

## Event Studies in Finance

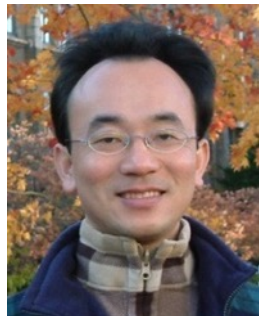
1121AIFQA04

MBA, IM, NTPU (M5276) (Fall 2023)

Tue 2, 3, 4 (9:10-12:00) (B3F17)



<https://meet.google.com/paj-zhhj-mya>



Min-Yuh Day, Ph.D,  
Associate Professor

Institute of Information Management, National Taipei University

<https://web.ntpu.edu.tw/~myday>



# Syllabus

| Week | Date       | Subject/Topics  |
|------|------------|---|
| 1    | 2023/09/12 | Introduction to Artificial Intelligence in Finance and Quantitative Analysis              |
| 2    | 2023/09/19 | AI in FinTech: Metaverse, Web3, DeFi, NFT, Financial Services Innovation and Applications |
| 3    | 2023/09/26 | Investing Psychology and Behavioral Finance   |
| 4    | 2023/10/03 | Event Studies in Finance  |
| 5    | 2023/10/10 | National Day (Day off)  |
| 6    | 2023/10/17 | Case Study on AI in Finance and Quantitative Analysis I                                   |

# Syllabus

| Week | Date       | Subject/Topics  |
|------|------------|---|
| 7    | 2023/10/24 | Finance Theory and Data-Driven Finance                        |
| 8    | 2023/10/31 | Midterm Project Report  |
| 9    | 2023/11/07 | Financial Econometrics  |
| 10   | 2023/11/14 | AI-First Finance  |
| 11   | 2023/11/21 | Industry Practices of AI in Finance and Quantitative Analysis |
| 12   | 2023/11/28 | Case Study on AI in Finance and Quantitative Analysis II      |

# Syllabus

| <b>Week</b> | <b>Date</b>       | <b>Subject/Topics</b>  |
|-------------|-------------------|--|
| <b>13</b>   | <b>2023/12/05</b> | <b>Deep Learning in Finance;<br/>Reinforcement Learning in Finance</b>                   |
| <b>14</b>   | <b>2023/12/12</b> | <b>Algorithmic Trading; Risk Management;<br/>Trading Bot and Event-Based Backtesting</b> |
| <b>15</b>   | <b>2023/12/19</b> | <b>Final Project Report I</b>  |
| <b>16</b>   | <b>2023/12/26</b> | <b>Final Project Report II</b>   |

# Event Studies in Finance

# Outline

- **Event Studies in Finance**
- **Event Studies for Financial Research**
- **Event Study Methodology**
- **Efficient Market Hypothesis (EMH)**
  - **Efficient Markets**
  - **Inefficient Markets**

Doron Kliger and Gregory Gurevich (2014),  
**Event Studies for Financial Research:**  
**A Comprehensive Guide,**  
Palgrave Macmillan



# Event Studies in Finance

- **Event studies are widely used in finance research to investigate the implications of**
  - **Announcements of corporate initiatives**
    - Mergers and acquisitions, equity and debt issuance, dividends and repurchases, corporate restructuring
  - **Regulatory changes**
    - Board reform, compensation, changes in taxation, workplace safety
  - **Macroeconomic shocks on stock prices**
    - The COVID-19 pandemic, Brexit, the Paris Agreement



# Event Studies in ESG and Sustainable Finance

- Atz, U., Van Holt, T., Liu, Z. Z., & Bruno, C. C. (2023). **Does sustainability generate better financial performance? review, meta-analysis, and propositions.** Journal of Sustainable Finance & Investment, 13(1), 802-825.
- Kumar, S. (2023). **Exploratory review of esg factor attribution to the portfolio return in Fama-French factor model framework.** Academy of Marketing Studies Journal, 27, 1-20.
- Leite, B. J., & Uysal, V. B. (2023). **Does ESG matter to investors? ESG scores and the stock price response to new information.** Global Finance Journal, 100851.
- Li, Z., Feng, L., Pan, Z., & Sohail, H. M. (2022). **ESG performance and stock prices: evidence from the COVID-19 outbreak in China.** Humanities and Social Sciences Communications, 9(1), 1-10.
- Wang, J., Hu, X., & Zhong, A. (2023). **Stock market reaction to mandatory ESG disclosure.** Finance Research Letters, 53, 103402.

# Firm-level Event Studies

- **M&As**
- **Restructuring**
- **Equity issuance**
- **Dividends**
- **Analyst forecasts and recommendations**
- **Earnings**

# Single- and Cross-county Event Studies

published in the four major finance and IB journals

| Event/sample                          | Single-country sample |     |     |      |       | Cross-country sample |     |     |      |       | Cross country (%) |
|---------------------------------------|-----------------------|-----|-----|------|-------|----------------------|-----|-----|------|-------|-------------------|
|                                       | JF                    | JFE | RFS | JIBS | Total | JF                   | JFE | RFS | JIBS | Total |                   |
| <b><i>Firm-level events</i></b>       |                       |     |     |      |       |                      |     |     |      |       |                   |
| <i>Firm-level events</i>              |                       |     |     |      |       |                      |     |     |      |       |                   |
| M&As                                  | 35                    | 50  | 13  | 0    | 98    | 0                    | 1   | 3   | 15   | 19    | 16.24             |
| Restructuring                         | 16                    | 18  | 3   | 0    | 37    | 0                    | 0   | 0   | 2    | 2     | 5.13              |
| Equity issuance                       | 15                    | 15  | 6   | 0    | 36    | 0                    | 1   | 0   | 0    | 1     | 2.70              |
| Dividends                             | 9                     | 11  | 3   | 0    | 23    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Analyst forecasts and recommendations | 9                     | 6   | 3   | 0    | 18    | 0                    | 0   | 2   | 0    | 2     | 10.00             |
| Earnings                              | 9                     | 5   | 4   | 0    | 18    | 0                    | 0   | 1   | 1    | 2     | 10.00             |
| Board structure changes               | 7                     | 9   | 3   | 0    | 19    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Debt issuance                         | 4                     | 9   | 3   | 0    | 16    | 0                    | 1   | 0   | 0    | 1     | 5.88              |
| Investor activism and voting          | 2                     | 10  | 5   | 0    | 17    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Listing/delisting                     | 10                    | 0   | 0   | 0    | 10    | 2                    | 3   | 1   | 1    | 7     | 41.18             |
| Share repurchases                     | 5                     | 9   | 1   | 0    | 15    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| News                                  | 3                     | 7   | 5   | 0    | 15    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Managerial turnover                   | 4                     | 7   | 2   | 0    | 13    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Bankruptcy and liquidation            | 6                     | 3   | 2   | 0    | 11    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Managerial compensation               | 4                     | 6   | 1   | 0    | 11    | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Credit ratings                        | 5                     | 3   | 1   | 0    | 9     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Right offerings                       | 2                     | 6   | 0   | 0    | 8     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Bank loan                             | 3                     | 3   | 1   | 0    | 7     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| IPOs, IPO lockups, and quiet period   | 2                     | 2   | 3   | 0    | 7     | 0                    | 0   | 0   | 0    | 0     | 0.00              |

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published in the four major finance and IB journals

| Event/sample                         | Single-country sample |     |     |      |       | Cross-country sample |     |     |      |       | Cross country (%) |
|--------------------------------------|-----------------------|-----|-----|------|-------|----------------------|-----|-----|------|-------|-------------------|
|                                      | JF                    | JFE | RFS | JIBS | Total | JF                   | JFE | RFS | JIBS | Total |                   |
| <b><i>Country-level events</i></b>   |                       |     |     |      |       |                      |     |     |      |       |                   |
| <i>Country-level events</i>          |                       |     |     |      |       |                      |     |     |      |       |                   |
| Governance reform/legislative change | 8                     | 15  | 6   | 0    | 29    | 2                    | 1   | 0   | 0    | 3     | 9.38              |
| Elections/Political risk events      | 0                     | 8   | 5   | 0    | 13    | 1                    | 0   | 1   | 2    | 4     | 23.53             |
| Monetary policy                      | 5                     | 4   | 1   | 0    | 10    | 0                    | 0   | 2   | 0    | 2     | 16.67             |
| Market trading mechanism changes     | 3                     | 6   | 1   | 0    | 10    | 1                    | 0   | 0   | 0    | 1     | 9.09              |
| Government intervention              | 2                     | 0   | 1   | 0    | 3     | 3                    | 0   | 1   | 0    | 4     | 57.14             |
| Macroeconomic and gov. announcement  | 0                     | 4   | 2   | 0    | 6     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| News                                 | 0                     | 1   | 0   | 0    | 1     | 1                    | 1   | 0   | 0    | 2     | 66.67             |
| Exchange rates and parity deviation  | 0                     | 0   | 0   | 0    | 0     | 0                    | 1   | 0   | 2    | 3     | 100.00            |
| Natural disasters                    | 0                     | 3   | 0   | 0    | 3     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Stock market liberalization          | 0                     | 0   | 0   | 0    | 0     | 2                    | 0   | 0   | 0    | 2     | 100.00            |
| Sovereign debt rating changes        | 0                     | 0   | 0   | 0    | 0     | 0                    | 2   | 0   | 0    | 2     | 100.00            |
| Tax enforcement                      | 0                     | 1   | 0   | 0    | 1     | 0                    | 0   | 0   | 1    | 1     | 50.00             |

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|--|-----------------------|-----|-----|------|-------|----------------------|-----|-----|------|-------|-------------------|
|  | JF                    | JFE | RFS | JIBS | Total | JF                   | JFE | RFS | JIBS | Total |                   |
| <b><i>Peer-level events</i></b>        |                       |     |     |      |       |                      |     |     |      |       |                   |
| <i>Peer-level events</i>               |                       |     |     |      |       |                      |     |     |      |       |                   |
| Distress in bank–borrower relationship | 3                     | 1   | 0   | 0    | 4     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Bankruptcy                             | 0                     | 3   | 0   | 0    | 3     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| M&As                                   | 0                     | 3   | 0   | 0    | 3     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Security issuance                      | 2                     | 0   | 1   | 0    | 3     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Regulatory enforcement                 | 0                     | 2   | 0   | 0    | 2     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Product market entry                   | 1                     | 1   | 0   | 0    | 2     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Earnings                               | 0                     | 0   | 2   | 0    | 2     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Proxy contests                         | 0                     | 2   | 0   | 0    | 2     | 0                    | 0   | 0   | 0    | 0     | 0.00              |
| Others                                 | 0                     | 14  | 3   | 0    | 17    | 0                    | 0   | 0   | 0    | 0     | 0.00              |

# **Event Studies for Financial Research**

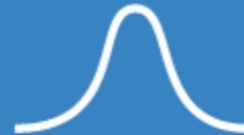
state-of-the-art  
**event study software**

event studies



**Short- and  
Long-Term  
Event Studies**

Cumulative Abnormal Returns  
Buy-and-hod Abnormal Returns  
Fama-French Calander Time  
Portfolios



**Parametric and  
Non-Parametric  
Tests**

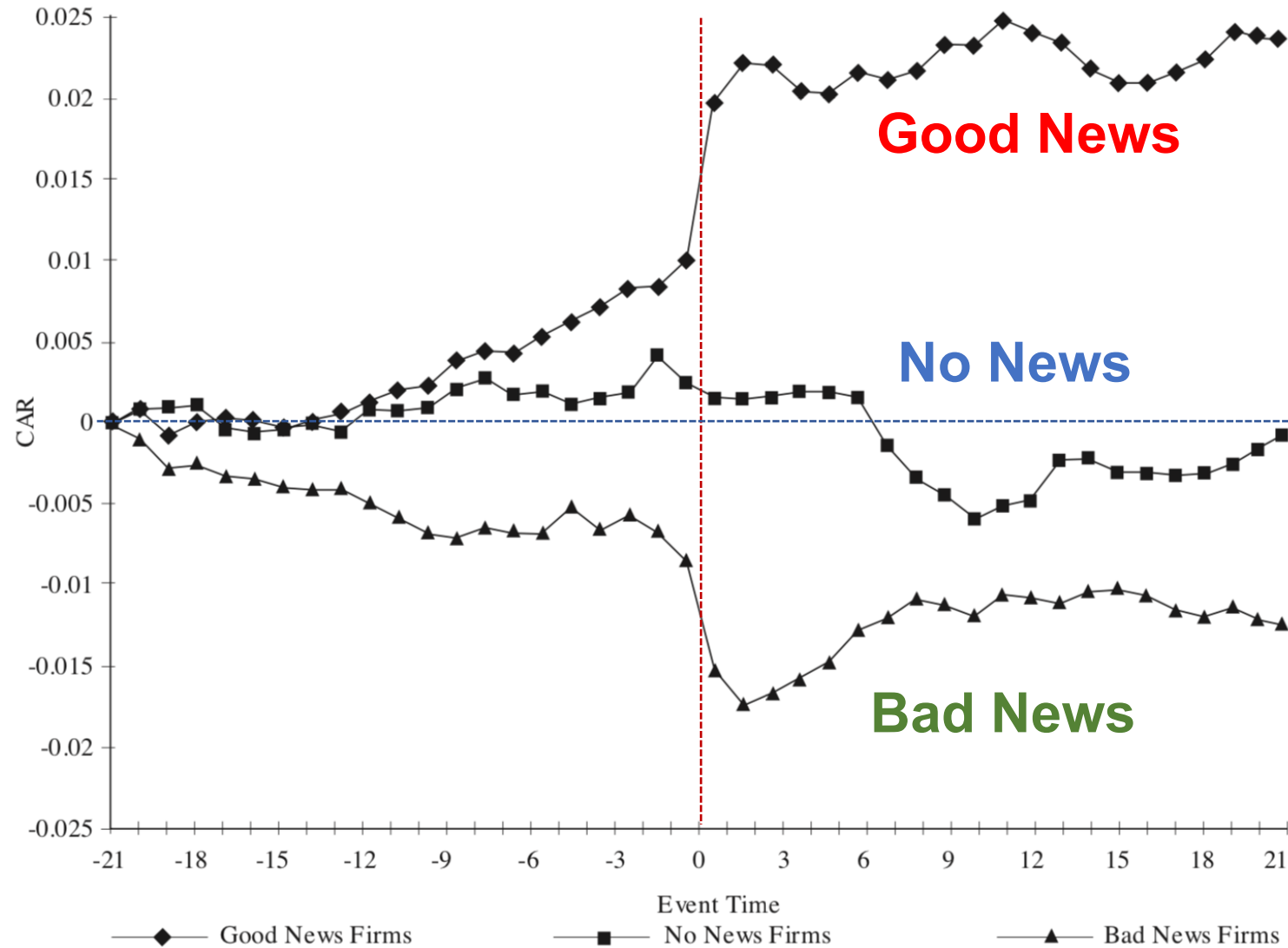
Time-Series t-Test  
Cross-Sectional t-Test  
Standardized Residual Test  
Standardized Cross-Sectional Test  
Corrado Rank Test  
Generalized Sign Test  
Skewness-Adjusted t-Test



