

Lecture Notes 17

Market Efficiency

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Buzz Words: ***Technical Analysis, Fundamental Analysis, Joint-Test Problem, Abnormal Returns, Insider Trading, Disclosure Rules.***

I. Readings and Suggested Practice Problems

A. Required: BKM, Chapter 12.

B. Complementary Material: BKM, Chapter 13.

Read Section 13.1, but only skim Sections 13.2 and 13.3.

C. *Suggested Problems*

Chapter 12: Problems 1-5, 14, 18, 19, 28

II. What do we Mean by “Efficiency?”

The Efficient Market Hypothesis (EMH):

In an efficient market, prices reflect all available information.

Notice that the *level/degree/form* of efficiency in a market depends on two dimensions:

1. The *type* of information incorporated into price (which information is “available”?).
2. The *speed* with which new information is incorporated into price (how fast information is “reflected”?).

III. Why are we Interested in Market Efficiency?

- A. *If market prices reflect at a given date only information of a particular type, then one can profit by trading based on information relevant for pricing but not yet reflected in prices.*

- B. *To assess the level of market efficiency need to know the security's value; which requires knowing how assets are priced.*

- C. *Joint-Test Problem in Empirical Tests of the EMH:*

Market Efficiency per se is not testable because the question whether price reflects a given piece of information always depends on the model of asset pricing that the researcher is using. It is always a joint test of market efficiency and the used pricing model.

- D. *Despite the joint-test problem, tests of market efficiency, i.e., scientific search for inefficiencies, improves our understanding of the behavior of returns across time and securities. It helps to improve existing asset pricing models and the view and practices of financial-markets professionals.*

IV. Categories of Market Efficiency

A. Weak-Form Efficiency / Lack of Predictability

1. Price reflects all information contained in market trading data (past prices, volume, dividends, interest rates, etc.).
2. So an investor can not use past prices to identify mispriced securities.
3. Technical analysis:
 - (1) Refers to the practice of using past patterns in stock prices (and trades) to identify future patterns in prices.
 - (2) Is not profitable in a market which is at least weak form (i.e., weakly) efficient.

B. Semi-Strong Form / “Events” Reflected Immediately

1. Price reflects all publicly available information.
2. So an investor can not use publicly available information to identify mispriced securities.
3. Fundamental analysis:
 - (1) Refers to the practice of using financial statements, announcements, and other publicly available information about firms to pick stocks.
 - (2) Is not profitable in a market which is at least semi-strong form (i.e., semi-strongly) efficient.
4. If a market is semi-strong form efficient, then it is also weak form efficient since past prices and other past trading data are publicly available.

Example: Market reaction to public announcement.

- Stock *XYZ Mining* closed yesterday at 100.
- Morning paper reports: *XYZ Mining* has larger than expected reserves (extra value = \$10 per share).
- Suppose this estimate is unanimously and immediately deemed valid and accurate.
- Stock jumps to 110 *immediately* (at the open). (More likely 109.9 bid, 110.1 offered.)
- *No trading is needed.*
- News report “*XYZ* climbed to 110 today on announcement of a new gold mine.”

Suppose *XYZ Mining* stock only jumps to 104:

- Report might be suspicious (“*XYZ* known to exaggerate”).
- But if we deem the information reliable . . .
 - A price of 104 for *XYZ* does not accurately reflect all the available information.
 - We can make trading profits by buying *XYZ* at 104 and holding until
 - a.* The market realizes we’re right, or
 - b.* *XYZ* pays out (in dividends or distributions) the value of the reserves.
 - (*Semi-strong*) efficiency is violated in the senses that 104 does not fully reflect the new information. We can make trading profits.

C. Strong-Form / All Private Information is Reflected

Price reflects all available information.

If a market is strong form efficient, then it is also semi-strong and weak form efficient since all available information includes past prices and publicly available information.

1. What is “private” information?

Information that you hold that is not reflected in the market price:

Two types of Private Information:

- a. “Inside information” Info known to company management but not yet made public.
 - Knowledge of an impending takeover bid.
 - Knowledge that earnings are going to be lower than the street expects.
- b. A private assessment based on public information.
 - An analyst’s report based on public accounting statements.

Example

Private information can be impounded into the security price via reported trades.

- Stock *XYZ Mining* closed yesterday at 100.
Opening quotes today are 99.9 bid; 100.1 offered.
- We overhear two geologists talking on the subway:
“*XYZ Mining* has larger than expected reserves
(extra value = \$10 per share).”
- We begin to buy at the ask (100.1)
 - Quotes revised to 100 bid, 100.2 offered.
 - We buy more at 100.2.
 - Quotes revised to 100.1 bid, 100.3 offered.
 - Etc.

