not all investors are rational as stated in the above condition, their deviations from the rational assessment and reaction are independent. In other words, there is no systematic bias in their assessments and reactions to the newly released information.
- If the above condition does not hold such that arbitrage opportunities exist in the pricing of securities, professional investors will act on these arbitrage opportunities and hence correct any mispricing in the capital market.





The Efficient Market Hypothesis (EMH) has implications for investors and firms:

- Since information is reflected in security prices quickly, publicly available information does not help investors outperform the market. Investors will earn a normal required return that commensurate with the risk of the security. In other words, investments in financial securities in an informational efficient market are zero NPV projects.
- Firms should expect to receive the fair value for securities that they sell, i.e., securities are fairly priced. Firms cannot profit from fooling investors in an efficient market.

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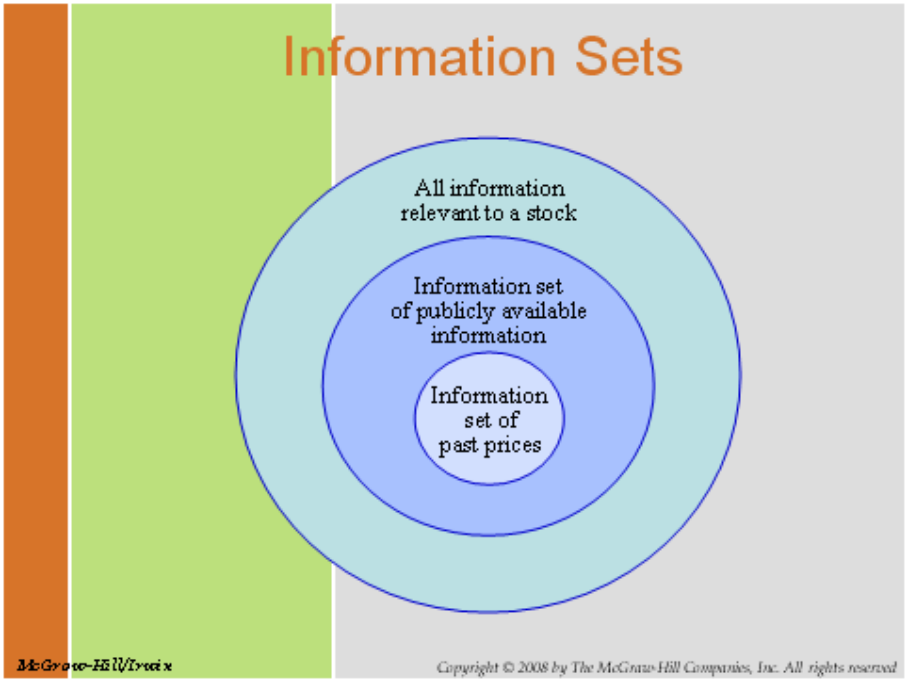
The Different Types of Efficiency (Ref: Section 14.3)

The relevant question regarding market efficiency is NOT whether the capital market is efficient, but HOW efficient is the capital market. There are three forms of the Efficient Market Hypothesis (EMH) depending on the scope of the information set:

- Historic stock prices.
- Publicly available information.
- All information relevant to a stock.

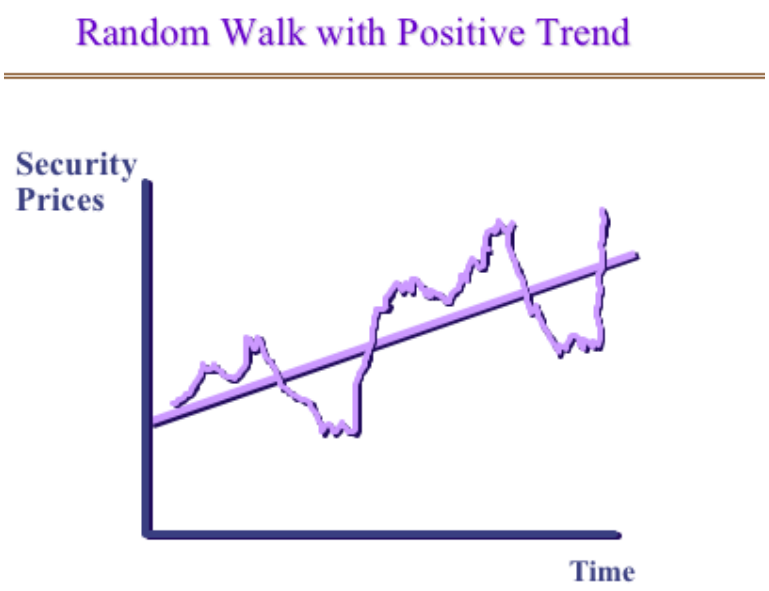
Each information set is a subset of the previous set, i.e., publicly available information includes historic information. Each information set also corresponds to one form of efficient market hypothesis.

