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Efficient Market Hypothesis and Market Anomalies of LQ 45 Index in Indonesia Stock Exchange

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Abstract: The validity of Efficient Market Hypothesis (EMH) needs to be examine and investigate throughout the time, particularly relates with the existence of Calendar Effect in one country stock exchange. LQ 45 Index is one of the Index that known as the most liquid index in Indonesia stock exchange, however the liquidity of this Index is influenced by many factors including past prices and calendar effect. This paper investigates the existence of EMH in Indonesia where the result showed that weak form EMH exist in LQ 45 Index. The result also showed that during certain condition investor are not able to gain profit in LQ45 Index using historical share prices data.

Keywords: LQ 45; Return Behaviour; Stock price; Market Anomalies; Efficient Market Hypothesis

Introduction

The most liquid Index in Indonesia Stock Exchange known as LQ 45 Index, this Index represents liquidity where the 45 companies that is include in the Index are holding certain criteria; highest capitalization, huge value of transaction and future prospect growth. The criteria are frequently evaluated by Indonesia Stock Exchange in order to maintain the standard. However, with market uncertainties and volatilities that known as market anomalies, the criteria and evaluation process of LQ 45 is always changing and dynamics.

In order to maintain the criteria of LQ 45, it is significantly important to investigate market efficiency in LQ 45 Index since market efficiency is the concept that introducing about availability of information and information always lead to transparency, fairness and liquidity of one country stock exchange. "The theory of speculation" a study that conducted by Louis Bachelier (1900) stated that the movement of stock prices is randomly moved and known as Brownian motion where this theory leads to the next theory that becoming the foundation of market efficiency known as Random walk theory. Furthermore, the theory of Efficient Market Hypothesis (EMH) develops in 1970 where

Fama (1970) published the three types of market efficiency; Weak, Semi and Strong form (EMH), where each type represents its own uniqueness and characteristics. This study represents the weak EMH that investigates how the movement of past prices of companies that includes in LQ 45. Several Researchers stated that weak form market efficiency is compatible with technical analysis (Miller, 1999). However, major differences can be withdrawn that weak form EMH use statistical process that different from technical analysis, thus the result would be different.

This research focuses on weak form of Efficient Market Hypothesis, since most of capital market found to be in efficient in weak form of EMH (Husnan, 1998, Rodoni, 2005, Abdullah 2004) Despite the previous research, LQ 45 Index has its own uniqueness that differentiate from another index in Indonesia Stock Exchange (IDX) Liquidity is the major uniqueness of LQ 45 where most of investor in IDX choose this Index with the characteristics of huge capitalization within the companies that listed in LQ 45 and huge trading volume on daily basis. In the implementation the criteria of LQ 45 will be influence and intervene with many factors, one of the is market anomalies where there are tendencies of market move in opposite of direction because of anomalies that happened in the market. News and event, time period or known as calendar will be the contributing factors that change the course and uniqueness of LQ 45 Index in IDX.

The existence of market anomalies in capital market has been widely discussed over the past few decades. Markets anomali appear to be related with calendar, it is widely known as a calendar effect. Calendar effect apparently characterize differently in stock markets on different days of the week, times of the month and even times of the year. There are many different calendar effects that exist within capital market, such as, sell in the month of May principle, January effect, Mark Twain effect, Monday effect and weekend effect. This calendar effects anomaly influences the decision making that must be taken by investors by distracting investors from conducting fundamental and technical analysis of the existing and potential investments. Research about market anomalies conducted by Meidawati (2004) revealed that from 9 stock samples of Jakarta Islamic Index showed that the *Shari'ah* capital market is in the weak form EMH and market anomalies were found to be inconsistent in the market. The measurement of Efficient Market Hypothesis is very important in capital market. In terms of market price, the stock price of classified company in LQ 45 should reflect the real condition of the company which issues a stock. Meanwhile, the efficiency of LQ 45 believed to be the main factor that can be used in answering the market price problem in capital market. The efficiency of LQ 45 refers to the condition where the price of stock fully reflects all available information.

