



# Lecture 17

## The Efficient Market Hypothesis

- The \$billion question: Is the market efficient in reflecting information about the future?
- Readings:
  - BM chapter 17
  - Reader, Lecture 17

# The Efficient Markets Hypothesis

- Market efficiency refers to the extent that market prices “reflect all available information”.
  - If market prices already reflect certain information, then you cannot profit by trading on that information.
- There are 3 primary forms of market efficiency:
  - **Weak form efficiency:** Market prices incorporate all past price information.
  - **Semi-strong form efficiency:** Market prices incorporate all publicly available information.
  - **Strong form efficiency:** market prices incorporate all information (both public and private).

# Weak Form Efficiency

- Market prices incorporate all past price information.
- This implies prices follow a “random walk” (sometimes called a drunkard's walk).
- If markets are weakly efficient, a person studying only past prices cannot outperform the market.
  - **Technical traders**

# Why should markets be at least weakly efficient?

- Suppose a stock always went up \$10 after falling by \$1 for 3 straight days.
  - Assume that on day 0 the stock is selling for \$33. Then on day 1 it falls to \$32 and on day 2 it falls to \$31.
  - Now put yourself in the position of a trader on day 3.
- If the price price now falls to \$30, will you sell?
  - NO! If the price is \$30 then tomorrow it will be worth \$40.
  - So nobody will sell at \$30.
- This implies there will never again be a series of three one dollar falls (let alone one followed by a \$10 rise). Traders have changed their behavior to eliminate the pattern.

# Semi-Strong Efficiency



- **Market** prices incorporate all publicly available information.
- This implies a person who analyzes only publicly available information cannot outperform the market.
- Should you buy heating oil futures when a broker calls to tell you a pipeline in Texas burst yesterday, so prices are sure to rise?

# Strong Form Efficiency

- Market prices incorporate all information.
  - Public *and* private
- If this is true nobody can outperform the market, even if they have "inside" information.
- We don't really believe markets are strong-form efficient.


# Mutual Fund Performance and Efficiency

## ■ Some mutual funds outperform the market for extended periods. Does this contradict efficiency?

- Suppose each fund has 50% annual chance to exceed the market.
- Suppose 10 years ago there were 1400 mutual funds.
- The probability a mutual fund outperforms the market for 10 straight years is  $.5^{10}=1/1024$ .
- So we expect 1.4 mutual funds to have a record this good.
  - » 9 out of 10 years:  $10(.5^{10})=.0098$ , yielding 13.7 funds.
  - » 8 out of 10 years:  $45(.5^{10})=.0439$ , yielding 61.5 funds.

## ■ Moral: Luck alone can produce consistent winners.

# The Case for Strong Form Efficiency

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- A stock is worth either \$100 or \$200, with 50% probabilities. 10% of the traders know which one. The other 90% have no information.
  - If insiders know it is worth \$100, what is the market price?
    - As long as the market price is above \$100, the insiders will all sell (and even sell short), driving the price down until it reaches \$100.
  - What if insiders know the stock is worth \$200?
    - As long as the market price is below \$200, the insiders will buy, driving up the price until it reaches \$200.
  - Thus, the market price must equal what the insiders know!
    - Even the outsiders can figure out what the insiders know:
      - » Just look at the price.
    - Thus, insiders do not earn an excess return from their information.