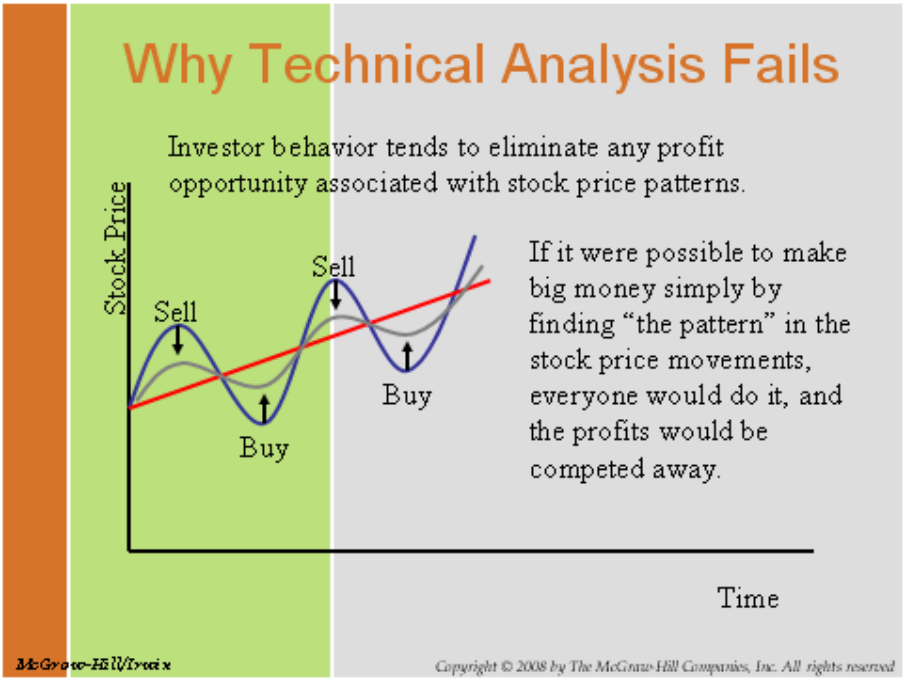


Types of EFM's

Weak Form

- Information set: the historic market trading data.
- In a weak form efficient market, security prices reflect all information found in past prices and trading volume.
  - → technical analysis cannot help investors outperform the market, i.e., earning an abnormal return that is higher than the required return.
- Security prices in a weak form efficient market can be represented as
  - → $P_t = P_{t-1} (1 + E(R_t)) + \text{Random Error}_t$
- Since security prices only respond to new information, which by definition arrives randomly, security prices follow a random walk (with a positive trend).





Semi-Strong Form

- Information set: all publicly available data, which include market-trading data, published financial statement data and annual report data.
  - → new information conveyed in a company's public announcement is fully reflected in the security prices at the announcement such that no one can consistently beat the market based on the announced information.
  - → fundamental analysis cannot help investors outperform the market.
- A semi-strong form efficient market also implies that it is weak-form efficient.

Strong Form

- Information set: all information (both public and private).
- In a strong form efficient market, anything pertinent to the company or the stock and known to at least one investor is already incorporated into the security price.
    - → no one, including insiders, can consistently earn abnormal returns.
- A strong form efficient market also implies that it is both weak and semi-strong forms efficient.

Characteristics of Efficient Markets

Stock prices should respond fully, quickly and accurately to the arrival of new information because of the intense competition among professional analysts who try to profit from their analyses of the newly arrived information.

The change in stock prices from one transaction to the next should be random in nature such that stock returns are serially uncorrelated because new information arrives in an unpredictable manner.

It should be impossible to develop investment strategies that generate abnormal profits, based on publicly available information because stock prices already reflect current information.