This research is significant to conduct since it will provide special treatment for the LQ 45 in one side and realize the core concepts of LQ 45 regulation and decide what the best concept for capital market in Indonesia in the future in order to achieve efficient market in term of fairness, transparency, protection to investor and reducing systematic risk. The similarity of concept between EMH and capital market trading principle makes these two concepts are hand in hand to examine. Investors who invest in LQ 45 seek for investment that provides stability, transparency and fairness, while investor tends not having the same information at the same time because information are dynamics and move randomly. On the other hand, EMH concept also seeks to provide information that available to investor free and transparent by testing return predictability and stock price that moved randomly.

The existing literature mostly provides empirical evidence on the existing EMH that occurs in stock markets and focuses on index based on the number of the market capitalization. As the growth of individual companies of LQ 45 in Indonesia Stock Exchange increase over the last five years, which indicates that investors already aware of LQ 45 stock index, this Index should improve its level of efficiency as a prove that LQ 45 stock Index is a stable portfolio platform. The inconsistency that is found from the previous studies has proven that there are still rooms for further research about the validity of weak form efficient market hypothesis. Due to this fact, author encouraged to discuss about the weak form efficiency market and market anomalies in Indonesia stock exchange market and therefore the title of this research is Efficient Market Hypothesis and Market Anomalies of LQ 45 Index in Indonesia Stock Exchange.

Literature Review

Three types of EMH by Fama, later by many researchers interpreted into different field of research, whether it is in term of conceptual or statistical measurement. Conceptually, efficient market stated that current price describes available information or in other interpretation past information are not useful to predict future prices. Statistically, efficient market also describes as random data that normally distribute with capability to predict return in the future. Most of researcher considered EMH as hypothesis that needed to be tested and propose with adjustment through market current condition. Thus, the appropriate tools for measuring and examine EMH by using predictability to validate EMH. Fama (1970) reviewed two EMH testing methods that generally used at that time. First is the test of probability called “fair game” model, where it is implying the possibility of earning superior profit with historical prices information (weak-form EMH). Second is the test of serial covariances of returns. The serial covariance’s of a “fair game” should be zero, follow with the fact that serial covariance’s between lagged values of “fair game” are always zero.

Following Fama statistical method in examining market efficiency, Samuelson (1973a) wrote a survey paper “Mathematics of Speculative Price” where it is summarized the variety of mathematical methods applied for economist analysis to speculate pricing such as; Brownian motion, fair game martingales and the theory of portfolio optimization. Although, Samuelson model based on Fama statistical method in term of using Brownian motion and fair game martingales for measuring EMH, still, there are differences particularly in stressing stock prices as tools to predict without any bias. Bias predictability often occurs if securities in stock market showed response toward fundamental variable and other unrelated variables.

By putting again Fama (1970) EMH concept, Samuelson immediately sees the direct implication of efficient market, where there is no a group or individual investor able to consistently beat the market by using common investment strategy. In efficient market, the measurement of company’s value needs zero cost, as the direct implication of the information availability, while in market that is not efficient, the measurement of company’s values is costly particularly in providing information to investor. Cost for gaining information in EMH is considerable factor to decide investor willingness in buying securities. Ball (1978) explained the matter by writing a survey paper which revealed that cost in EMH is the justification of revenues as a result of investor who eliminates risk and chasing excess return. Ball (1978) believed that EMH is a combination between pricing and

arrival of information by examines post announcement risk adjusted abnormal returns that showed zero result, if the period after the earning announcements is in consistent with market efficiency. Ball also argues that non-zero abnormal returns occur due to the inadequacies of two asset pricing model parameter used in the studies to adjust with risk differentials.

Furthermore, Ball also arguing on the meaning of “available information”, if available information interpreted as publicly available or available only to individual investors, then it is as a result of competitive process in gaining information. The process of searching, investigating and analyzing the information will creates efficiency in information. Excessively volatile stock market has been a major challenge for EMH, particularly in term of measuring the real value of stock price. LeRoy and Porter (1981) explained stock markets that exhibit ‘excess volatility’ is rejecting the hypothesis of market efficiency. They proposed an alternative to test EMH in volatile market by using the same test that used by Samuelson (1965) and considered present value relation is equivalent to the null hypothesis tested in the return test.