**Return Models**

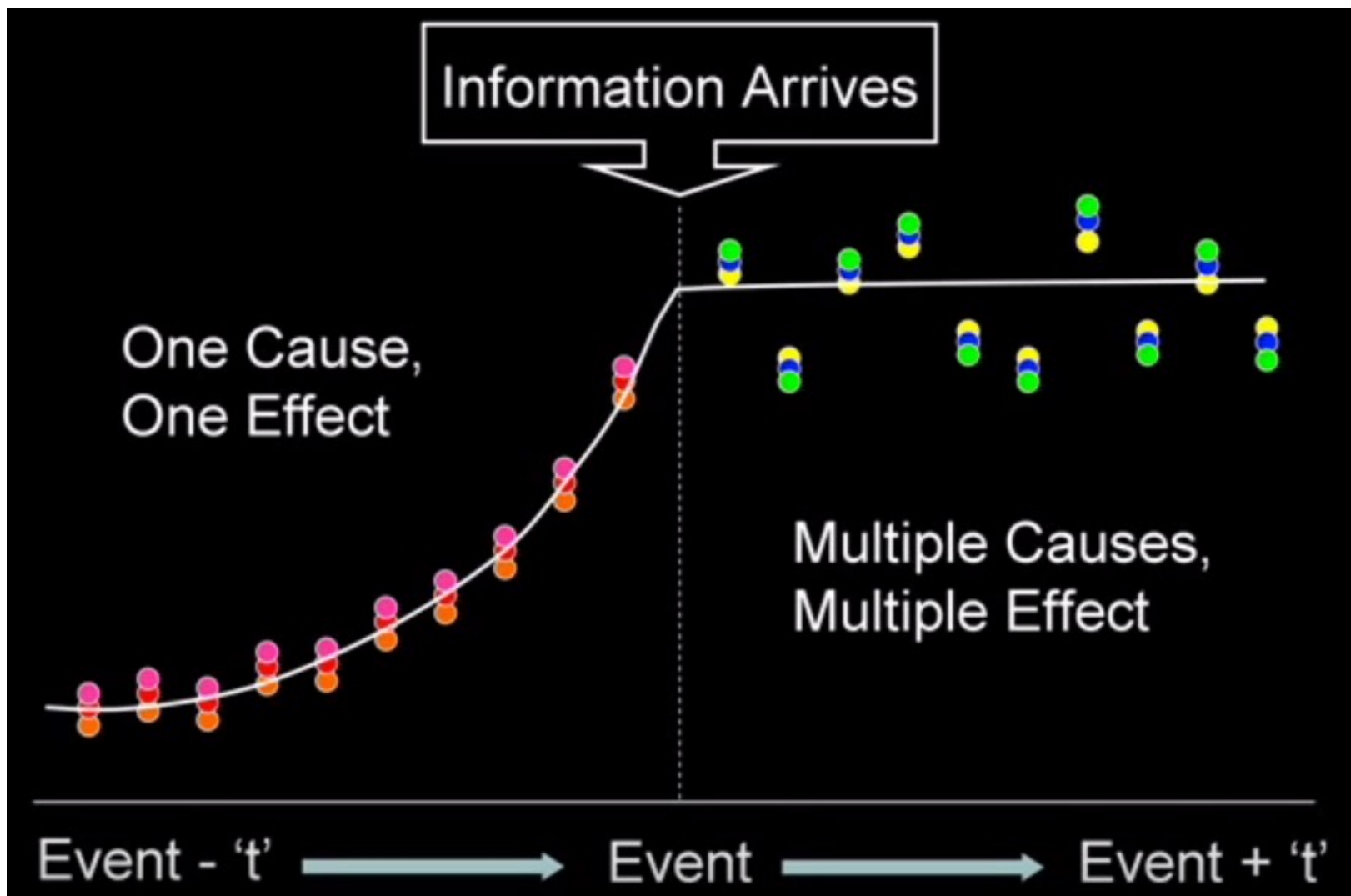
Constant-Mean  
Market Adjusted  
Market Model  
Factor Model  
Matching Models  
Stocks and Bonds

# Event Studies in Economics and Finance



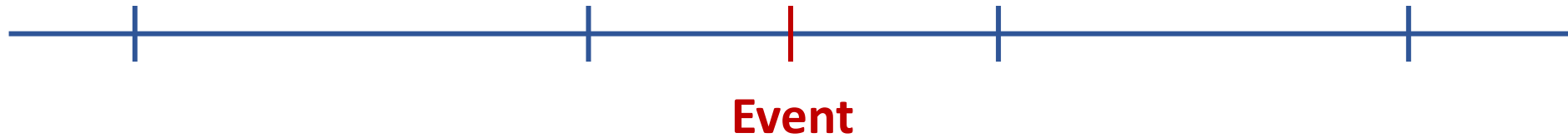


# Event Study

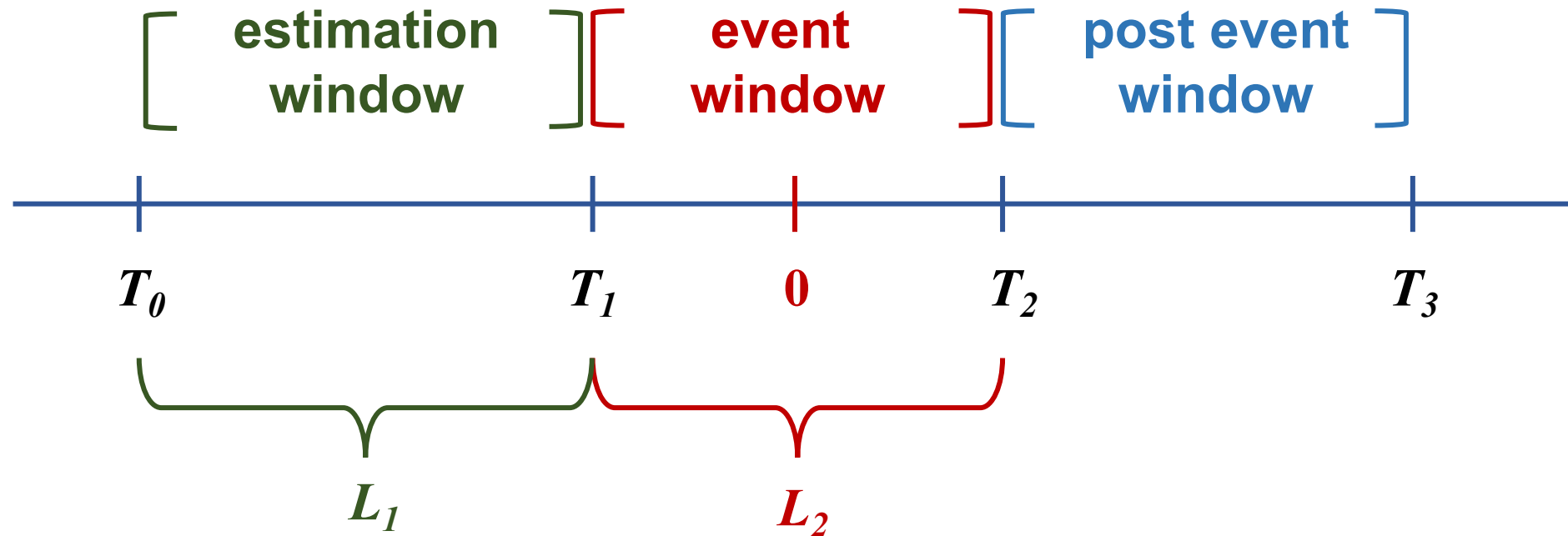


# Event Study

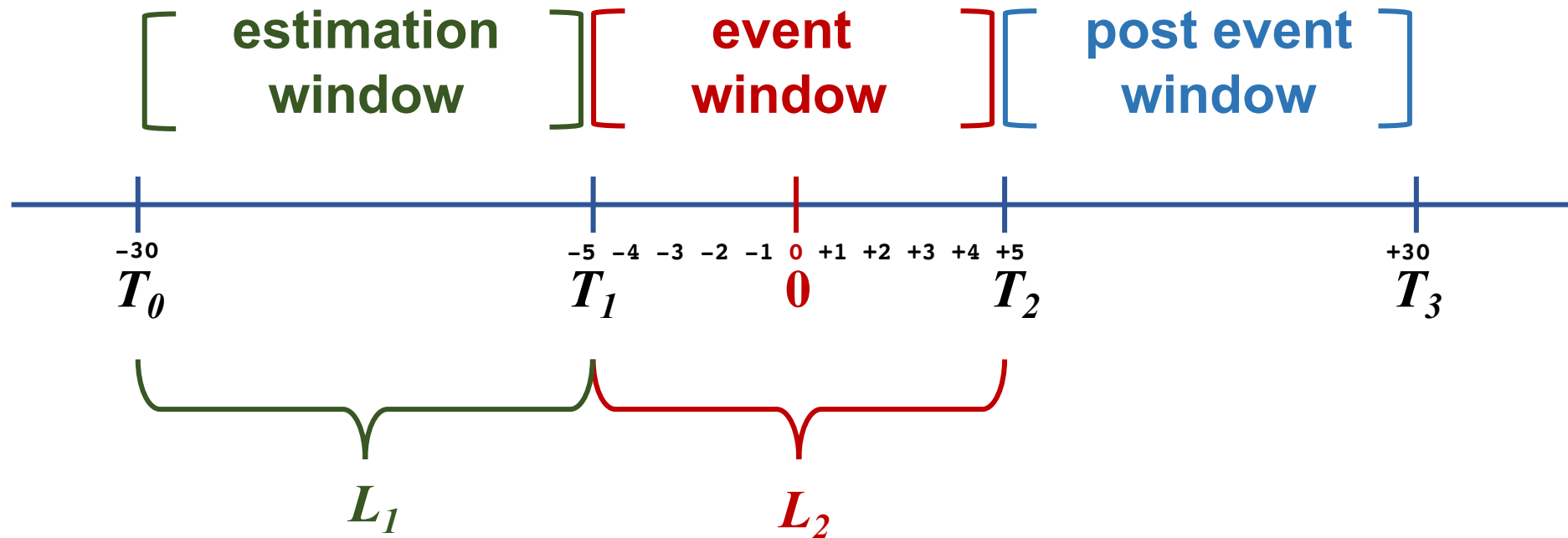
## Time line for an event study



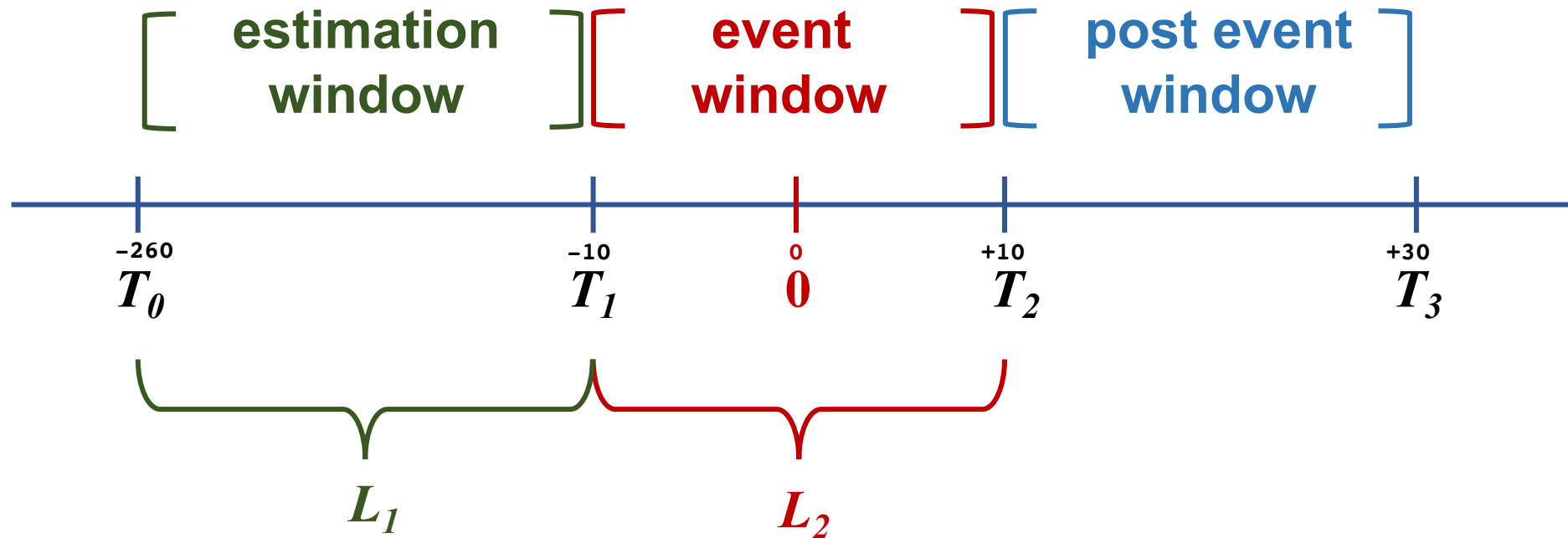
# Event Study Methodology



# Event Study Methodology



# Event Study Methodology



# Efficient Markets

# Behavioral Economics

# Behavioral Finance



**Rational Behavior**

**Irrational Behavior**

**Emotion**

**Sentiment**

# Modern Financial Research

- **Theoretical Finance**
  - study of **logical relationships among assets.**
- **Empirical Finance**
  - study of **data in order to infer relationships.**
- **Behavioral Finance**
  - integrates **psychology** into the **investment process.**

# Behavioral Finance Themes

- **Heuristic-Driven Bias**
- **Framing Dependence**
- **Inefficient Markets**

# Efficient Market Hypothesis (EMH)

# Efficient Market Hypothesis (EMH) (Fama, 1970)

## Efficient capital markets: A review of theory and empirical work

EF Fama - *The Journal of Finance*, 1970

This paper reviews the theoretical and empirical literature on the efficient markets model. After a discussion of the theory, empirical work concerned with the adjustment of security prices to three relevant information subsets is considered. First, weak form tests, in which the information set is just historical prices, are discussed. Then semi-strong form tests, in which the concern is whether prices efficiently adjust to other information that is obviously ...