It should be unable to find persistent significant differences between average performance of knowledgeable investors and naive investors.

Common Misconceptions about Efficient Markets

There is no upward trend in stock prices and hence investors cannot earn any return.

- NO; risk-averse investors still demand a positive risk premium for investing in risky securities. Securities have to deliver positive returns to attract or maintain investors' capital.

Investors should throw darts to select stock, i.e., random stock selection.

- NO; an investor must still decide how risky a portfolio he/she wants based on his/her risk preference and the level of expected return.

Daily price fluctuations are inconsistent with efficient markets.

- NO; efficient security prices should fluctuate with the random arrival of new information.

The number of active stockholders is too small to achieve efficiency.

- NO; it only takes one or a few investors to keep the market efficient.

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The Evidence and Challenges (Ref: Sections 14.4 – 14.7)

The record on the EMH is extensive, and, in general, supports the efficiency of markets. These studies compare observed stock returns against returns predicted by the EMH, controlling for systematic risk. Therefore, tests of the EMH are joint tests of market efficiency and the asset-pricing model such as the CAPM used to estimate systematic risk.

Studies fall into three broad categories:

1. Are changes in stock prices random? Are there profitable "trading rules"?
2. Event studies: does the market quickly and accurately respond to new information?
3. The record of professionally managed investment firms.

A. Tests of Weak Form EMH: Are changes in stock prices random? (Slide)

Tests for serial correlation are often used to test the weak form EMH, which implies that security prices follow a random walk. Both positive serial correlation (a momentum effect) and negative serial correlation (a reversal effect) imply violation of the weak form EMH. The majority of empirical evidence is consistent with the weak form EMH.

B. Tests of Semi-Strong Form EMH: Event Studies

This form of EMH implies that prices should reflect all publicly available information. To test this, event studies examine prices and returns over time, particularly around the arrival of new information. These tests look for evidence of under reaction, overreaction, early reaction, and delayed reaction around the announcement of new information that implies violation of the semi-strong form efficiency.

In an event study analysis, security returns are adjusted to determine if they are abnormal by taking into account what the rest of the market did that day. The abnormal return (AR) on a given stock for a particular day can be calculated by subtracting the market's return on the same day (RM) from the actual return (R) on the stock for that day:

$$AR = R - RM$$

Or the abnormal return can be calculated using the market model approach:

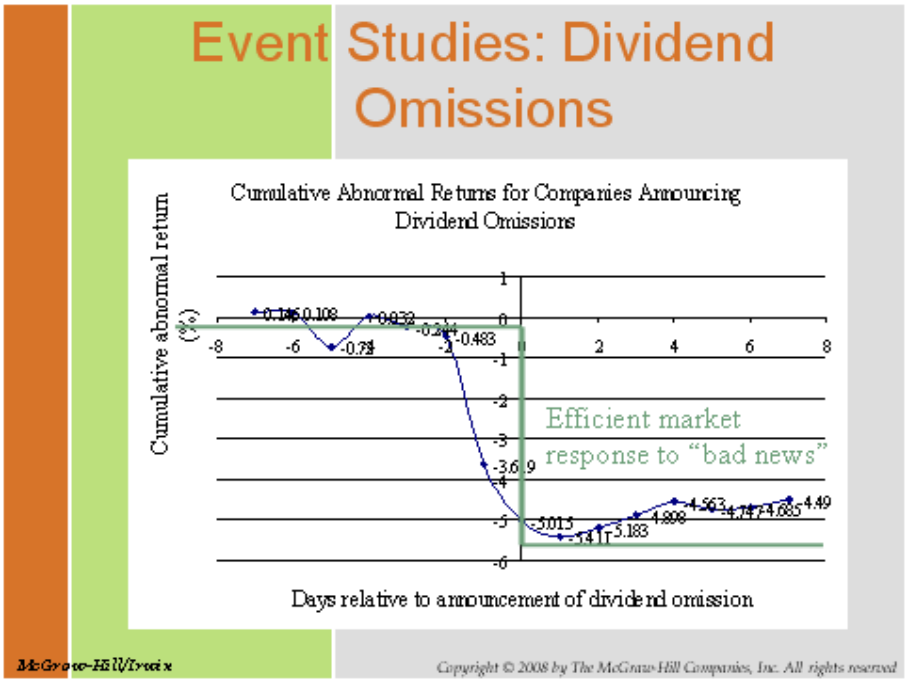
$$AR = R - (\alpha + \beta * R_M)$$

Numerous studies have applied the event study methodology to a large number of events including:

