

## Special Episode - Market Efficiency Transcript

*The following is a supplementary transcript for tutorial videos from*

<https://blogs.ubc.ca/financefundamentals/>

Hi everyone. Today, we are going to be taking a break from our usual programming to talk about the Efficient Market Hypothesis. Up to this point in the course, we have learned formulas to help calculate the expected price of bonds and stocks in the market. Today, we are going to be looking at what information is factored into the market price -- that is, what do investors look at when they decide whether to buy or sell an asset, driving its market price up or down?

Video at 00:26

There are three hypotheses about what types of information are factored into market prices. Some people believe that markets are weak form efficient. Others believe that markets are semi-strong form efficient, and still others believe that markets are strong form efficient. First, we are going to go over each of these hypotheses in detail. Second, we will discuss how investors can profit under each of these hypotheses. And lastly, we will look at which of these hypotheses is most supported by empirical evidence.

Video at 00:54

Let's start by talking about the weak form efficiency hypothesis. Weak form efficiency suggests that market prices reflect all past information, including historical returns, trade volumes, and trends. Next we have semi-strong form efficiency. The semi-strong form efficient hypothesis suggests that market prices reflect all publicly available information, like company press releases and news articles. So if there is news of an E. coli outbreak at a meat packaging plant, the company's stock price should drop accordingly. Note that public information includes past price information, so if the market is semi-strong form efficient, then it must be weak form efficient also.

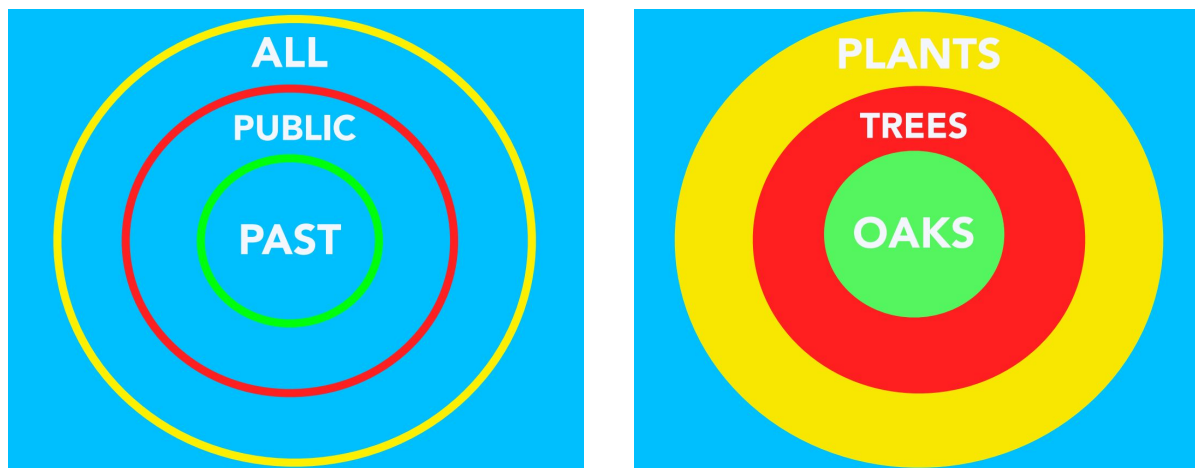
Video at 01:34

Lastly, there's the strong form efficient hypothesis. Strong form efficiency suggests that market prices reflect all information: both public and private. Private information is any material (significant), non-public, price sensitive information. Let's say a company executive starts putting plastic into the ground beef as filler. Strong form efficiency would suggest that market prices

would drop to reflect that, even if this information has not been leaked to the public. Note that markets which are strong form efficient must also be semi-strong form efficient, since strong form efficient markets contain both private and public information. And if these markets are semi-strong form efficient, then they must also be weak form efficient, since all of the past price information is also reflected in these prices.

Video at 02:14

We can think of the relationship between these three hypotheses using this diagram (Figure 1). In strong form efficiency, prices capture all information, including public information and past price information. In semi-strong form efficiency, prices capture only public information, which includes past price information. In weak form efficient markets, prices only capture past price information. This is kind of like the relationship between oaks, trees, and plants. Oak trees are a subset of all trees, and trees are a subset of all plants. Each layer also includes the previous layer.



**Figure 1**

Video at 02:52

What do each of these three hypotheses suggest about how investors can beat the market? That is, how can investors earn a higher return than the market return under each of these three hypotheses? Imagine you are an investor in the stock market. If you have more information about a stock than everyone else in the market, then you can tell whether the stock is

underpriced or overpriced. You can use this information to decide whether to buy or sell that stock in the market to earn a profit.