The present value relation will reveal current actual stock price is the best predictor of discounted value of future actual dividends, referred to as the ex post rational price. The same statement about excess volatility is not proper tool to predict value of stock price also came from Shiller (1981). According to Shiller, several factors contribute to excess volatility such as influences from company’s internal factor that gives commensurate changes to stock price. Other factors such as financial crisis considered as contributed influence that has significant impact to stock prices volatility. Furthermore, Shiller added that the influence is related and integrated with volatility of stock price, if there are changes in the contributed factors than stock price will directly response toward volatility.

In the implementation, price correction applies if there is no individual or group of investors have the advantages of receiving particular information. Investor who has the advantages of gaining particular information or “insider trading” have a chance to gain abnormal return by benefiting from using the information. Milgrom and Stokey (1982) stated that a group of rational investors can overcome the problem of insider trading by setting a rational expectation to minimizing speculation strategy. However, in the long run, rational expectation brings advantages and problem, while efficient market hypothesis stated that stock prices reflect all available information leads to the ability of predicting future stock price limited since investor aware about the information. If market is efficient, abnormal return is possible to occur, but at certain condition or generally known as market anomalies, investor could earn abnormal return and asset price not reflecting all available information. In ideal market, market expectation will adjust to price immediately, the adjustment proves that the existence of arguments that saying random walk was the assumption where most economic agents are rational and utility maximize with unbiased expectation of future asset prices. Given that research about random walk remains a question since the attribution of the measurement tools is still on debate.

Lo and MacKinlay (1988) is one of the early researcher that trying to prove the existence of EMH by observing the movement of stock prices. The rejection to the existence of random walk according to Lo and MacKinlay do not imply that there is inefficiency in stock price formation, but mainly because of stock response towards varying volatilities. On the other hand, statistical tools to measure random walk is merely an equipment to observe the evolution of stock prices through period of time, but the using of descriptive tools is more useful to explain the pattern of the stock price evolution.

Availability of information is crucial for EMH to examine market reaction toward news and events after the information available. Certain events and news can bring ordinary and extraordinary impact to investment decision based on investor level of expectation. Shiller (1989) strongly believes that market volatility occur due to uncertainty of future earnings or future dividends. Uncertainty is possible to measure statistically but taking analyzing action toward interest rate and other influence variables, the uncertainty can be measured toward those variables. LeRoy (1989) published survey paper about EMH where he reviewing Fama's definition about efficient market. LeRoy stated that in order to reach a "fully reflect" available information not necessarily mean that market is in equilibrium condition, but by measuring expected return is appropriate for explaining "fully reflect" available information.

Based on the above discussion, EMH is not necessarily means reflecting all available information, but also reflecting how investor response and behaviour toward news and events. Rational response from investor will have implication to market in term of influence the behaviour of other investor in investment decision making. The implication reviewed by Fama (1991) by providing a proper methodology in joining hypothesis problem and giving new question to the return predictability. Fama finds that EMH depend on how market response to major down trend and up trend in economy. Response toward information can be analyzed everyday by using predictability of return. According to Fama (1991), predictability will enhance perspective value of EMH through time, adjustment toward current business condition and technology is needed because EMH needs to adapt to the changing of environment.

Predictability in EMH are used to measures other concept in finance that related with EMH such as in behavioural finance where predictability able to measure investor behaviour towards certain condition. Malkiel (1992) examines the relation between predictability and efficiency using two major events in world economy; crash of 1987 and internet bubble. Malkiel finds that the more efficient and less predictable the stock market, the more it will create a safe and trusted trading environment for investor. Malkiel also used Fama's efficiency definition that can be tested by revealing information to market participants or investor and measuring the reaction of security prices or alternatively by measuring the profits that one can gain by trading on information.

