

# Efficient Market Hypothesis in Indonesia Stock Exchange 2019

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Abstract-Indonesian capital market is very important in developing Indonesia's economy by getting a cheap funding for their industry. Industry in the Indonesian capital market there are a variety of products was traded like bonds, mutual funds, equity or shares, warrant or option. The phenomenon from stock trading on the Indonesia Stock Exchange is very diverse like how to analyse stock price movements. Investors try to analyse stock prices with model like fundamental analysis or technical analysis. The capital market industry or the Stock Exchange must run its business with efficiently both in the company's operations or other efficiency such how to disseminate information that will be received by stock investors and efficiency in managing information so investors can know much. Efficient Market Hypothesis relates to the efficiency of information obtained by investors like transparency of information from private information like information each issuer and other information like public information that has been exposed to the public such as announcements of a rights issue or announcement of a company's stock withdrawal from the capital market. These announcements will usually have a significant effect on the share price on the Indonesia Stock Exchange, which will increase or decrease. The more efficient a capital market is all the information received will result in the movement of shares accurately and immediately so that it is considered to be unpredictable or randomly moving from day to day. The methodology of this research is will take data on the Indonesia Stock Exchange like the IHSG (composite stock price index) data in 2019 daily and will be proven whether the movement of the composite stock price index is random walk or not with use a **Stochastic Process.** 

Keywords: Efficient Market Hypothesis, investment in stocks, random walk, stochastic process

### I. INTRODUCTION

Capital market in Indonesia or the Indonesian Stock Exchange is a means for investors to invest on his wealth by way of purchase of securities. The products that investors will buy from the capital market are stocks, bonds and mutual funds. In its development, the capital market has an issue to find out whether or not the relevant price of a stock in the capital market is to easily obtain information about these market instruments, known as capital market efficiency.

Market efficiency has three forms, namely the efficient market hypothesis weak form (the weak form efficient market

hypothesis), the efficient market hypothesis form of semi strong (semi-strong form efficient market hypothesis), and the efficient market hypothesis form strong (strong form efficient market hypothesis) [1,2].

A semi-strong efficient market is divided into two, namely the efficient market information form strong half (informationally efficient market) and market a semi-strong efficient decision (decisionally efficient market) [2]. The informationally efficient market form emphasizes the speed of market reaction to an announcement that is published (quickly reflect) and testing the information content (fully reflect). The efficient market in the form of a strong half in a decision includes fully reflect, quickly reflect, and market sophistication.

### **II. LITERATURE REVIEW**

### A. Theory of Random Movement (Random Walk Theory)

Random walk is a theory in the stock market which reveals that the stock price or the whole market cannot be used as a reference to predict future stock price movements [3]. Because, stock price movements are random (random) and cannot be predicted. Chance of increase is the same as its chance to go down. However, in the long run the trend of stock prices has increased. Followers of this theory believe that it is impossible for investors to guess the direction of stock prices correctly, so both fundamental and technical analysis actually does not produce anything. The strategy (buy and hold) or buy stocks and save them in the long run is the most appropriate strategy for individual investors or can be said as a passive portfolio strategy [3].

Investors have many choices of strategies in the stock market. One of them, investors can buy shares and narrow them in the long run. Is a random walk theory that teaches this strategy. According to this theory, investors will be more profitable if he invests in certain stocks for the long term. That way, investors avoid the risk of unexpected short-term price fluctuations.

The random walk theory, also called the random walk hypothesis, appeared in 1973. At that time, a lecturer in economics at Princeton University, wrote a book called A Random Walk Down Wall Street [3]. Random walk is a stock market theory which says that past stock prices and the direction of stock prices or the market as a whole cannot be used as a tool to predict future stock price movements. Because, stock prices move randomly (randomly) and cannot be predicted. The odds of going up are the same as the chances of going down. But, in the long run, stock prices will tend to increase.

Followers of this theory believe that it is impossible for investors to guess the direction of prices correctly. Therefore, fundamental and technical analysis are actually of no use. Therefore, Malkiel said that buying shares and storing them in the long run is the most appropriate strategy for individual investors. Don't try to beat the market. He then showed that most mutual funds in America failed to beat the S&P index. Now, there are still many investors who follow Malkiel's strategy. However, other investors say that the current stock market conditions are very different from when Malkiel wrote a book about 30 years ago. Today, investors have a lot of access to market news and stock prices. Therefore, investors have more and more tools for making predictions. Whatever, vou believe which opinion. But, if you are a follower of Malkiel, perhaps, now is the right time to buy shares. While it is still affordable.

The term random walk is a term that first appeared in a correspondent in Nature that discusses the optimal strategy for finding drunk people left in the middle of the field. The trick is to start looking where the first drunk person was placed because the person will walk in an unpredictable and random direction [4].

This theory states that changes in the price of a stock or the entire market that has occurred cannot be used to predict future movements. Research conducted by Roberts [5] states that changes in stock prices are not dependent on each other and have the same probability distribution [4]. In other words, this theory states that stock prices move in a random and unpredictable direction. So it is not possible for an investor to be able to get a return that exceeds market returns without taking on more risk.

This also gives the meaning that the difference between prices in certain periods with prices in other periods is random. The difference is the stock price return, which within a certain period of time fulfils the requirement that the average is zero. This means that stock volatility will not have a significant trend in a long period of time.