Video at 03:15

If markets are weak form efficient, then we cannot gain an advantage by tracking past price information, because this information is already factored into the market price. Analyzing past price information is known as technical analysis, and it is useless if we believe that the markets are at least weak form efficient. However, we can still gain an advantage by tracking other types of information in the market and factoring this into our trades. For example, if we only know the amount of profit that the meat packaging plant made, we cannot gain an advantage above the market, because everyone else knows that information too -- but if we have public information, such as a press release saying that there has been an E.coli outbreak, or private information that the CEO is putting plastic into the meat supply, this is information we can use to gain an advantage. When a stock is overvalued, you can sell it to other investors in the market who think that the high price they are paying is reasonable.

Video at 04:10

If markets are semi-strong form efficient, then not only is technical analysis useless, but so is analyzing any publicly available financial accounting or economic information. This type of analysis is known as fundamental analysis, and it is useless if markets are semi-strong form efficient, since all of this information has already been factored into the market price. However, in these markets, we can still gain an advantage by trading on private information. However, trading on private information is illegal and is known as insider trading.

Video at 04:42

What do Martha Stewart and this character from The Office (Martin Nash) have in common? They both went to jail for insider trading. Let's say you are the CEO of a major pharmaceuticals company that is preparing to launch its newest cancer fighting drug, so your stocks have been booming. However, prior to the launch, a scientist approaches you and tells you that there are major flaws in the drug, which means it is not going to get FDA approval. You use this opportunity to tell your friends to sell their stocks right away so that they avoid major losses. Profiting off of private information is known as insider trading, and it is a criminal offense. But only if you get caught (wink) ... no seriously, do not engage in insider trading! Don't do it! In

Martha Stewart's case, she avoided a loss of \$45,000 by selling her stocks, but then went to prison for five months and had to pay back four times that amount in penalties.

Video at 05:29

If all markets are strong form efficient, then there is no way for an investor to "beat the market"; that is, all information about a security has already been factored into the market price, so technical analysis, fundamental analysis, and even insider trading are completely useless. The only way for an investor to earn a return above the market is to take on riskier assets that are going to yield a higher return.

Video at 05:45

So, which one is it? Are markets weak form efficient, semi-strong form efficient, strong form efficient, or none of the above? Some people do not even believe that the market is weak form efficient. Technical analysts who look for patterns and trends in past stock prices do so because they think they can gain an advantage by analyzing this information. If the market was truly weak form efficient, we would not expect to see anyone conducting technical analysis. Other investors, such as mutual fund managers and fundamental analysts, try to use public information in order to identify mispriced securities in the market. This would suggest that markets are actually weak form efficient, but not semi-strong form efficient. If markets were semi-strong form efficient, we would not expect to see anyone doing fundamental analysis in the market. And those who engage in insider trading do so because they believe they can profit from acting on this private information. This suggests that markets are not strong form efficient.

Video at 06:45

So, who is correct? Well, evidence suggests that markets are at least weak form efficient, meaning that investors can not earn an above-normal return by trading on past price information. Historical information does not help us, because other investors already know this information and it is already being factored into market returns. It is also easy to see that markets are not strong form efficient; otherwise, nobody would bother with the risk of insider trading, and there would be no need to make this activity illegal. What is less clear is whether or not markets are semi-strong form efficient. Some academics believe that markets are semi-strong form efficient, but other market analysts believe that there's still benefit to trading on

publicly available information. Some investors such as Warren Buffett yield consistently higher returns than the market.

Video at 07:28

Most likely, the market falls somewhere between semi-strong form efficiency and weak form efficiency. We can say that markets are generally semi-strong form efficient, with certain anomalies, like how security prices tend to increase more in January, known as the January effect, or that there are pockets of inefficiency in not well-understood markets such as the tech industry. So there may be some opportunities for investors to gain an advantage by trading on securities they believe are overvalued or undervalued in the market. But for the most part, investors are going to earn the same return as the market, or a risk adjusted return based on the market return.

Video at 08:03

We have decided that, in general, market prices reflect all publicly available information. But how quickly is this information factored into market prices? That is, how long does it take for the market price to adjust to its optimal price? The semi-strong form efficient hypothesis would suggest that market prices adjust to their optimal levels as soon as information becomes public like this. But, there are actually two ways the actual market response can differ from the efficient market response.

Video at 08:29

Sometimes, the market can overreact to new information. Suppose, for example, that a tech company announces it is going to launch a new patent. Investors are overexcited and rush to buy shares in the company. Before the announcement, the shares are trading at \$30/share. After the announcement, the share price jumps to \$40/share. Gradually, the price falls back to its true value of \$35/share (Figure 2). Or suppose news breaks of a scandal involving the company's CEO. Investors panic and rush to sell their shares, and the prices drop from \$20/share to \$14/share. Eventually, the price rises to its true value of \$16/share as the initial panic subsides (Figure 3).

