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).
Markets 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 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.
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.
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 $0.5^{10}=1/1024$.
- So we expect 1.4 mutual funds to have a record this good.
  - 9 out of 10 years: $10(0.5^{10})=0.0098$, yielding 13.7 funds.
  - 8 out of 10 years: $45(0.5^{10})=0.0439$, yielding 61.5 funds.

Moral: Luck alone can produce consistent winners.
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.