The debate on how to measured market volatility based on information continued when Rubinstein (2001), examined market rationality and irrationality by using historical evidence on events and news that happened in economy during the period of observation. According to Rubinstein, market irrationality happened as the influence from over confident investor toward market condition. Over confidence investor tend to think that they can beat the market, this assumption lead to decision making based on bias prediction. Rubinstein also stated that the requirement to compete in efficient market is a willingness from rational and oriented investor to compete by using all information without any bias or prejudice. In a volatile market, rational and oriented investor can be categorized as risk taker, where one investor capable to influence market price in form of influencing other investor investment decision.

Daniel and Titman (1999) explained that the relation between EMH and behavioural finance due to biases and perception from over confidence investor. Over confidence investor influence market price both direct and indirectly. Direct implication is in term of over analyzing information data in financial report, while indirect implication toward stock market price is for investor who eliminates proper information will lowering their self

confidence, such as; taking advice from other investor or denial of losses. Further research about EMH is focusing on whether EMH has influences toward crisis. In the beginning of EMH introduction to financial market, free market is in question due to the doubt about EMH theory. Several investors gain abnormal return and leads to bubbles in stock market. A bubble occurred because of stock market was surrounded with profit takers. Profit taker lead other investor to considering that current stock price is the real value of stock price and forced them to continuously investing their money to one portfolio that eventually triggered a bubble in market. To prevent bubble into financial crisis, the maximization of EMH function to reflect information to all market participants should be establish.

Malkiel (2003), argue on EMH as the triggered to financial crisis. Malkiel concludes that EMH is not merely about “available information” but also as the reaction of certain anomalies that occur in stock market. Lo (2004, 2005), examines the new paradigm of EMH by using the term of Adaptive Market Hypothesis (AMH) and criticize EMH by focusing on the behaviour of market participants. Lo suggesting that EMH and behavioural finance mutually move market in intellectual manner. Lo (2004) argues that the different perception from investor occur with how investor dealing with the changes of environment, the performance of investment products, businesses and industrial competition. While, Lo (2005) stated that AMH is more compatible for current stock market condition because risk were adjusted to the changing of market condition while EMH is more into transferring risk into certain level of investor acceptance. Lo also believed that further improvement of market efficiency and rationality toward increasing the level of market adjustment. If investor confidentiality decreased over time, market tend to be more rational and the chances of getting abnormal return is higher, while if investor is over confident, then the chances of getting lower market rationality is higher, because it will also affect the chances of earning abnormal return.

Methods

Data

Scope of research in this study is companies listed in LQ 45 Index of Indonesia Stock Exchange Market (IDX) from period of January 2013 - December 2018.

Methodology

1. Non-parametric test

Run Test

Run Test which also called as Wald-Wolfowitz test after its founder, Abraham Waid and Jacob Wolfowitz, is categorized as part of non-parametric statistical test which test a randomness hypothesis for two-valued data sequence of that research. A “run” of a sequence is the total change in sign of a segment of a sequence. For the example, a 30 element-long sequence such as:

| |
|---------------------------------|
| ++----+++++-----+++---+++--++-- |
|---------------------------------|

This sequence consists of 10 runs in which 5 of them consist of “+” sign and the others consist of “-“ sign. This runs test is based on the null hypothesis of each element in the sequence that is formed based on the purpose of study and they are independently drawn from the equal distribution. According to (Rodoni :2005,42) Run Test is the method that is used in order to know whether the movement of the stock price moves randomly or not. Since the aim of the study in this research is to find out the existence of weak form efficient market hypothesis, run test is applied as tool in observing the random walk model. In having run test in the study, the models for the statistic test to examine the sequence under the null hypothesis are as follow:

Calculating mean of the sequence:

$$\mu = \frac{2N + N_-}{N} + 1$$

Calculating variance of the sequence:

$$\sigma^2 = \frac{(2N + N_-)(2N + N_- - N)}{N^2(N - 1)}$$

a. Kruskal-Wallis test

Kruskal-Wallis test is a non- parametric method that is found by William Kruskal and W. According to Uyanto (2009), the main function from Kruskal-Wallis test is to compare the k-sample which is independent that comes from different population with ordinal scale or its interval scale is assumed not to be distributed normally. The form of Kruskal-Wallis test formula by using chi square distribution approach is as follow:

$$\frac{12}{N(N + 1)} \sum_{j=1}^k \frac{R_j^2}{n_j} - 3(n + 1)$$

1.) Test on day of the week effect

In order to test the day of the week effect in the capital market, the use of non-parametric statistical test such as Kruskal-Wallis test is necessary. The form of this hypothesis is as follow:

$$H_0 : \eta_{\text{mon}} = \eta_{\text{tue}} = \eta_{\text{wed}} = \eta_{\text{thu}} = \eta_{\text{fri}}$$

$$H_1 : \text{not every mean } \eta_i, i = 1 \dots, k \text{ is in equal value}$$

where :

$$\eta_{\text{mon}} = \text{mean return on Monday}$$

$$\eta_{\text{tue}} = \text{mean return on Tuesday}$$

$$\eta_{\text{wed}} = \text{mean return on Wednesday}$$

$$\eta_{\text{thu}} = \text{mean return on Thursday}$$

$$\eta_{\text{fri}} = \text{mean return on Friday}$$

2.) Test on the month of the year effect

In order to figure out the existence of month of the year effect in the market, this paper utilizes Kruskal-Wallis test. In which the form of the hypothesis is as follow:

$$H_0 : \eta_{jan} = \eta_{feb} = \eta_{mar} = \eta_{apr} = \eta_{may} = \eta_{jun} = \eta_{jul} = \eta_{aug} = \eta_{sep} = \eta_{oct} = \eta_{nov} = \eta_{des}$$

$$H_1 : \text{not every mean } \eta_i, i = 1 \dots, k \text{ is in equal value}$$

$$H_1 : \eta_1 \neq \eta_2$$

Where:

$$\eta_1 = \text{Median return from Monday}$$

$$\eta_2 = \text{Median return from days besides Monday}$$

2. Parametric Test

Parametric statistic test is a test which assumes that the data come from a well distributed population. In other interpretation said, parametric test is considered to be able to make more assumptions than non-parametric methods and this method is simpler rather than the others. Parametric test deals with the estimation of population parameters like the mean of particular data.

a.) Series Correlation test

Series correlation test is used to find out strength and weakness of the relation between the stock prices in t period with the previous period. The stock price in period t is equal to variable y and the previous stock price is equal to variable x .

$$r = \frac{\frac{1}{(T-j)} \sum_{t=1}^T (X_t - \bar{X})(X_{t-j} - \bar{X})}{\sigma^2}$$

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Where:

- X_t = Change of stock price on t day
- \bar{X} = Mean change of stock price
- X_{t-j} = Change of stock price on the previous day
- σ^2 = Variance

Weak form market efficiency test by using serial correlation test as one of the parametric statistical test, possess hypothesis form as follow:

$$H_0 : p = 0$$

$$H_1 : p \neq 0$$

Where :

P = Correlation coefficient

In doing this hypothesis test the value of confidence interval is equal to 95% with the value of α is equal to 5% and from the result of the calculation the decision that will be taken are

first if the value of the significant level from the output is bigger than the value of α , then H_0 is rejected. Otherwise if the value of the significant level is equal to or larger than the value of α then the H_0 can't be rejected.

b.) One-way Anova test

The one-way variance analysis or which is known as One-way Anova is used to compare the mean of more than 2 samples. The test on more than these 2 samples have the purpose to know whether there is a significant difference between the mean calculated with two groups or more.