- Dividend increases and decreases
- Earnings announcements
- Mergers and acquisitions
- Capital spending
- New issues of security

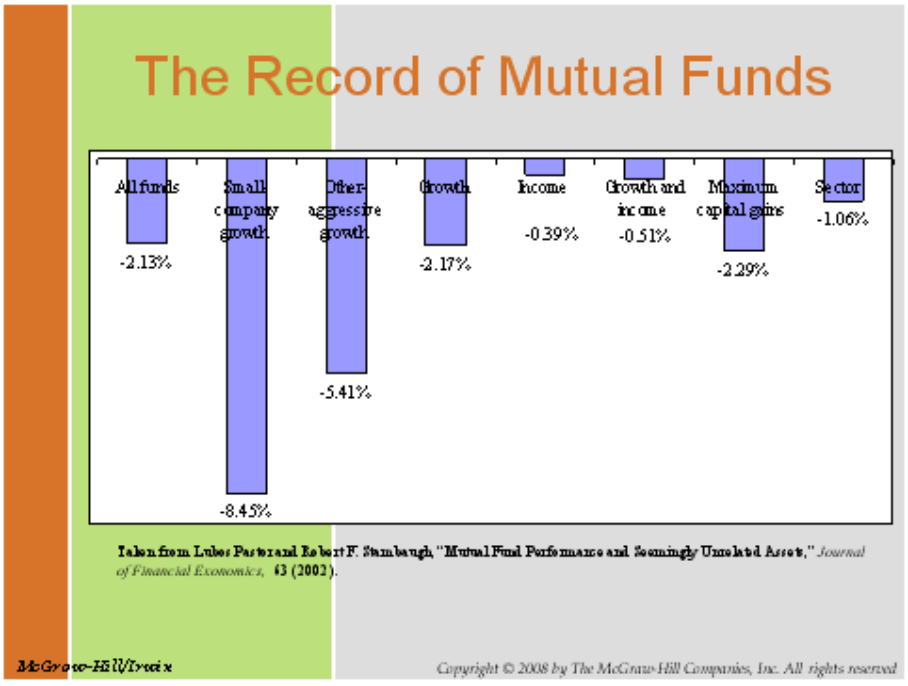
These studies generally support the view that the market is semi-strong form efficient. In fact, the studies suggest that markets may even have some foresight into the future–in other words, news tends to leak out in advance of public announcements. For instance, stocks of companies that announced dividend

omissions tended to have significant negative abnormal return on the day prior to the announcement date (t=0).



C. Tests of Semi-Strong Form EMH: The Record of Mutual Funds

Mutual fund performance studies compare the return on actively managed mutual funds to return on passive broad-based index. Since trading on insider information is illegal, most fund managers rely on public information to formulate their investment strategies. The majority of mutual fund studies find that fund managers do not outperform passive broad-based indexes, supporting the semi-strong form EMH.



D. Tests of Strong Form EMH: The Returns of Insider Trading

This form of EMH implies that prices should reflect all information, including (private) insider information. If so, even insiders cannot earn abnormal returns from trading on their privileged information. The findings of studies investigating insider trading support the view that insider trading is abnormally profitable. Thus, the evidence does not substantiate strong form efficiency.

E. Some Contrary Views and Their Evidence

Limits to Arbitrage

- The efficient market hypothesis predicts that rational investors will react quickly to arbitrage opportunities that exist in the mispricing of securities. However, there is evidence that "markets can stay irrational longer than you can stay solvent" (John Maynard Keynes). This limits the effectiveness of arbitragers in their attempts to correct the deviations from parity in security pricing.

Post-Announcement Drifts (Earnings Surprises)

- The semi-strong form of efficient market hypothesis predicts that rational investors will react accurately and instantaneously to the announcements of unanticipated events. However, empirical findings show that stock prices adjust slowly to the earnings announcements such that one can earn abnormal returns by constructing portfolios basing on the publicly available earnings information.

