

Efficient Markets

(Welch, Chapter 12)

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Did you bring your calculator? Did you read these notes and the chapter ahead of time?

Perfect vs. Efficient Markets

- ▶ An efficient market is one that sets the price correctly.
- ▶ Historically, there has been much confusion here: most people mean perfect markets when they say efficient markets.

Perfect Market \Rightarrow Efficient Market

but

Perfect Market \nLeftarrow Efficient Market

- ▶ Our coverage is highly abbreviated. (An investments course covers market efficiency (ME) in much more detail.)

Covered Topics

- ▶ ME means roughly that “prices are set right.”
 - ▶ The problem is: what does right mean? We need to have a good model for the right target.
- ▶ Classification Schemes for Market Efficiency (ME).
 - ▶ Classical Finance vs. Behavioral Finance.
- ▶ Advantages of ME: you can learn from market values; and you know where you can add value and where not.
- ▶ Event Study Methods.
- ▶ Arbitrage and Great Bets.

What does it mean to believe the market is efficient?

Illustration

The General Case

Efficient Market

The financial markets estimate the statistical distribution of future cash flows, including their expected cash flow values, covariances, liquidity, and anything else possibly of interest.

Pricing Model

The financial market determines the appropriate expected rate of return, given all value-relevant characteristics.

Today's Price

The market sets today's price, so that the expected rate of return is as the model states.

A Specific Example: ABC

The market estimates ABC's expected value next year to be \$55 per share. It also estimates all other interesting characteristics, such as cash flows, market-betas, covariances, liquidity, etc.

Say the CAPM is the correct pricing model. Then the financial market looks at ABC's market beta, the risk-free rate, and the expected rate of return on the market, and sets ABC's expected rate of return. Say this CAPM expected rate of return is 10%.

The price today is $\$55/1.1 = \50 per share.

What is the link between perfect markets and efficient markets?

You see that the price of IBM is such that you expect it to earn 20% over the next year. Can you conclude that the market is inefficient?

What sort of claims would reject ME?

Is market efficiency a stronger concept over short intervals (a day) or over long intervals (a decade)?

In itself, is ME a very strong claim? As believer, how can you dispute someone doubting it?

What types of markets are more likely to be (in-)efficient?

Traditional Classifications (EM)

Focuses on information availability:

Strong Form: Price reflects all public and private information. You cannot outperform (“make money”) even with insider information. (Noone believes this one.)

Semi-Strong Form: Price reflects public, but not all private information. You cannot make money with public information.

Weak Form: Price reflects enough public and private information that you cannot make money by plotting historical price patterns—but you could still make money analyzing other aspects, such as company fundamentals.

More Modern Classification (EM)

Focuses on the relation between price reflecting underlying value, and closely linked to behavioral finance:

True believer: Price is always PV of the firm's cash flow.

Firm believer: Price deviates from PV, but this is not exploitable.

Mild believer: Price deviates from PV, and exploiting it is possible, giving you as an investor a mild edge.

Non believer: Price deviates strongly from PV, so investors can easily get rich.

Causality

True market efficiency implies unpredictable stock prices, i.e., strong or semi-strong form efficiency.

Strong or semi-strong form unpredictability does not imply true (underlying fundamentals-based) market efficiency.

Take “unpredictability” loosely here. It could be that expected returns themselves are time-varying, e.g., because the risk-profile is time-varying. In this case, it may be predictable that you get higher average returns when risk is higher. Unpredictable here means “relative to expectations.”

Why is the debate over ME so difficult to settle?

According to the CAPM or similar models, what do you expect the expected rate of return on a trading day be?

What is the typical daily move up or down of a stock? Of an Index?

How does risk (standard deviation) grow with the holding period duration (time) in a random walk?

What is a T-statistic that gives you statistical confidence?

What kind of an investment edge does it mean to be an investments superstar?

Over 1-day, what is your expected performance T-statistic?

Over 100 days, what is your expected T-statistic?

Over 10,000 days, what is your expected T-statistic?

What is the problem in testing for ME, and testing whether you can outperform the market?

What exactly is arbitrage?

What is a great bet?

Who would prefer an arbitrage to a great bet?