[Cited by 37957](#) [Related articles](#) [All 25 versions](#)

Malkiel, B. G., & Fama, E. F. (1970).

Efficient capital markets: A review of theory and empirical work.

*The Journal of Finance*, 25(2), 383-417.

# Efficient Market Hypothesis (EMH) (Fama, 1970)

SESSION TOPIC: STOCK MARKET PRICE BEHAVIOR

SESSION CHAIRMAN: BURTON G. MALKIEL

EFFICIENT CAPITAL MARKETS: A REVIEW OF  
THEORY AND EMPIRICAL WORK\*

EUGENE F. FAMA\*\*

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## I. INTRODUCTION

THE PRIMARY ROLE of the capital market is allocation of ownership of the economy's capital stock. In general terms, the ideal is a market in which prices provide accurate signals for resource allocation: that is, a market in which firms can make production-investment decisions, and investors can choose among the securities that represent ownership of firms' activities under the assumption that security prices at any time "fully reflect" all available information. A market in which prices always "fully reflect" available information is called "efficient."

This paper reviews the theoretical and empirical literature on the efficient markets model. After a discussion of the theory, empirical work concerned with the adjustment of security prices to three relevant information subsets is considered. First, *weak form* tests, in which the information set is just historical prices, are discussed. Then *semi-strong form* tests, in which the concern is whether prices efficiently adjust to other information that is obviously publicly available (e.g., announcements of annual earnings, stock splits, etc.) are considered. Finally, *strong form* tests concerned with whether given investors or groups have monopolistic access to any information relevant for price formation are reviewed.<sup>1</sup> We shall conclude that, with but a few exceptions, the efficient markets model stands up well.

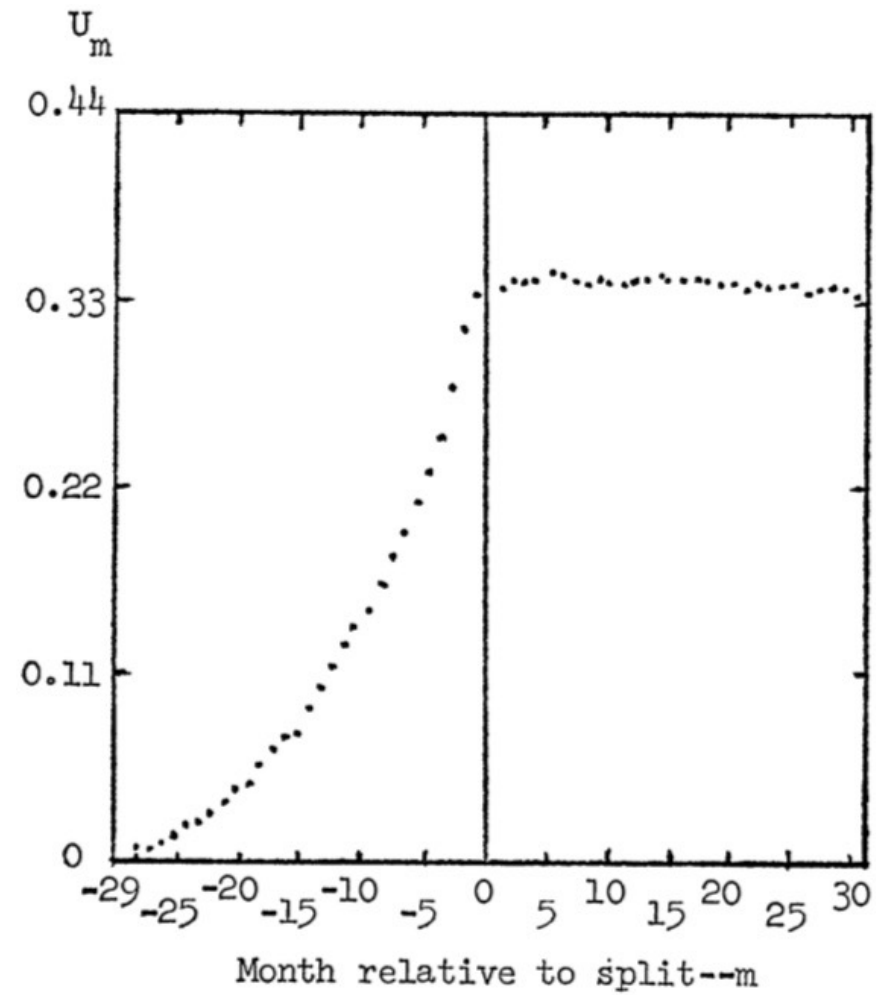


TABLE 1 (from [10])  
 First-order Serial Correlation Coefficients for One-, Four-, Nine-, and Sixteen-Day  
 Changes in  $\text{Log}_e$  Price

| Stock                   | Differencing Interval (Days) |        |        |         |
|-------------------------|------------------------------|--------|--------|---------|
|                         | One                          | Four   | Nine   | Sixteen |
| Allied Chemical         | .017                         | .029   | -.091  | -.118   |
| Alcoa                   | .118*                        | .095   | -.112  | -.044   |
| American Can            | -.087*                       | -.124* | -.060  | .031    |
| A. T. & T.              | -.039                        | -.010  | -.009  | -.003   |
| American Tobacco        | .111*                        | -.175* | .033   | .007    |
| Anaconda                | .067*                        | -.068  | -.125  | .202    |
| Bethlehem Steel         | .013                         | -.122  | -.148  | .112    |
| Chrysler                | .012                         | .060   | -.026  | .040    |
| Du Pont                 | .013                         | .069   | -.043  | -.055   |
| Eastman Kodak           | .025                         | -.006  | -.053  | -.023   |
| General Electric        | .011                         | .020   | -.004  | .000    |
| General Foods           | .061*                        | -.005  | -.140  | -.098   |
| General Motors          | -.004                        | -.128* | .009   | -.028   |
| Goodyear                | -.123*                       | .001   | -.037  | .033    |
| International Harvester | -.017                        | -.068  | -.244* | .116    |
| International Nickel    | .096*                        | .038   | .124   | .041    |
| International Paper     | .046                         | .060   | -.004  | -.010   |
| Johns Manville          | .006                         | -.068  | -.002  | .002    |
| Owens Illinois          | -.021                        | -.006  | .003   | -.022   |
| Procter & Gamble        | .099*                        | -.006  | .098   | .076    |
| Sears                   | .097*                        | -.070  | -.113  | .041    |
| Standard Oil (Calif.)   | .025                         | -.143* | -.046  | .040    |
| Standard Oil (N.J.)     | .008                         | -.109  | -.082  | -.121   |
| Swift & Co.             | -.004                        | -.072  | .118   | -.197   |
| Texaco                  | .094*                        | -.053  | -.047  | -.178   |
| Union Carbide           | .107*                        | .049   | -.101  | .124    |
| United Aircraft         | .014                         | -.190* | -.192* | -.040   |
| U.S. Steel              | .040                         | -.006  | -.056  | .236*   |
| Westinghouse            | -.027                        | -.097  | -.137  | .067    |
| Woolworth               | .028                         | -.033  | -.112  | .040    |

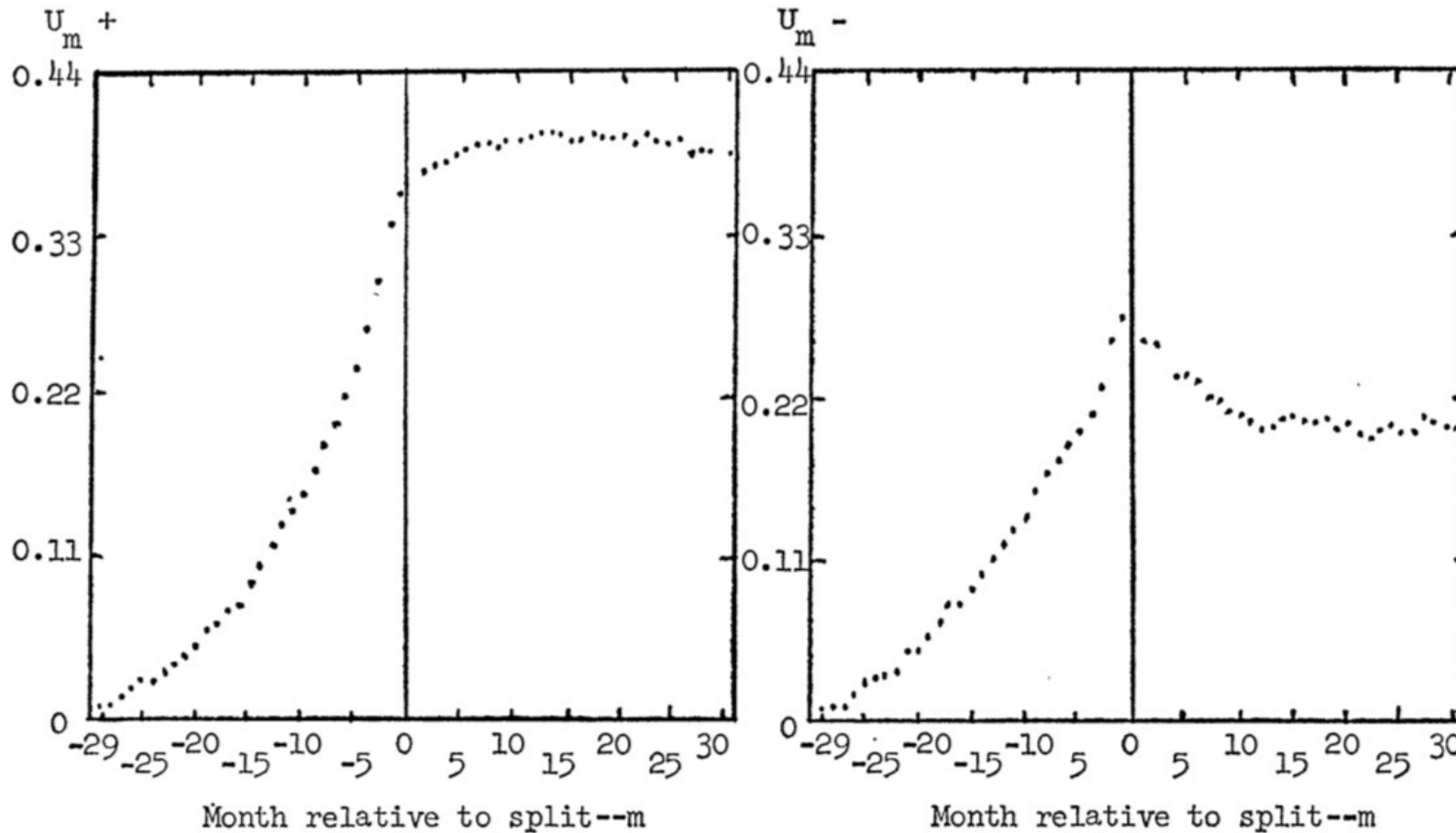
\* Coefficient is twice its computed standard error.

# Cumulative Average Residuals



**FIGURE 1a**  
Cumulative average residuals—all splits.

# Cumulative Average Residuals



**FIGURE 1b**  
Cumulative average residuals for dividend  
"increases."

**FIGURE 1c**  
Cumulative average residuals for dividend  
"decreases."

# Market Efficiency

The empirical work itself can be divided into three categories depending on the nature of the information subset of interest. *Strong-form* tests are concerned with whether individual investors or groups have monopolistic access to any information relevant for price formation. One would not expect such an extreme model to be an exact description of the world, and it is probably best viewed as a benchmark against which the importance of deviations from market efficiency can be judged. In the less restrictive *semi-strong-form* tests the information subset of interest includes all obviously publicly available information, while in the *weak form* tests the information subset is just historical price or return sequences.

# Types of Efficiency Market

- **Weak Form**

- Security prices reflect all information found in **past prices** and **volume**.

- **Semi-Strong Form**

- Security prices reflect all **publicly available information**.

- **Strong Form**

- Security prices reflect **all information—public and private**.