# B. Stochastic Process Theory

Furthermore, the apparent random changes in financial markets have motivated the widespread use of stochastic processes in finance. The application and study of phenomena in turn inspired the proposals of new stochastic processes. Examples of stochastic processes such as including the Wiener process or the process of Brownian motion, used by Louis Bachelier to study changes in prices on the Paris Bourse, P roses stochastic is considered the most important and centres I in the theory of stochastic processes, and are found repeatedly and independently, both before and after Bachelier and Erlang, in various settings and countries.

The term random function is also used to refer to stochastic or random processes, because stochastic processes can also be interpreted as random elements in the function space. The terms stochastic processes and random processes are used interchangeably, often without special mathematical spaces for sets that index random variables. But often these two terms are used when random variables are indexed by integers or intervals from real lines. If a random variable is indexed by a Cartesian field or a higher-dimensional Euclidean space, the collection of random variables is usually called a random field. Stochastic process values are not always numbers and can be vectors or other mathematical objects.

Based on the mathematical properties, stochastic processes can be divided into various categories, which include a random street, martingales, Markov processes, process Levy, Process Gaussian, random field, the update process, and the process of branching. The study of stochastic processes uses mathematical knowledge and techniques from probability, calculus, linear algebra, set theory, and topology as well as branches of mathematical analysis such as real analysis, size theory, Fourier analysis, and functional analysis. The theory of stochastic processes considered as important contribution for mathematics and continue to be a topic of active research for theoretical reasons and applications.

# **III. METHODS**

# A. Test to Know a Capital Market Efficiency

In this study we use a quantitative approach, which is the research method presented in numbers. Arikunto which states quantitative is an approach that uses a lot of numbers in his research starting from collecting data, interpretation of the data, and other manifestations. In general, quantitative studies are structured objective studies of parts and symptoms and their relationships. Quantitative research has the goal of developing and applying mathematical forms, concepts and / or premises related to specific symptoms.

Analysis of data techniques in this study apply the series test, autocorrelation test, and root unit test. Cascading test (run test) is a statistical method used to test samples of random moves or not. The definition of run is a sequence of similar signs that are accompanied and accompanying different signs, or not accompanying or accompanied by any sign. Nisar and Hanif state that if the z-value is more than -1.96 and less than +1.96 then the sample movement is random, if the z-value is less than -1.96 and is more than +1.96 then the movement not random sample [6].

### IV. RESULTS AND DISCUSSION

There is a correlation between changes in stock prices with changes in previous stock prices if the asymp.sig value run test <0.05. If the asymp.sig value is smaller than  $\alpha$  (0.05), this means that the z-value is not between -1.96 and +1.96, therefore H0 is rejected. Conversely, if it is greater than  $\alpha$  (0.05) then z-values are between -1.96 and +1.96 and H0 is accepted, which means that the JCI return movement moves randomly. The second test used is the autocorrelation test, the autocorrelation test is used to find the correlation between



current return and previous return [6]. The existence of a positive or negative correlation can be said that the movement has not been random. The hypothesis of this test is:

- H0: There is no correlation i changes in stock returns with changes in previous stock returns.
- H1: There is a correlation of changes in the return stock with a change return stock previously.

Another method for testing the presence or absence of market efficiency is the unit root test. This test can be used, in an efficient market that requires random (not stationary) movements on the price of securities. The hypothesis of this test is:

- H0 : ADF test-stat ≥ Crit-Value Test (There are unit roots, index return data is not stationary) (1)
- H1 : ADF test-stat ≤ Crit-Value Test (There are no unit roots, stationary index return data ) (2)

If the t value is smaller than the Mckinnon critical value and the P value is less than 0.05 then it can be said that the data is stationary (not random walk). If the t value is greater than the Mckinnon critical value and the P value is greater than 0.05 then the data is not stationary (random walk).

Another test the efficiency of the Indonesian capital market, we will cointegration Test research methods used. This test is used to find out whether there will be a balance in the long run, i.e. there are similarities in the movement and stability of the relationships between the variables in this study or not. The number of cointegrated equations can be determined by comparing the Trace Statistics value to the critical value. The real level used in this study is 5%. Hypothesis testing the test is as follows:

- H0 : r = 0 (no cointegration) (3)
- H1 :  $r \neq 0$  (there is cointegration) (4)

H0 is rejected if the Trace Statistics value or the max Eigen value is greater than the critical value of 5% and H0 is accepted otherwise.

# V. CONCLUSION

An efficient capital market that is if prices reflect all information that occurs in the capital market. Information that occurs in the capital market will reflect the price of shares in the capital market. An example in the Indonesian capital market is that after there is information that a person is appointed to be a minister, then the share price of the group of owners of the Minister will go up or will go down. This reflects that the stock price changes after the information that will be done by investors to raise the stock price or lower the stock price. The investor's decision is in accordance with the efficient market theory that stock prices reflect the information received by investors, both information private and public, which is translated by each of the investors' decisions.

Because stock prices move randomly, investors cannot beat market movements because Investor cannot predict random movements. In the development of knowledge of random movements some stock prices can be predicted by stochastic processes. The stochastic process will produce an equation in the sequence of prices that will produce a value of stock on the next price movement can use a stochastic process. Stochastic process will also produce a particular vector in the direction of the random price of stock. So that the stochastic process can predict stock prices in the future in efficient market. Some ways to create a stochastic process so that it will be able to predict the movement of stock prices in the future like a Bernoulli Process, random walk symmetric, Wiener Process, Process and Markov chain. All of the above processes will produce a vector or direction of stock price movements that can predict future stock price in Indonesia Market Capital.

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