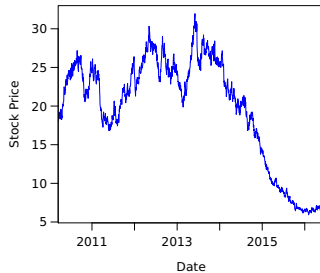
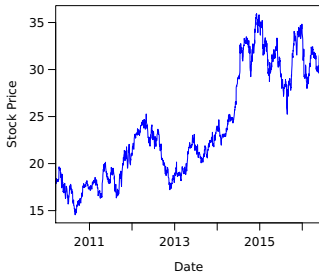
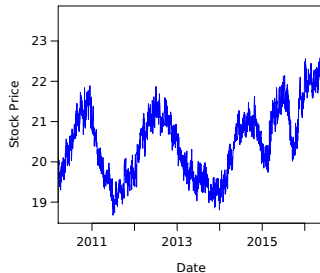
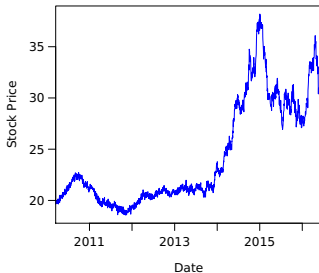
Do you believe it is easy to find either?

All reasonable financial models impose the belief that there is an absence of both non-trivial great bets and non-trivial arbitrage opportunities.

What is Technical Analysis?

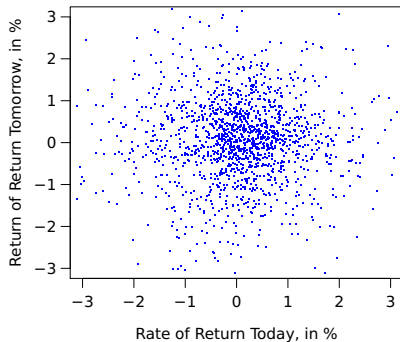
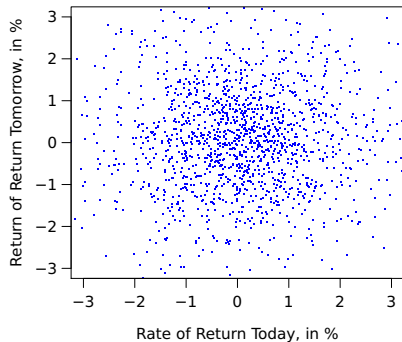
What sort of price/return patterns should not be observable?

What sort of price/return patterns is reasonable?



How should the relation between yesterday's return and today's return look like?

How should the relation between yesterday's return and today's return look like?



The left graph is the IXIC, the right graph is Intel.

What is the historical empirical evidence?

First-order: the U.S. financial markets are reasonably efficient with respect to public information. It is very difficult to get rich easily. Few funds manage to outperform. It is close to random.

Second-order: There may be some “anomalies” that seem to offer a tiny bit more than what seems reasonable. The two main equities-related anomalies are

- ▶ Momentum (at least a specific form thereof)—although much of momentum’s average rate of return of 1% per month is probably simply compensation for risk. We learned this in the financial crisis, where the zero-investment momentum portfolio (\$1 long, \$1 short) lost more than \$1 in one year!
- ▶ Value vs. growth—value firms prefer much better than glamorous growth stocks, but they did not do so in all situations.

There are non-equities and other more specialized anomalies, too.

If you can beat the market, who would you tell?

How much data do you need to prove to investors that you are good?

How do (hedge/mutual) funds get started?

How many funds should outperform the market 10 years in a row *if* **none** have skills?

How many funds should outperform the market 10 years in a row *if* **some** have skills?

Among *existing*, large funds, how many funds should have outperformed the market with/without skills?

Is Berkshire-Hathaway a good investment?

Who would get the rents from Buffett's abilities?

If you were an investment manager having made 5% per year above your benchmark five years in a row, what would you think of your capabilities?

What do you think of contingent compensation—you pay me only if I give you a profitable stock pick? Will this not remedy the problem of ignorant managers not wanting to get into the business?

What is the empirical evidence for ME?

Are there any corporate consequences of ME?

- ▶ You can learn from your own market value.
- ▶ You can learn from your competitors' values.
- ▶ You can learn from other values.
- ▶ You cannot add value by doing things that investors can do (or undo). [splits, dividends, etc.]
- ▶ You cannot make money by trying to time interest rates or gambling on commodities.

As the CEO, what should you do if your shares are undervalued, relative to your (possibly private) information?

As the CEO, what should you do if your shares are overvalued, relative to your (possibly private) information?

Event Studies

Event studies are another way to determine value without having to forecast cash flows. They work in some circumstances, but not others.

They allow you to ask and answer very convincingly such questions as:

- ▶ Does paying dividends increase or decrease stock price?
- ▶ Does Trump's election increase or decrease hospital stocks?
- ▶ Does Trump's election increase or decrease Mexican Pesos?
- ▶ Does Deepwater Horizon increase or decrease Oil Price?
- ▶ Does Divestment hurt divested stocks or divesting managers?