# Can Financing Decisions Create Value?

# What Sort of Financing Decisions?

- **Typical financing decisions include:**
  - **How much debt and equity to sell**
  - **When (or if) to pay dividends**
  - **When to sell debt and equity**
- **Just as we can use NPV criteria to evaluate investment decisions, we can use NPV to evaluate financing decisions.**

# How to Create Value through Financing

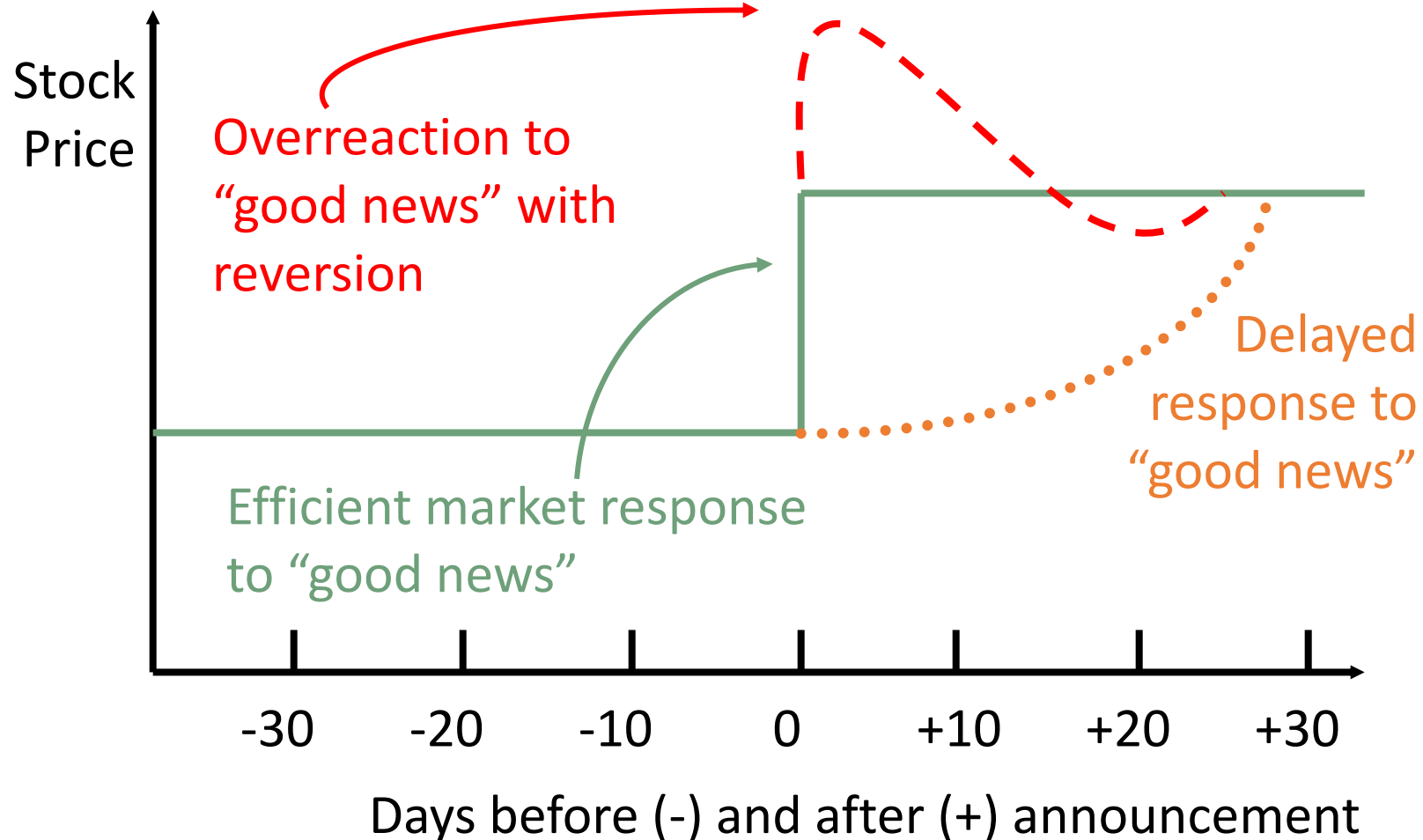
- **Fool Investors**
  - Empirical evidence suggests that it is hard to fool investors consistently.
- **Reduce Costs or Increase Subsidies**
  - Certain forms of financing have tax advantages or carry other subsidies.
- **Create a New Security**
  - Sometimes a firm can find a previously-unsatisfied clientele and issue new securities at favorable prices.
  - In the long-run, this value creation is relatively small, however.



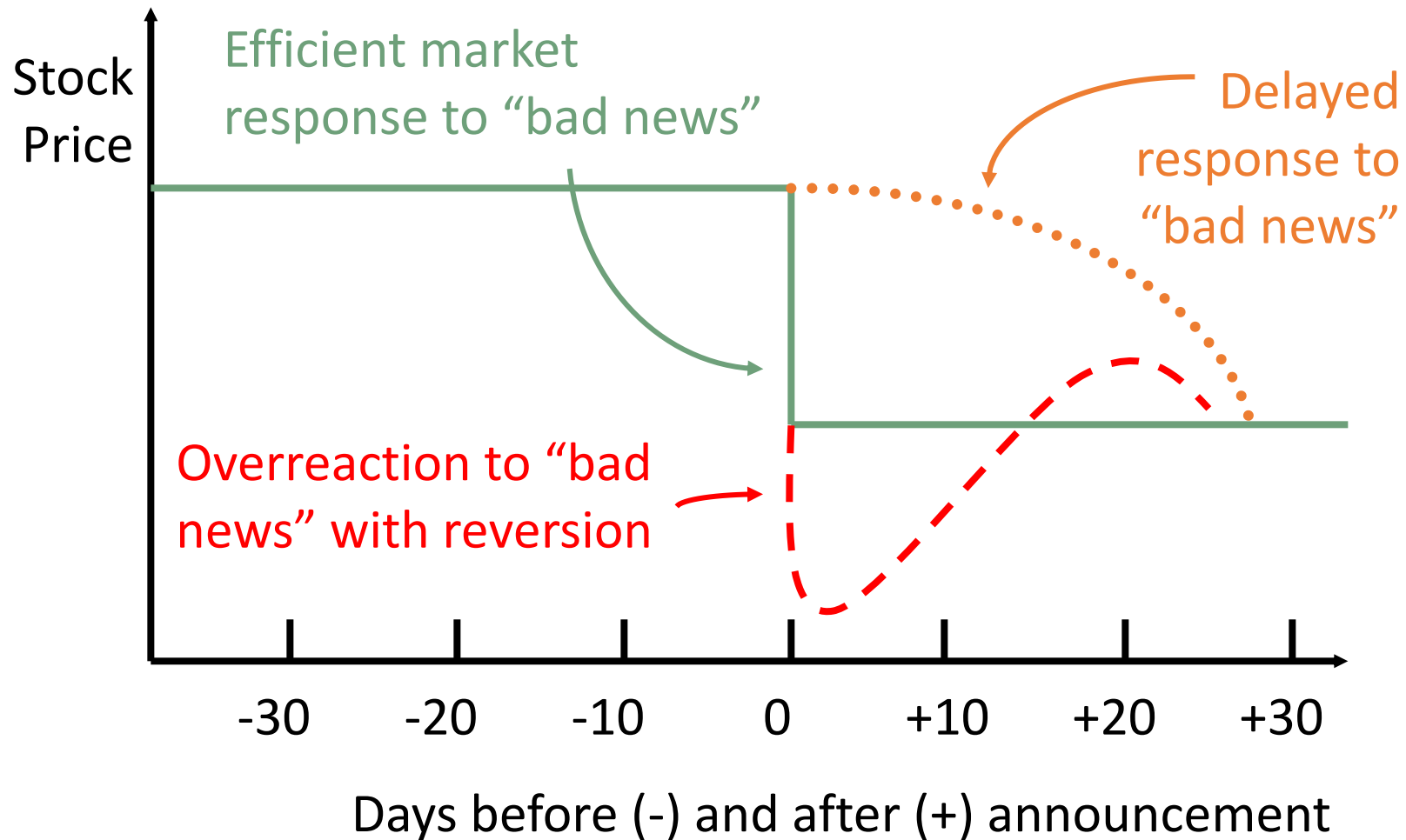
# Efficient Capital Markets

- **An efficient capital market is one in which stock prices fully reflect available information.**
- **The EMH has implications for investors and firms.**
  - **Since information is reflected in security prices quickly, knowing information when it is released does an investor no good.**
  - **Firms should expect to receive the fair value for securities that they sell. Firms cannot profit from fooling investors in an efficient market.**

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

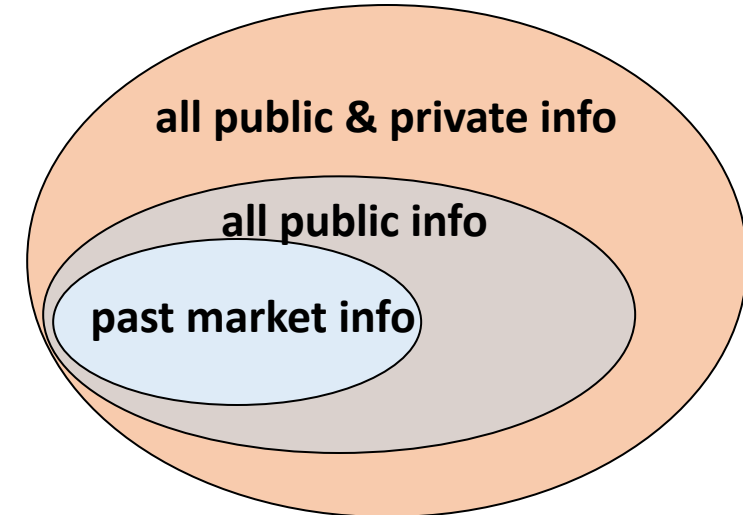


# Reaction of Stock Price to New Information in Efficient and Inefficient Markets

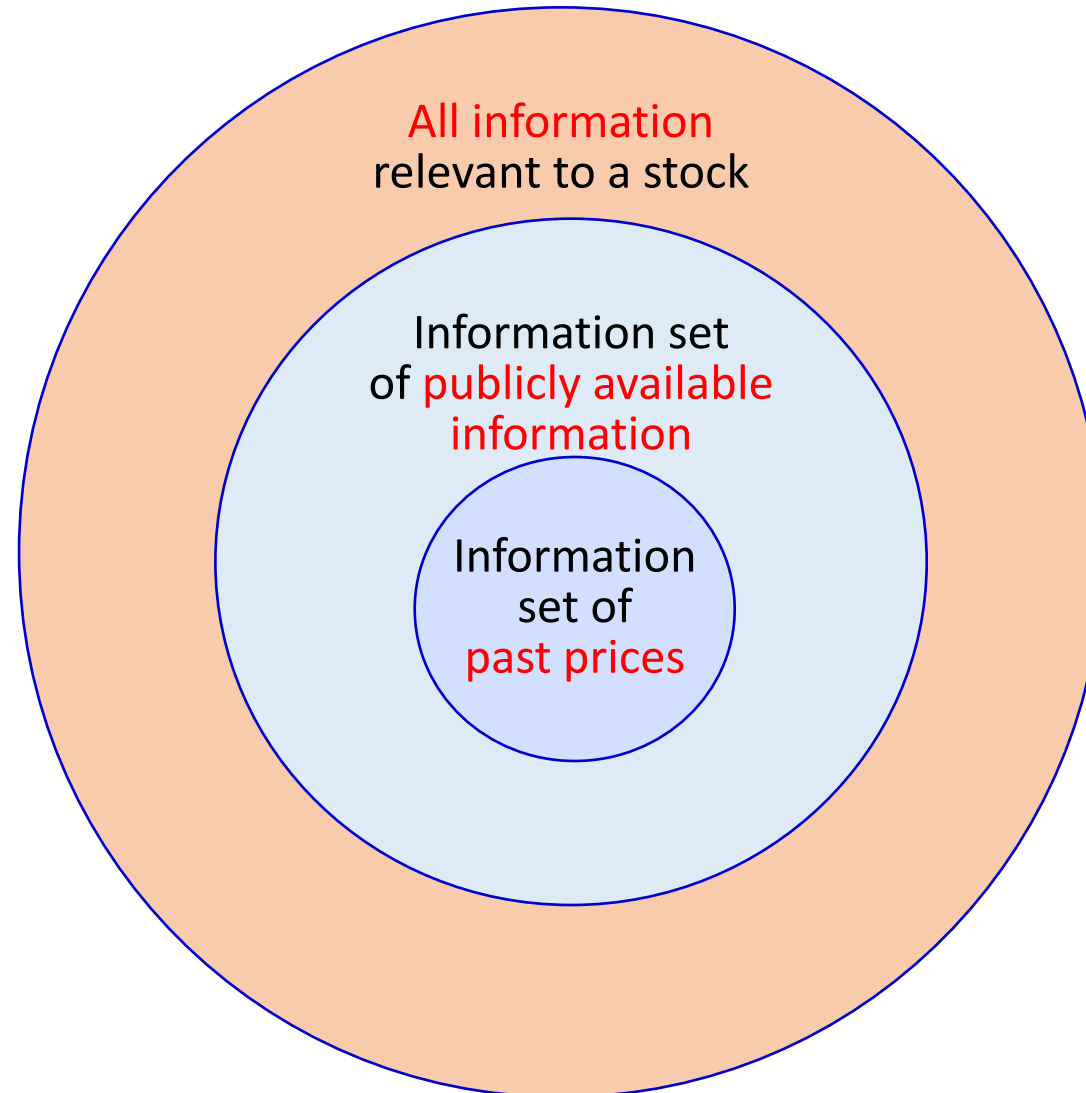


# Versions of EMH/Info-Efficiency

- **Weak-form** efficiency:
  - Prices reflect all information contained in **past prices**
- **Semi-strong-form** efficiency:
  - Prices reflect all **publicly** available information
- **Strong-form** efficiency:
  - Prices reflect **all relevant information**, include **private (insider)** information