Small versus Large Company Stocks

- Studies have shown that small capitalization stocks earn higher returns than large capitalization stocks after adjusting for systematic risk. This finding is mainly driven by the stock returns behavior in the month of January. One controversy on this finding is whether the correct asset-pricing model was used to adjust for risk associated with small company stocks.

Temporal Anomalies

- Researchers discover several patterns in stock returns, implying that stock prices do not follow a random walk. However, these findings are not strong evidence against the EMH because investment strategies based on these patterns cannot generate abnormal profits after accounting for transaction costs.

Value versus Growth Stocks

- Some studies find that value (low PE ratio) stocks tend to generate higher abnormal returns than growth (high PE ratio) stocks. These findings are inconsistent with the semi-strong form EMH. However, other studies find that these findings are results of biases in the data. As such, the verdict on this issue remains inconclusive.

Stock Market Crash of 1987

- The market dropped 20+ percent on a Monday (10/19) following a weekend during which little surprising information was released.

Speculative Bubbles

- The recent experience of Internet or Dot-Com bubble!

F. Issues in Examining the Findings

Magnitude

- Statistically insignificant abnormal returns can still be economically significant.
    - An investment strategy that generates an abnormal return that is insignificant in statistical terms can be translated into millions of dollars for major players – institutional investors.

Selection Bias

- Winners will keep their successful investment schemes, which generate abnormal returns, to themselves, while losers do not mind letting the world know about their unsuccessful investment strategies.
    - The studies on the EMH might not have tested the real winning strategies.

Lucky Event

- One-time big shots make the news but they keep their mouths shut when they fail.
    - The proper test would be to see whether the successful investors (big shots) could repeat their performance over time.

Possible Model Misspecification

- Most empirical tests are joint tests of the EMH and the model that is used to detect abnormal returns. Thus, evidence of abnormal returns may not necessarily imply that the market is inefficient. It may have resulted from the deficiency of the model used in measuring abnormal returns.

G. The Behavioral Finance Explanations

In recent two decades, there has been a growing body of research that incorporates individuals' behaviors in explaining their financial decision making. There are two hypotheses proposed by the school of behavioral finance for explaining the above empirical anomalies:

- **Representativeness**
  Individuals tend to base their conclusion, and investment decision, on a small sample of recent observations. This likely results in overreaction in stock returns.
- **Conservatism**
  Individuals tend to adjust their beliefs too slowly to new information. This likely results in underreaction in stock returns.

Implications for Corporate Finance (Ref: Sections 14.1 & 14.8)

A. Accounting and Efficient Markets: Can financial managers "fool" investors?

Early studies find that stock prices do not react to changes in accounting methods, such as LIFO versus FIFO. These findings are consistent with the semi-strong form EMH and suggest that restating financial performance in a deceptive manner is unlikely to increase value unless it can also decrease taxes, bankruptcy costs, or agency costs. However, recent evidence suggests that investors react slowly to changes in accounting accruals.

B. The Timing Decision: Can financial managers "time" security sales?

Studies find that firms that issue new equity have negative abnormal returns in following years and firms that repurchase equity have positive abnormal returns in following years. These findings suggest that managers "time" equity sales(repurchases) correctly. Such evidence on post-announcement drifts in abnormal returns may be inconsistent with the semi-strong form EMH.

C. Price Pressure Effects: Are there any?

Empirical evidence on the price pressure effects is mix.

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Supplemental Problems

Problem 1

"According to the efficient market hypothesis, abnormal returns are expected to be zero. Therefore, no arbitrageurs can consistently earn profits." Comment.

Solution 1

Problem 2

Given the following situations, indicate whether or not the efficient market hypothesis is contradicted, and if contradicted, specify which form of efficiency is contradicted.

1. An investor can consistently earn an abnormal return over that expected by the market by examining charts of historical price movements.
2. The daily stock price follows a process given by Pt+1 =Pt + E t+1 where E t+1 is independent and normally distributed.
3. The acquisition of the latest annual report of a company enables an investor to earn an abnormal return.
4. A stock, which has been fluctuating between $25 and $27 in the last three months suddenly, rises to $40 per share right after management announces a new project that has a promising impact on the firm's expected future cash inflows.
5. By subscribing to the Value Line Investment Survey, an investor can earn at least 5% over that earned by the market on comparable risk investments.

Solution 2

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