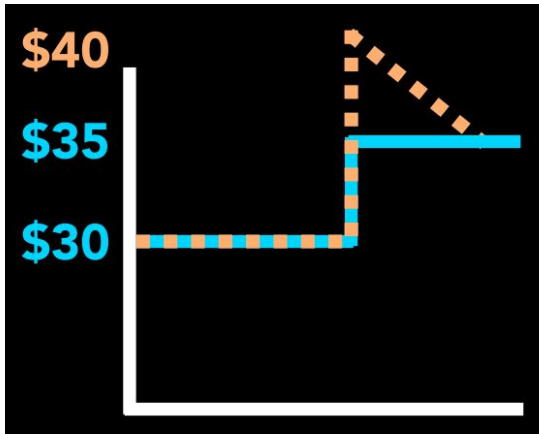


Figure 2

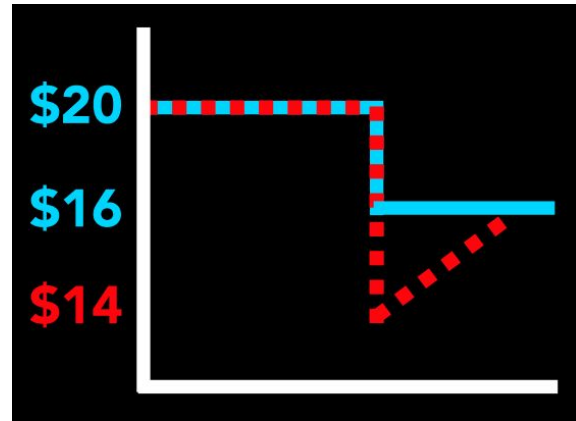


Figure 3

Video at 09:08

And sometimes, markets can underreact to new information. Suppose a company announces an increase in its annual dividend. Some investors respond by rushing to buy more of the company's shares, and the price rises from \$25 to \$28 in the market. But suppose some of the other investors do not realize that the change has occurred, and so the market price has risen by less than the optimal amount. Eventually, the market price will rise to the true value as more investors become aware of the change (Figure 4). Similarly, markets can underreact to negative information, causing the share price to fall by less than the optimal amount (Figure 5). We assume that, eventually, the market price will adjust to its optimal level.

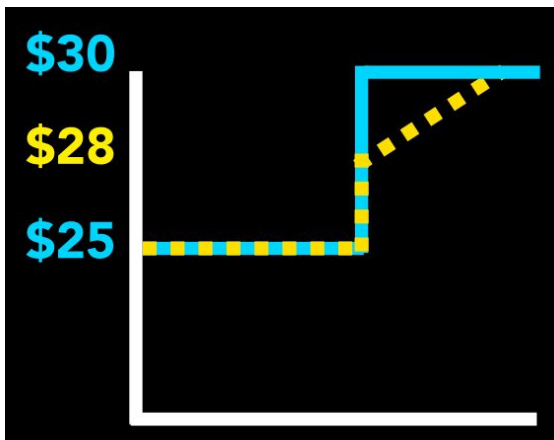


Figure 4

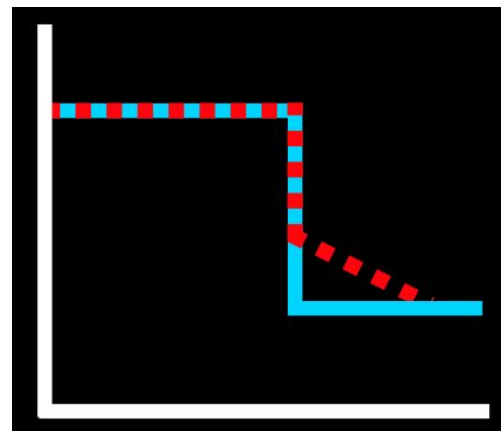


Figure 5

Video at 09:46

If sometimes we see a market overreaction, and other times we see a market underreaction, but on average the market reacts appropriately, then the market is still efficient. That is, there is no systemic bias in the way that the market is wrong. This is all just part of the inherent risk involved in market returns.

Video at 10:04

But perhaps, the market does have a tendency towards overreaction or underreaction. Some studies suggest that markets tend to overreact to unreliable information, such as long-term earnings projections, and underreact to more reliable information, such as short-term earnings reports. Let's say a company releases its short-term earnings report, and its share price goes up. If you think that the market tends to underreact to this kind of information, you may choose to buy the stock now while its price is still below its optimal price and earn a profit when the price rises to its true value.

Video at 10:35

Today, we went over the three hypotheses of market efficiency. Weak form efficient markets reflect all past information, meaning that investors can't profit from technical analysis; semi-strong form efficient markets reflect all publicly available information, meaning that investors cannot profit from fundamental analysis; and strong form efficient markets reflect all publicly and privately available information, meaning that investors cannot profit from insider trading. Evidence suggests that markets fall somewhere between weak form and semi-strong form efficiency, meaning that there are some opportunities for investors to earn an above market return. But, for the most part, investors earn the return of the market, plus an additional premium for taking on more risk. Thanks for watching, and we will see you next time back in the studio.