# Relationship among Three Different Information Sets

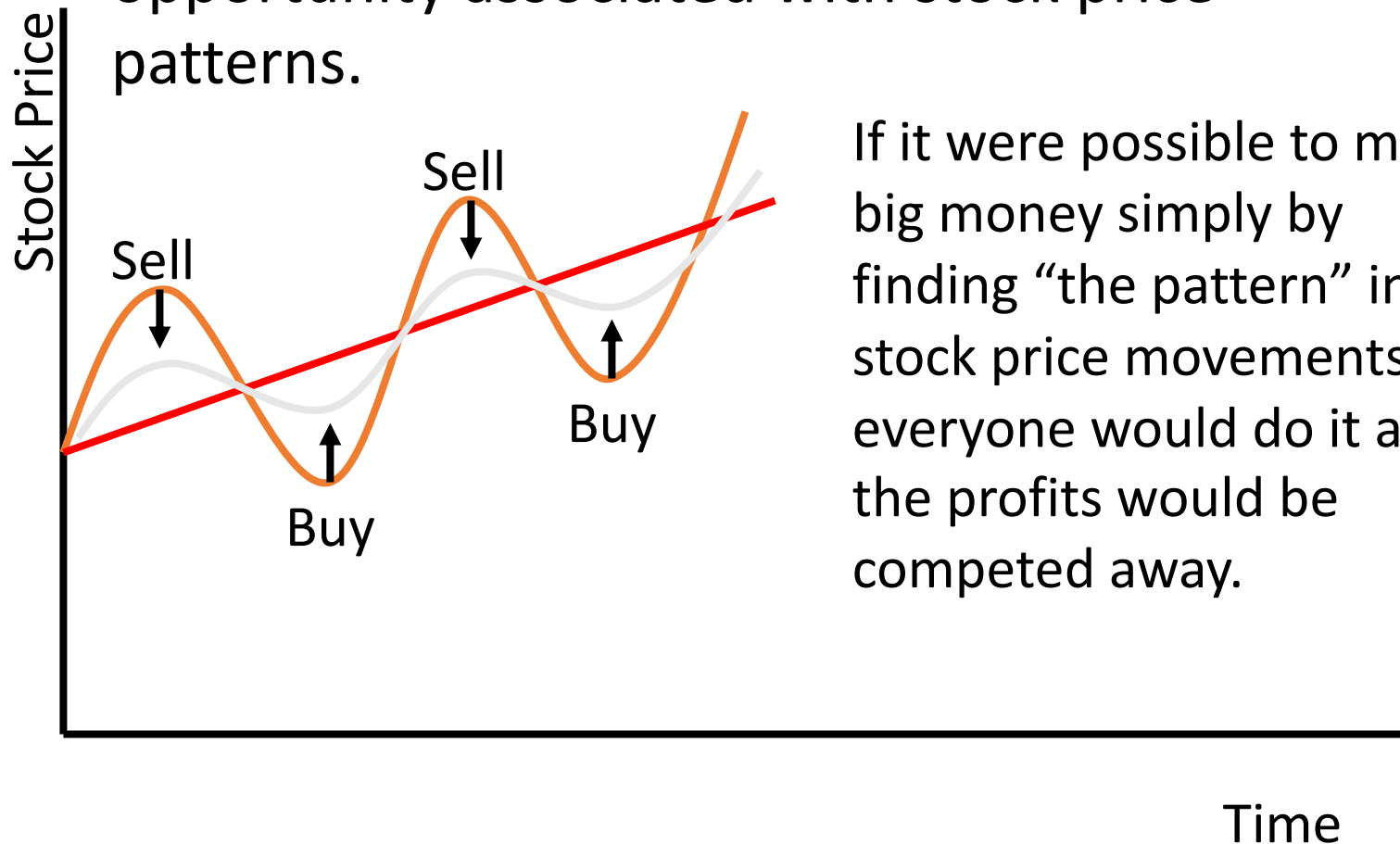


# Efficient Market

- An efficient market incorporates information in security prices.
- There are three forms of the EMH:
  - **Weak-Form EMH**  
Security prices reflect past price data.
  - **Semistrong-Form EMH**  
Security prices reflect publicly available information.
  - **Strong-Form EMH**  
Security prices reflect all information.
- There is abundant evidence for the first two forms of the EMH.

# Why Technical Analysis Fails

Investor behavior tends to eliminate any profit opportunity associated with stock price patterns.



If it were possible to make big money simply by finding “the pattern” in the stock price movements, everyone would do it and the profits would be competed away.

# Evidence on Market Efficiency

- **Return Predictability Studies**
- **Event Studies**
- **Performance Studies**



# Event Studies

- **Objective**
  - Examine if **new** (company specific) **information** is incorporated into the **stock price** in one single price jump upon **public release?**

# Event Studies Methodology

1. Define as day “zero” the day the information is released
2. Calculate the daily returns  $R_{it}$  the 30 days around day “zero”:  
 $t = -30, -29, \dots, -1, 0, 1, \dots, 29, 30$
3. Calculate the daily returns  $R_{mt}$  for the same days on the market  
(or a comparison group of firms of similar industry and risk)
4. Define **Abnormal Returns (AR)** as the difference  $AR_{it} = R_{it} - R_{mt}$
5. Calculate **Average Abnormal Returns (AAR)** over all N events in  
the sample for all 60 reference days

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it}$$

6. Cumulate the returns on the first T days to **CAAR**  $CAAR_T = \sum_{t=-30}^T AAR_t$

# Event Studies Methodology

## Step 1.

**Define as day “zero” the day the information is released**

# Event Studies Methodology

## Step 2.

Calculate the daily returns  $R_{it}$   
the 30 days around day “zero”:  
 $t = -30, -29, \dots, -1, 0, 1, \dots, 29, 30$

# Event Studies Methodology

## Step 3.

**Calculate the daily returns**  
 **$R_{mt}$  for the same days on the market**  
**(or a comparison group of firms of**  
**similar industry and risk)**

# Event Studies Methodology

**Step 4.**

**Define**

**Abnormal Returns (AR)**

**as the difference**

$$AR_{it} = R_{it} - R_{mt}$$

# Event Studies Methodology

**Step 5.**

**Calculate**

**Average Abnormal Returns (AAR)**

**over all N events in the sample for  
all 60 reference days**

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it}$$

# Event Studies Methodology

## Step 6.

Cumulate the returns on the  
first T days to

**Cumulative Average Abnormal  
Returns (CAAR)**

$$CAAR_T = \sum_{t=-30}^T AAR_t$$



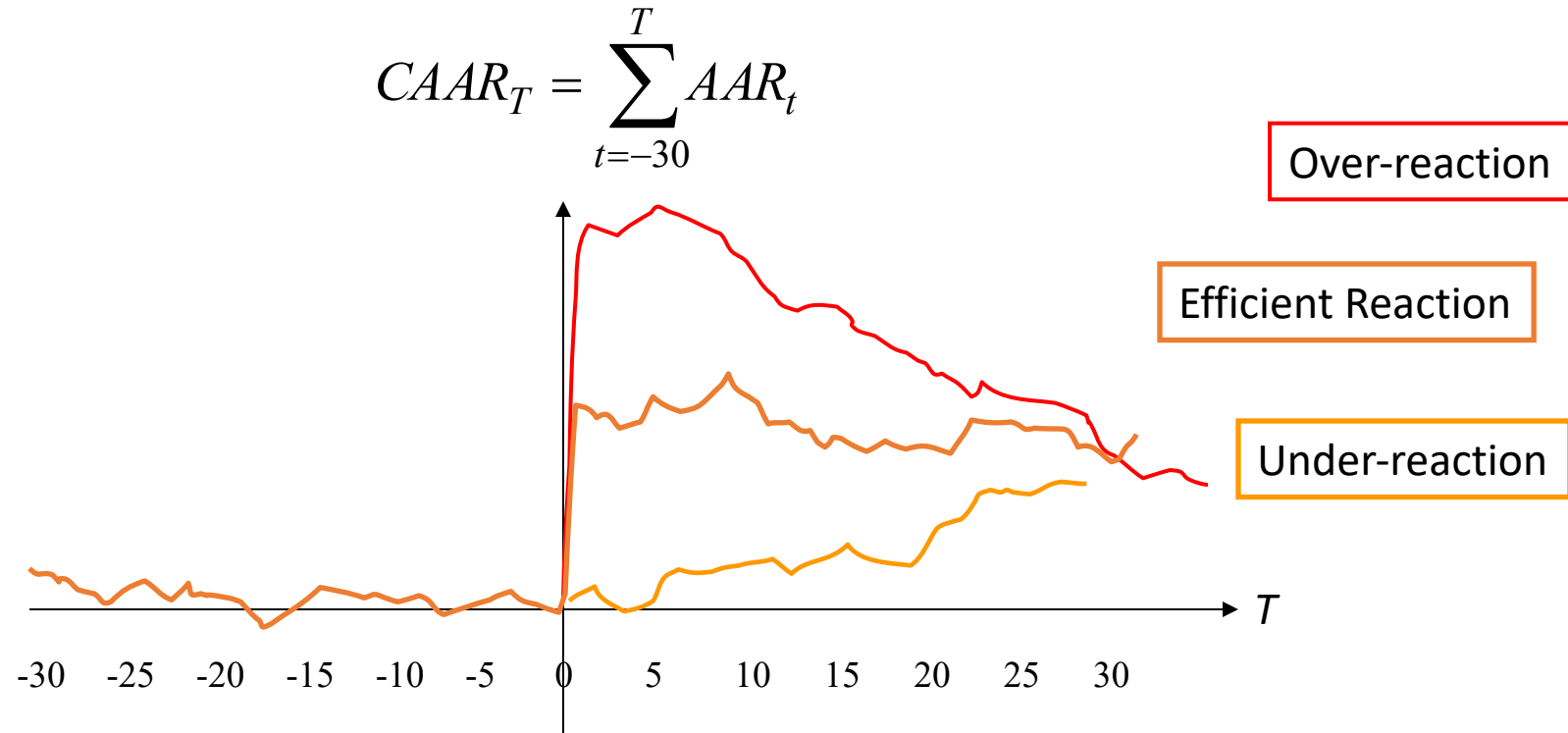
# Event Studies Methodology

1. Define as day “zero” the day the information is released
2. Calculate the daily returns  $R_{it}$  the 30 days around day “zero”:  
 $t = -30, -29, \dots, -1, 0, 1, \dots, 29, 30$
3. Calculate the daily returns  $R_{mt}$  for the same days on the market  
(or a comparison group of firms of similar industry and risk)
4. Define **Abnormal Returns (AR)** as the difference  $AR_{it} = R_{it} - R_{mt}$
5. Calculate **Average Abnormal Returns (AAR)** over all N events in  
the sample for all 60 reference days

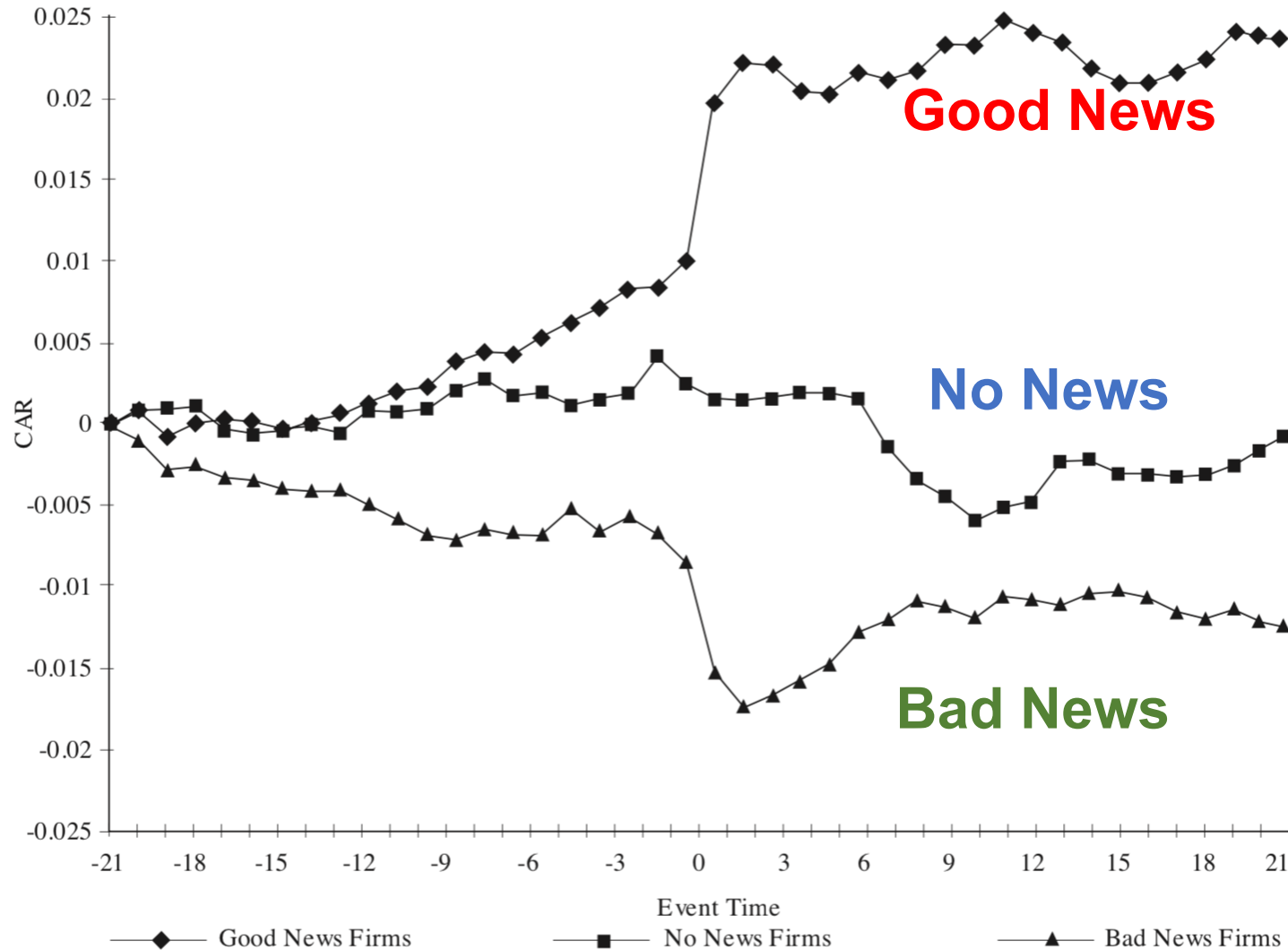
$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it}$$