We'll stop buying only when the price reaches 110.

- Market price will be 110, reflecting the *private* information.
- Market reaction is not driven directly by the private info, but instead by the related buying.
- Trader profits at the expense of other market participants (those who have exposed offers, either dealers or limit-order traders).

- Qualifications
 - Timing of trades unclear (all at once? spread out over time?)
 - If more than one trader gets the info, most of the profits accrue to the one who trades first.
 - Trader might be capital-constrained (might not have enough cash to buy all the stock that is offered below 110).

2. *U.S. Securities Exchange Act Rule 10b-5*

It shall be unlawful for any person, directly or indirectly, by the use of any means or instrumentality of interstate commerce, or of the mails, or of any facility of any national securities exchange,

- (1) to employ any device, scheme, or artifice to defraud,
- (2) to make any untrue statement of a material fact or to omit to state a material fact necessary in order to make the statements made, in light of the circumstances under which they were made, not misleading, or
- (3) to engage in any act practice, or course of business which operates or would operate as a fraud or deceit upon any person,

in connection with the purchase or sale of any security.

3. *Corporate insiders*

Directors and officers of U.S. companies can trade that company's stock so long as:

- (1) The trades are not motivated by private information (in the sense described below).
- (2) They report their trades to the Securities and Exchange Commission.
- (3) They do not engage in short term trading.

SEC publicizes these reports.

4. *Insider trading: what is illegal?*

- Are you prohibited from trading on *everything* that is not public knowledge? – No! U.S. Supreme Court:
 - “Not every instance of financial unfairness constitutes fraudulent activity.”
 - “a duty to disclose . . . does not arise from the mere possession of nonpublic market information”
- Information is illegal if you obtained it by breach of a fiduciary duty, i.e., a relationship of trust. (“Misappropriation” principle)

Example: a WSJ reporter who traded on the basis of information in his “Heard on the Street” Column (before it was published).

5. *Points to bear in mind*

- ***You are not protected from prosecution simply because you are removed from the initial breach of trust.***
(In one case, the Feds caught the psychiatrist of the wife of the company president.)
- ***It might be tough to claim “I didn’t know.”***
The SEC has ruled that for there to be a violation it is merely sufficient that the tippee “know or have reason to know that [the information] was non-public and had been obtained improperly by selective revelation or otherwise.”
- ***There are fewer and fewer countries that will not cooperate with U.S. authorities in investigating insider trading violations.***

6. *Example for 10b-5 Disclosure Cases*

- XYZ Mining announces that the gold mine reserves were only half of the initial estimate.
- Stock price falls by \$5.
- Donner, Blitzen and Associates (a member of the class action securities bar) immediately file a law suit. The initial complaint alleges that
 - The company did not previously disclose all that it knew.
 - This failure to disclose deprived investors who bought the stock (the “class”) of relevant information.
 - This failure cost these investors \$100 Million.
- The complaint also asks that the attorneys be granted broad rights of discovery.

What is the value of the information?

- To isolate the effect of the information, Donner, Blitzen estimates a *market model* for XYZ:
$$r_{XYZ} = \alpha_{XYZ} + \beta_{XYZ}r_{M,t} + e_{XYZ}$$
- The value of the information is estimated as the residual e_{XYZ} on the day of the disclosure.
(e_{XYZ} is also referred to as the *abnormal return*)
- Suppose that e_{XYZ} on the day of the disclosure = -4%

- Suppose that
 - discovery shows that the company received initial estimates of the shortfall 10 days prior to the disclosure.
 - The price per share at the start of the 10-day period was \$100.
 - The total trading volume over these 10 days was 5 Million shares.

Damages sought = $4\% (100) \times 5 \text{ Million} = \20 Million .

V. How Efficient are Financial Markets?

Bulk of evidence is that overall markets are efficient, i.e., the marginal benefits of acting on information (the profit to be made) do not exceed the marginal costs.

So, do not blindly follow your broker's stock tips, they may be useless, and financially oriented online bulletins and chat-room recommendations may even contain misleading information!!!

Still, There seem to be enough anomalies to warrant search for underpricing.

Specifically,

- A. Technical Analysis (e.g., “filter” rules, neural networks, artificial intelligence, pattern recognition, etc.) is of no value for short-term investments, but may work for longer-term investments.
- B. Research in general also supports semi-strong form efficiency, but can find examples of semi-strong form inefficiency.
- C. Superior information and/or insight may earn money.

VI. Additional Readings