6. Cumulate the returns on the first T days to **CAAR**  $CAAR_T = \sum_{t=-30}^T AAR_t$

# Market Efficiency in Event Studies



# Event Study: Earning Announcement



Cumulative abnormal returns  
around earning announcements  
(MacKinlay 1997)

# Event Study: Stock Splits

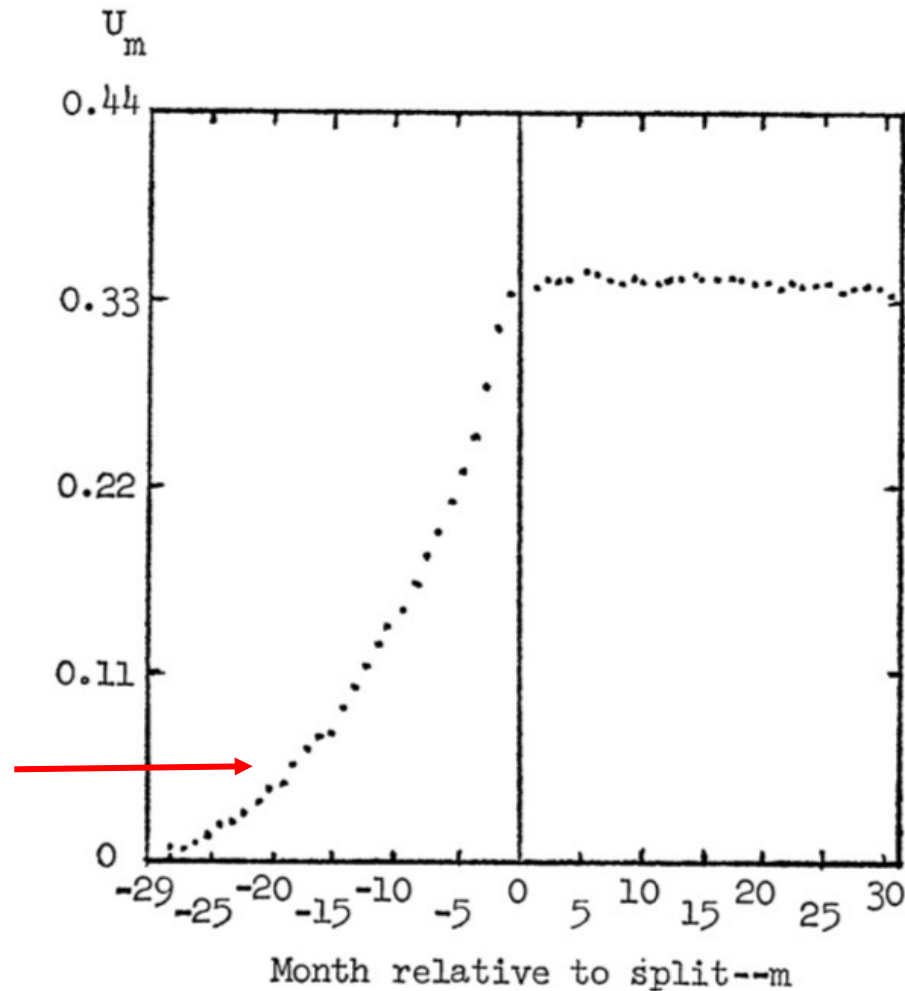


FIGURE 1a  
Cumulative average residuals—all splits.

Event Study on Stock Splits by  
Fama-French-Fischer-Jensen-Roll  
(1969)

Split is a signal of good profit

Pre-announcement drift can be due  
to selection bias (only good firms  
split) or insider trading.

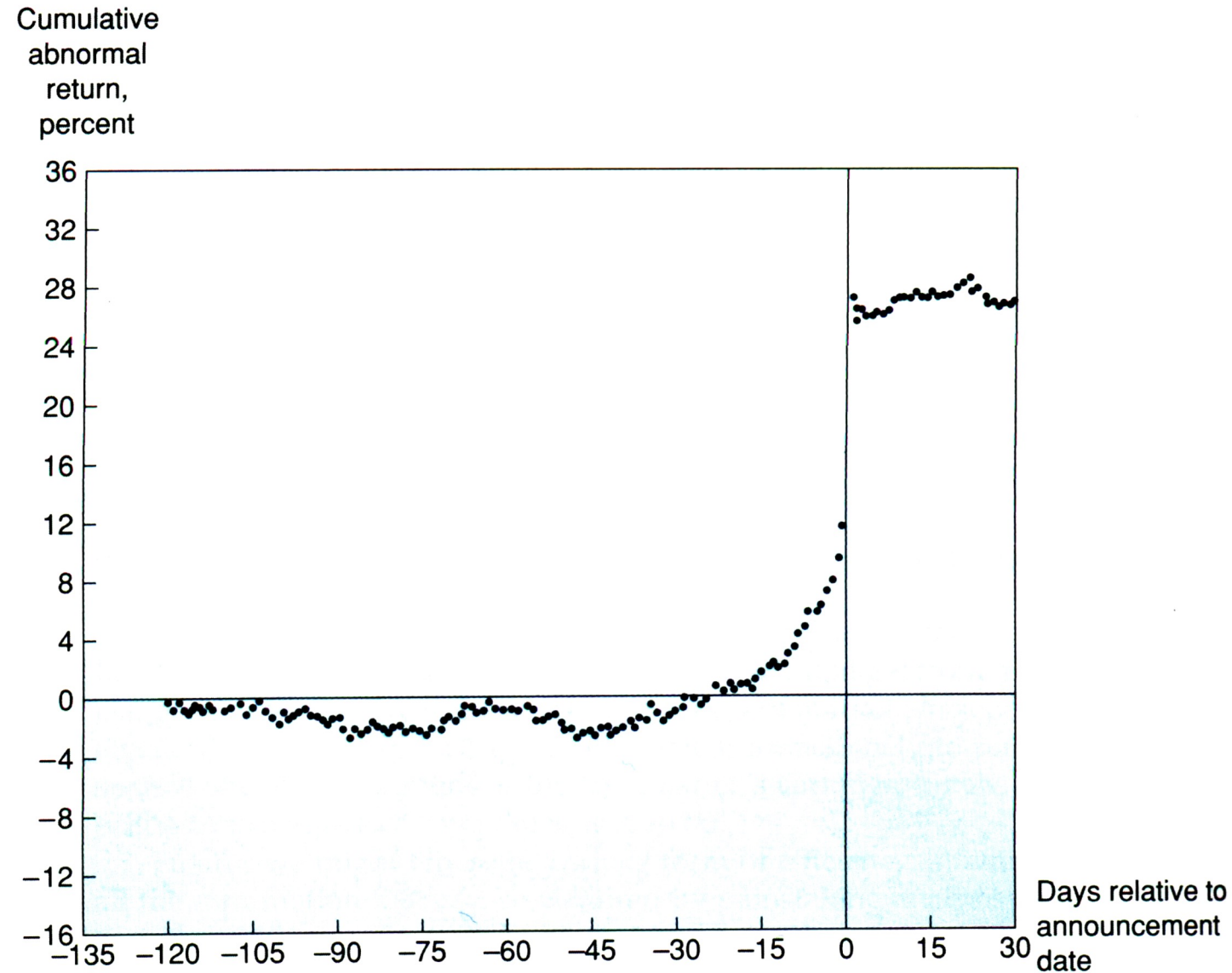
→ inconclusive

No post-announcement drift

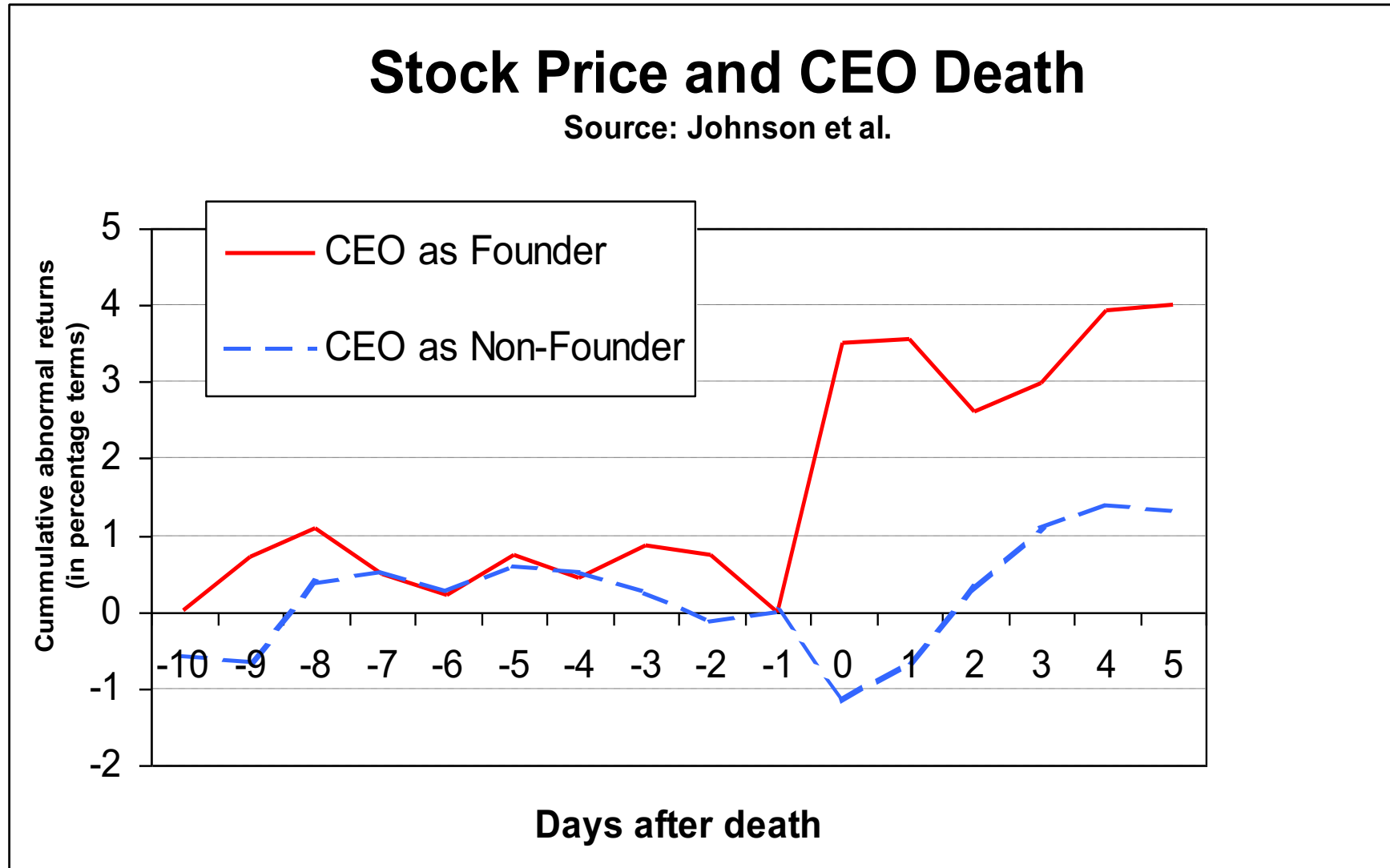
→ for weak form

Selection bias  
or  
Insider trading

# Event Study: Take-over



# Event Study: Death of CEO

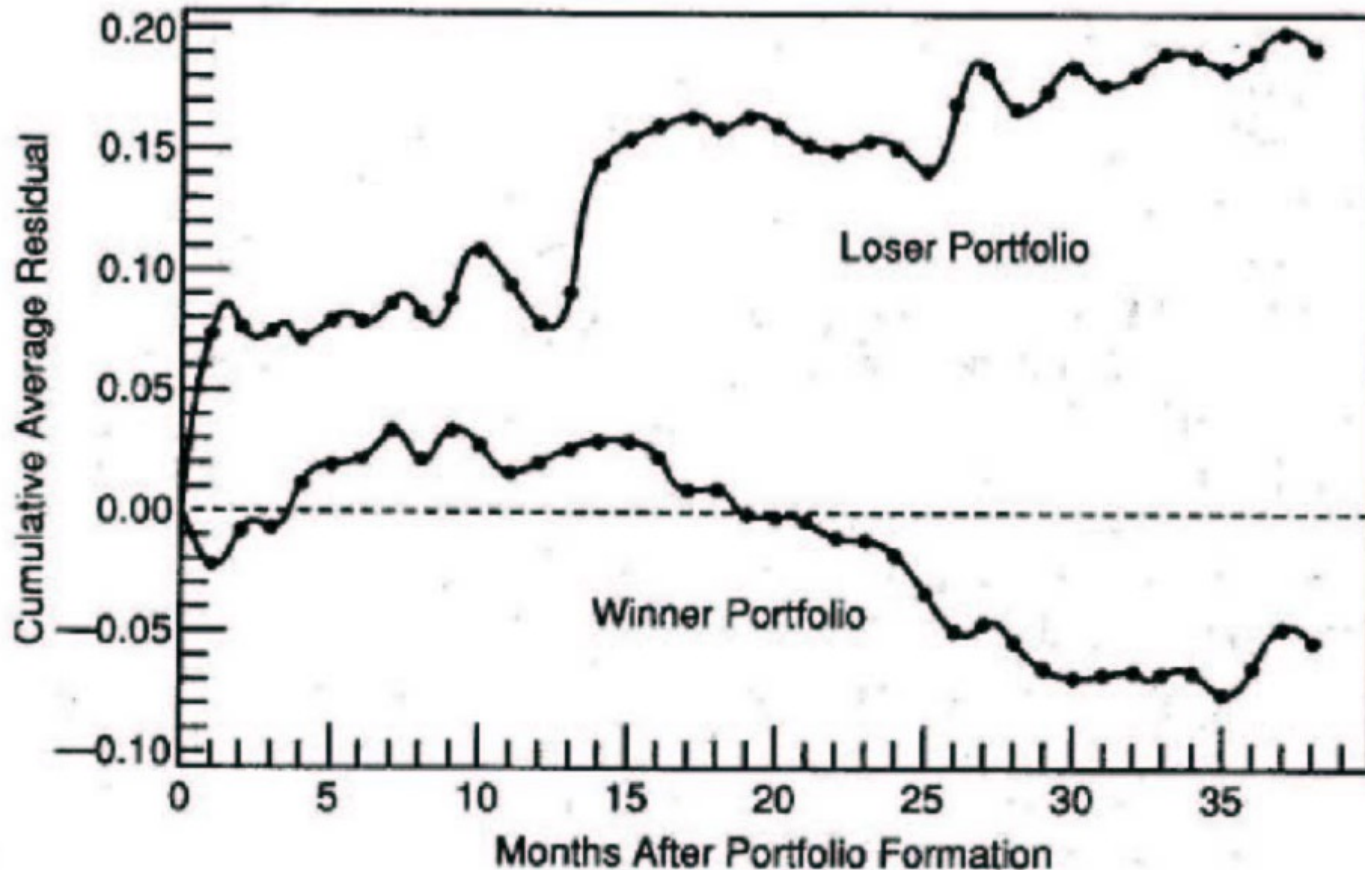


# Evidence I: Predictabilities Studies

- **Statistical variables have only low forecasting power, but**
  - **But some forecasting power for P/E or B/M**
  - **Short-run momentum and long-run reversals**
- **Calendar specific abnormal returns due to Monday effect, January effect etc.**
- **CAVEAT: Data mining: Find variables with spurious forecasting power if we search enough**

# Long-Run Reversals

Figure 1 Cumulative Average Residuals for Winner and Loser Portfolios of 35 Stocks (1–36 months into the test period)

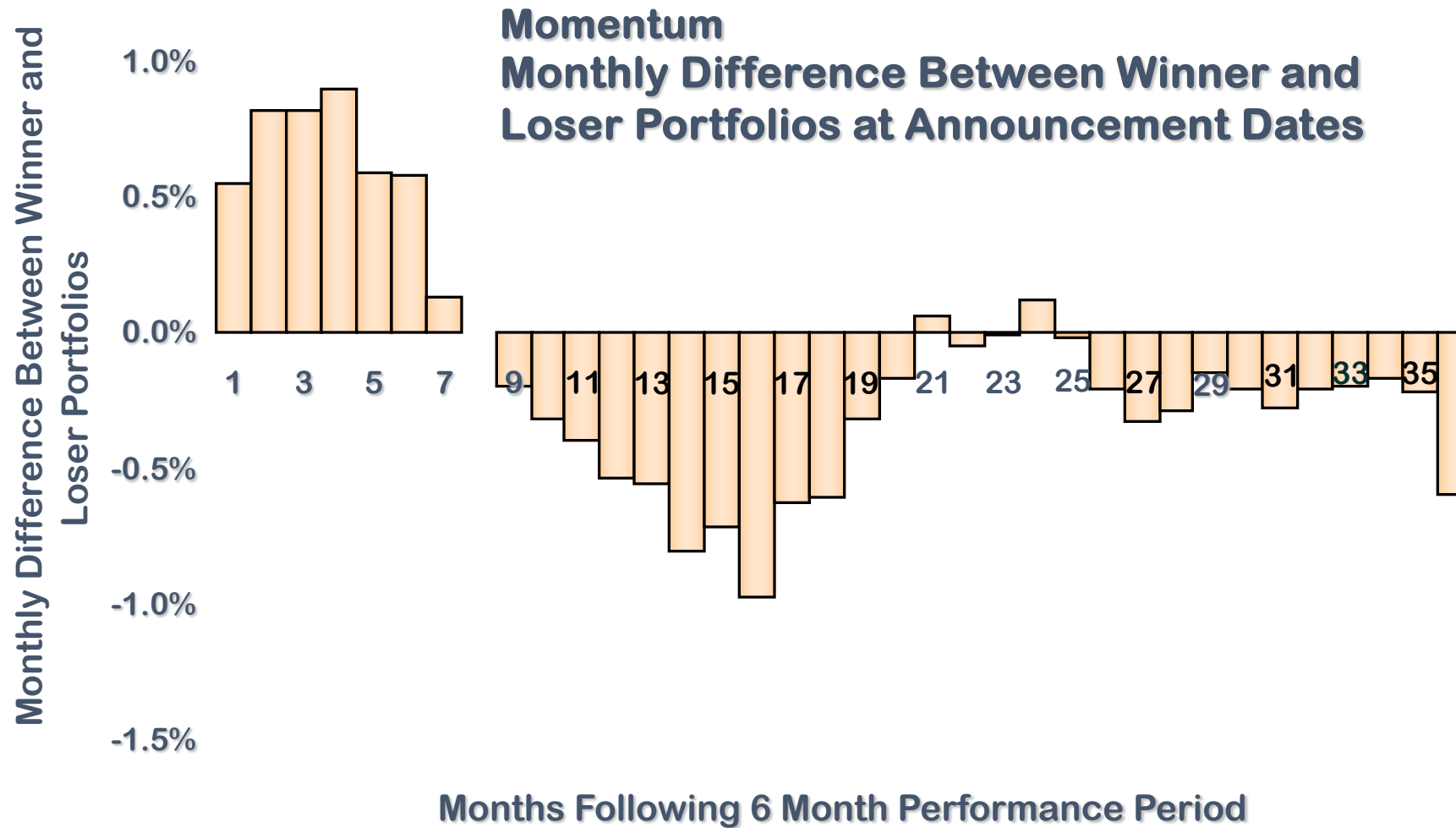


Long-run Reversals

Returns to previous 5 year's  
winner-loser stocks  
(market adjusted returns)

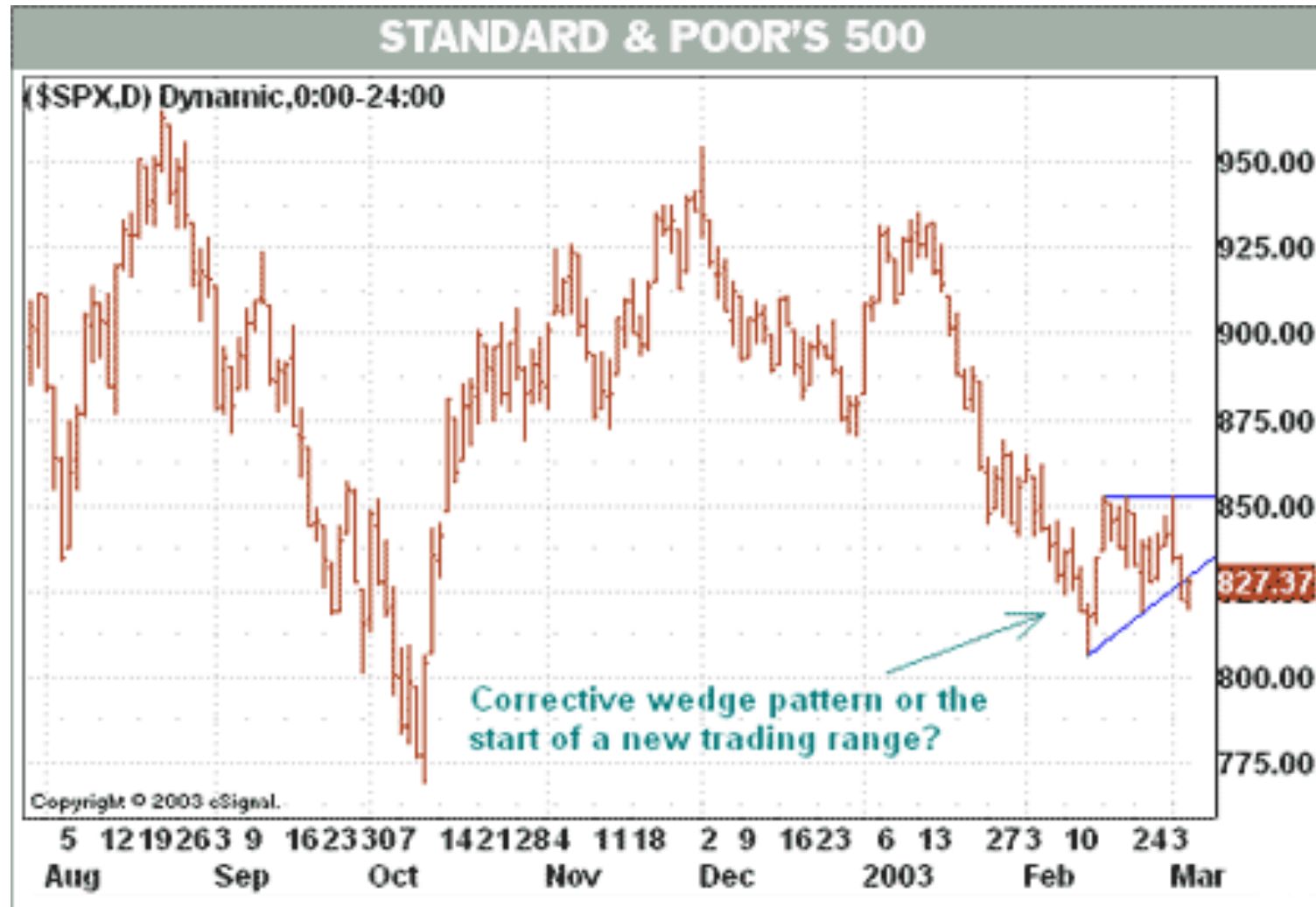


# Short-run Momentum



# Getting Technical

## Barron's March 5, 2003



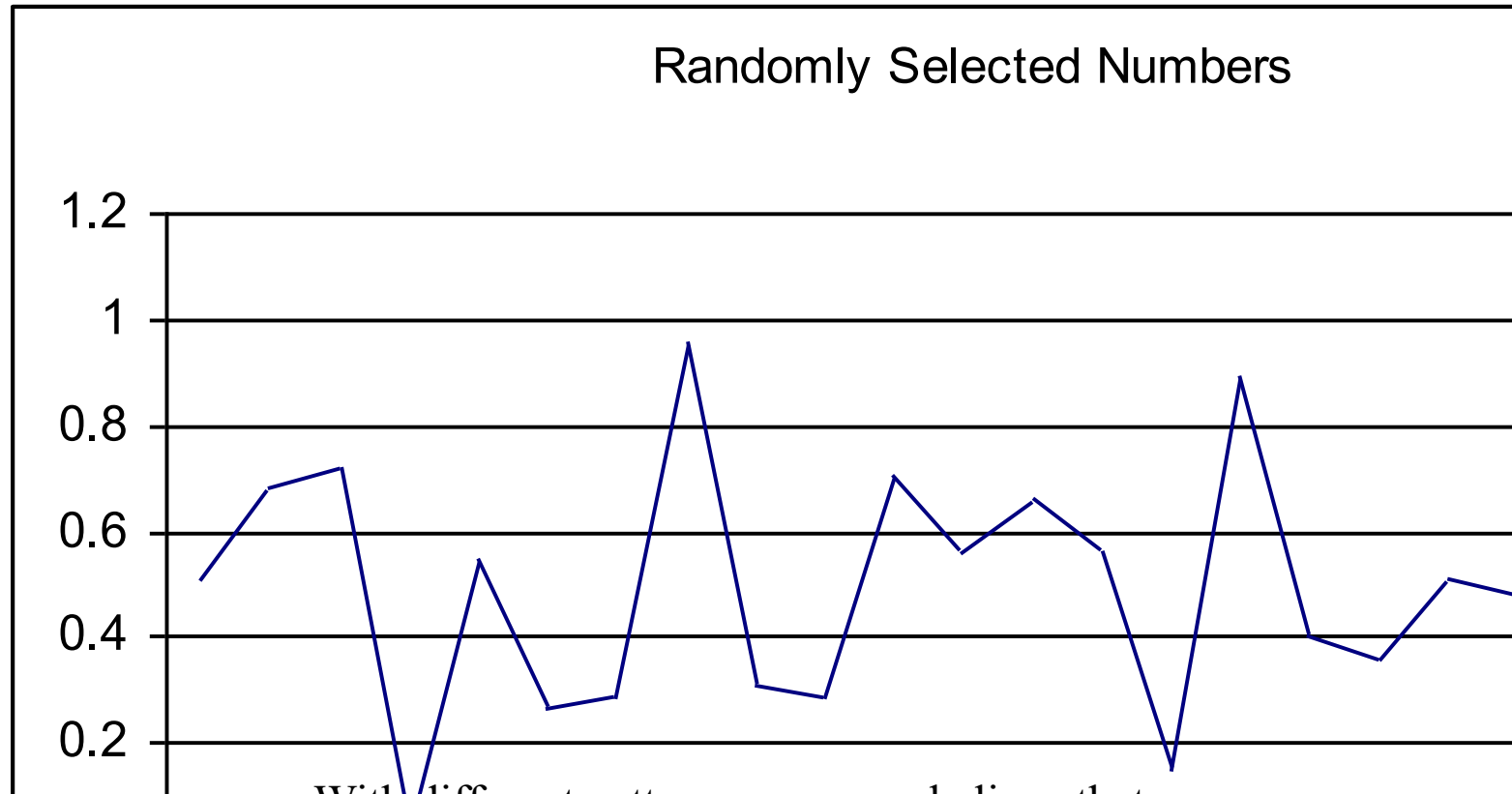
# Getting Technical

Back to Buy Low, Sell High

*Barron's March 12, 2003*

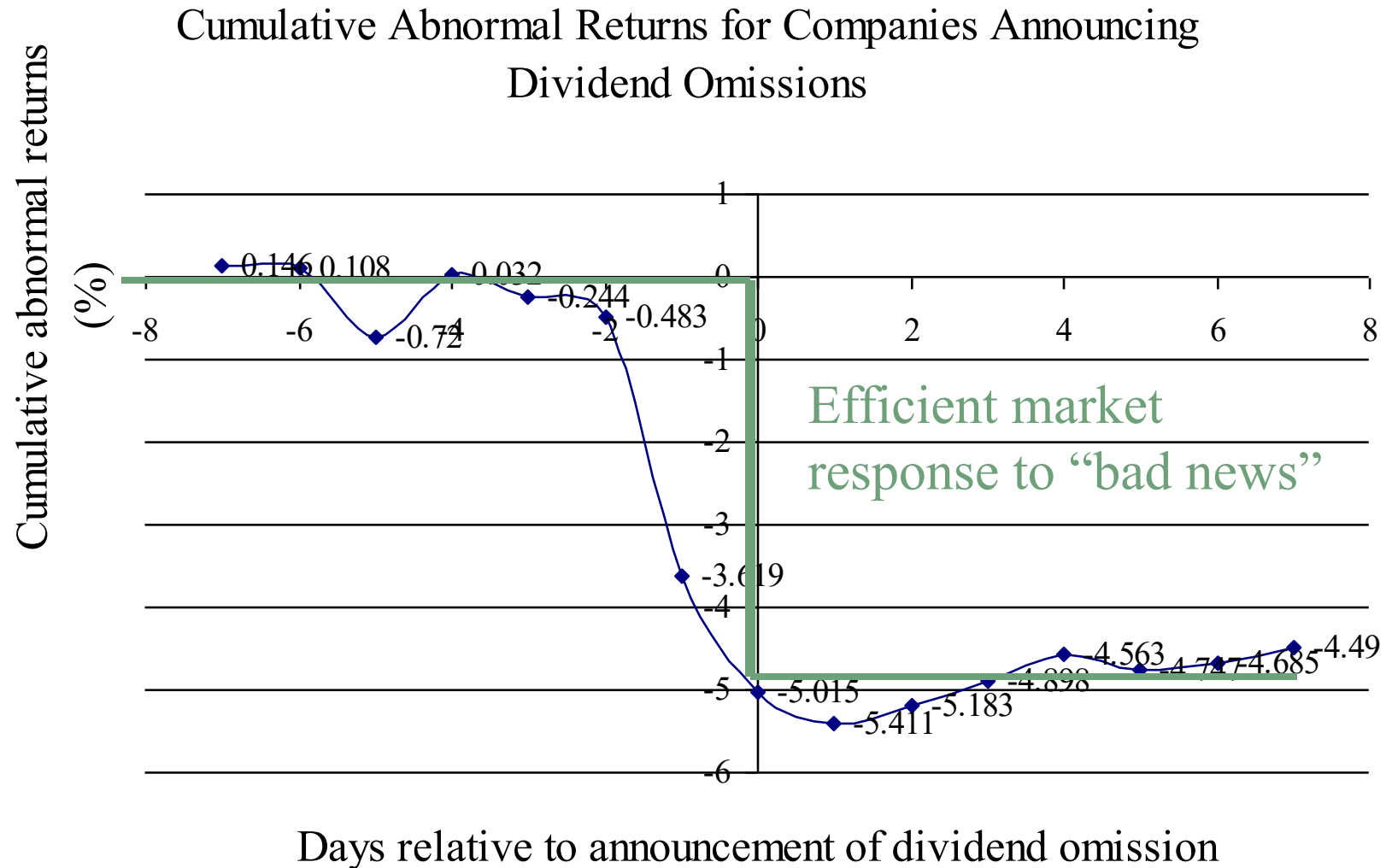


# What Pattern Do You See?



With different patterns, you may believe that you can predict the next value in the series—even though you *know* it is random.

# Event Studies: Dividend Omissions

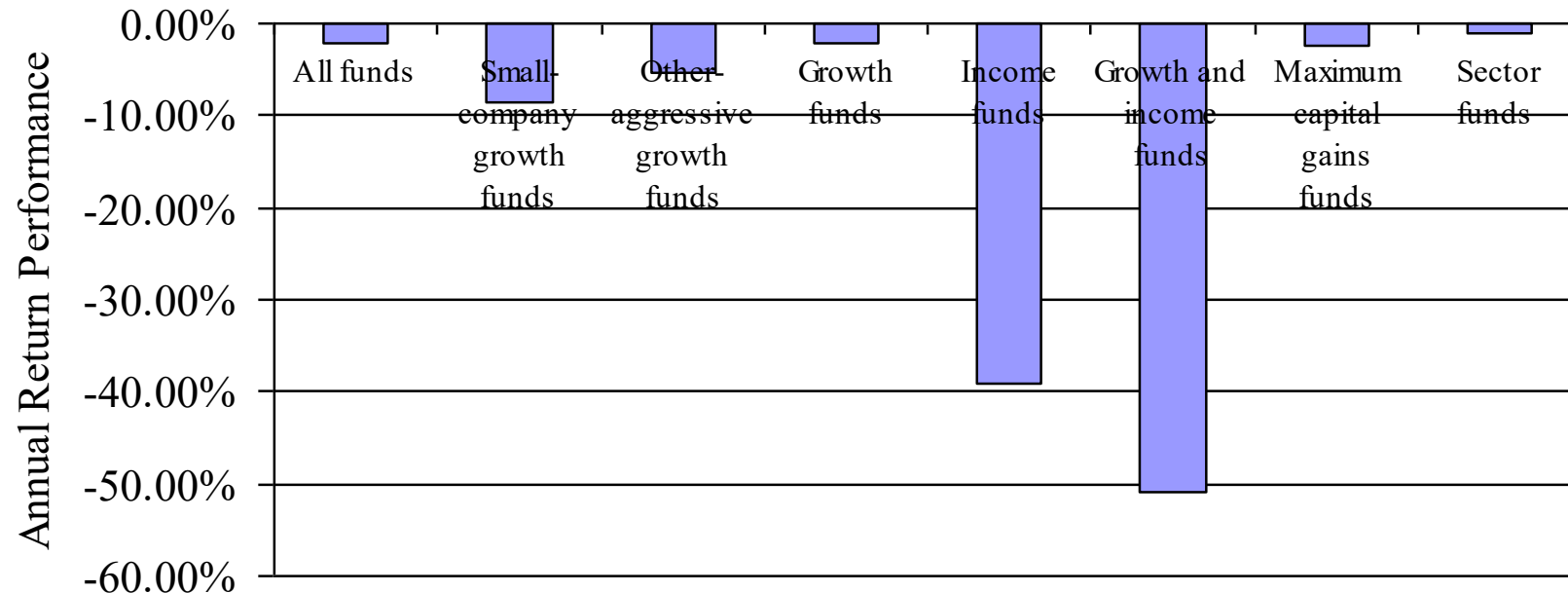


S.H. Szewczyk, G.P. Tsetsekos, and Z. Santout "Do Dividend Omissions Signal Future Earnings or Past Earnings?" *Journal of Investing* (Spring 1997)

Source: Ross et al. (2005), "Corporate Finance", 7th Edition, McGraw-Hill

# The Record of Mutual Funds

Annual Return Performance of Different Types of U.S. Mutual Funds Relative to a Broad-Based Market Index (1963-1998)



Taken from Lubos Pastor and Robert F. Stambaugh, "Evaluating and Investing in Equity Mutual Funds," unpublished paper, Graduate School of Business, University of Chicago (March 2000).

# Weak Form Market Efficiency

- Security prices reflect all information found in past prices and volume.
- If the weak form of market efficiency holds, then technical analysis is of no value.
- Often weak-form efficiency is represented as
- $P_t = P_{t-1} + \text{Expected return} + \text{random error } t$
- Since stock prices only respond to new information, which by definition arrives randomly, stock prices are said to follow a **random walk**.

# Market Efficiency

- **One group of studies of strong-form market efficiency investigates insider trading.**
- **A number of studies support the view that insider trading is abnormally profitable.**
- **Thus, strong-form efficiency does not seem to be substantiated by the evidence**



# Why Doesn't Everybody Believe the EMH?

- **There are optical illusions, mirages, and apparent patterns in charts of stock market returns.**
- **The truth is less interesting.**
- **There is some evidence against market efficiency:**
  - **Seasonality**
  - **Small versus Large stocks**
  - **Value versus growth stocks**
- **The tests of market efficiency are weak.**

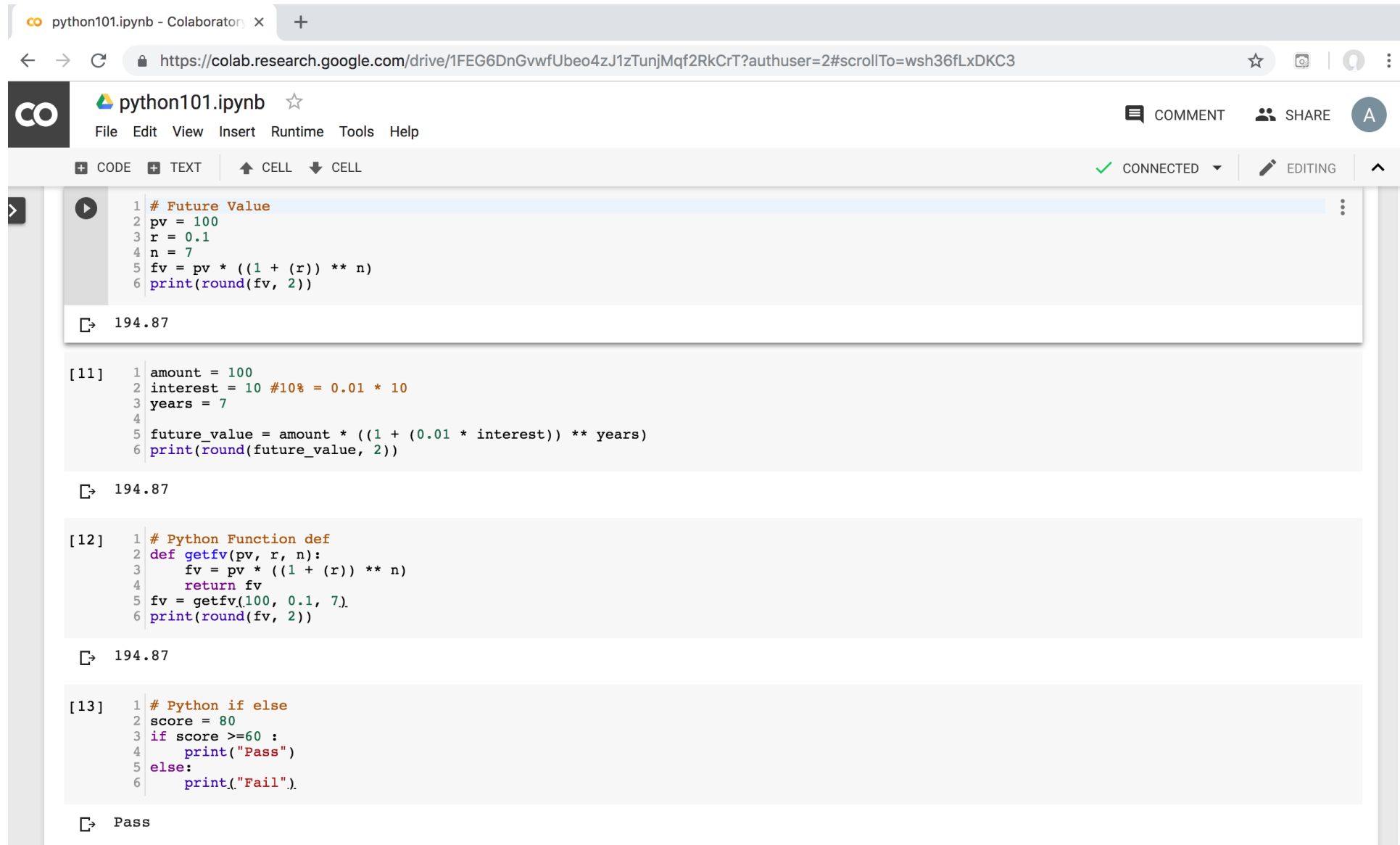
# Efficient Markets

# Inefficient Markets

# Behavioral Finance

# Python in Google Colab (Python101)

<https://colab.research.google.com/drive/1FEG6DnGvwfUbeo4zJ1zTunjMqf2RkCrT>



The screenshot shows a Google Colab notebook interface. The browser address bar displays the URL: <https://colab.research.google.com/drive/1FEG6DnGvwfUbeo4zJ1zTunjMqf2RkCrT?authuser=2#scrollTo=wsh36fLxDKC3>. The notebook title is "python101.ipynb". The interface includes a menu bar (File, Edit, View, Insert, Runtime, Tools, Help) and a toolbar with options for CODE, TEXT, CELL, and a status indicator showing "CONNECTED" and "EDITING".

The notebook contains four code cells:

- Cell 1:** A code cell with the following Python code:

```
1 # Future Value
2 pv = 100
3 r = 0.1
4 n = 7
5 fv = pv * ((1 + (r)) ** n)
6 print(round(fv, 2))
```

The output is "194.87".
- Cell 2:** A code cell with the following Python code:

```
[11] 1 amount = 100
2 interest = 10 #10% = 0.01 * 10
3 years = 7
4
5 future_value = amount * ((1 + (0.01 * interest)) ** years)
6 print(round(future_value, 2))
```

The output is "194.87".
- Cell 3:** A code cell with the following Python code:

```
[12] 1 # Python Function def
2 def getfv(pv, r, n):
3     fv = pv * ((1 + (r)) ** n)
4     return fv
5 fv = getfv(100, 0.1, 7)
6 print(round(fv, 2))
```

The output is "194.87".
- Cell 4:** A code cell with the following Python code:

```
[13] 1 # Python if else
2 score = 80
3 if score >=60 :
4     print("Pass")
5 else:
6     print("Fail").
```

The output is "Pass".

<https://tinyurl.com/aintpupython101>

# Summary

- **Event Studies in Finance**
- **Event Studies for Financial Research**
- **Event Study Methodology**
- **Efficient Market Hypothesis (EMH)**
  - **Efficient Markets**
  - **Inefficient Markets**

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