c.) Independent two samples t-test

Independent-samples t Test is a test that commonly used in order to compare the difference among two means from two independent samples. In conducting this research hypothesis test, the entire test uses Independent-samples t Test in both tails. The main intention why this test is needed in the research is to examine and find out whether there is a difference between two samples that will be tested or not. The formula for Independent-samples t Test is as follow:

$$t = \frac{\bar{x} - \bar{y}}{Sp \sqrt{\frac{1}{n_x} + \frac{1}{n_y}}}$$

$$Sp = \frac{\sqrt{(n_x - 1)S^2_x + (n_y - 1)S^2_y}}{n_x + n_y - 2}$$

Findings

Result and Data Analysis

Table 1. Result of the Run Test of the Research Samples

| Code | Number of Runs | Expected Number of Runs | P-Value | Alpha |
|---------|----------------|-------------------------|---------|-------|
| AAJI | 733 | 762.183 | 0.138 | 0.05 |
| ADRO | 741.000 | 730.742 | 0.603 | 0.05 |
| ASII | 761.000 | 762.424 | 0.962 | 0.05 |
| BBCA | 781.000 | 745.944 | 0.071 | 0.05 |
| BBNI | 754.000 | 739.559 | 0.463 | 0.05 |
| BBRI | 755.000 | 758.817 | 0.863 | 0.05 |
| BDMN | 737.000 | 729.899 | 0.725 | 0.05 |
| BMRI | 769.000 | 755.931 | 0.513 | 0.05 |
| INDF | 723.000 | 740.568 | 0.364 | 0.05 |
| INTP | 753.000 | 765.725 | 0.530 | 0.05 |
| ITMG | 733.000 | 751.115 | 0.361 | 0.05 |
| JSMR | 741.000 | 727.559 | 0.488 | 0.05 |
| KLBF | 771.000 | 731.406 | 0.037 | 0.05 |
| LPKR | 608.000 | 661.786 | 0.002 | 0.05 |
| LSIP | 733.000 | 749.026 | 0.414 | 0.05 |
| PGAS | 751.000 | 755.014 | 0.855 | 0.05 |
| PTBA | 755.000 | 756.529 | 0.957 | 0.05 |
| SMGR | 740.000 | 746.433 | 0.757 | 0.05 |
| TLKM | 759.000 | 741.066 | 0.359 | 0.05 |
| UNTR | 761.000 | 765.924 | 0.820 | 0.05 |
| UNVR | 780.000 | 746.911 | 0.089 | 0.05 |
| Average | 744.71 | 744.027 | 0.493 | 0.05 |

Run test is conducted to compare the amount of the probability value from every stock towards the average value of the probability value with the value of a ($\alpha = 5\%$ or 0.05). If the PV (probability value) $> \alpha$ then it shows that the stock price pattern is random. From the observed twenty-one companies, only one company that shows lower number of probability value compared with the average probability value, which is LPKR with the 0.001 probability value < 0.05 . This result showed that investor who chooses to invest in LQ 45 Index is efficient in weak form where investor cannot gain abnormal return during normal transaction at LQ 45 Index. Furthermore, investor needs to diversify their investment during certain period where anomalies of calendar should be avoided by conducting particular analysis such as fundamental and technical analysis.

Table 2. Statistical Description Summary of Kruskal-Wallis Test on Day of the Week Effect

| | Day | N | Mean Rank |
|------|-----------|-----|-----------|
| 2013 | Monday | 46 | 115.46 |
| | Tuesday | 52 | 121.28 |
| | Wednesday | 50 | 129.79 |
| | Thursday | 51 | 123.29 |
| | Friday | 50 | 134.6 |
| | Total | 249 | |
| 2014 | Monday | 52 | 131.73 |
| | Tuesday | 52 | 126.96 |
| | Wednesday | 52 | 134.89 |
| | Thursday | 52 | 125.21 |
| | Friday | 51 | 131.23 |
| | Total | 259 | |
| 2015 | Monday | 50 | 114.14 |
| | Tuesday | 49 | 114.58 |
| | Wednesday | 48 | 151.18 |
| | Thursday | 49 | 112.04 |
| | Friday | 50 | 126.26 |
| | Total | 246 | |
| 2016 | Monday | 53 | 108.63 |
| | Tuesday | 52 | 150.35 |
| | Wednesday | 52 | 142.65 |
| | Thursday | 52 | 118.2 |
| | Friday | 51 | 133.14 |
| | Total | 260 | |
| 2017 | Monday | 52 | 115.05 |
| | Tuesday | 53 | 141.08 |
| | Wednesday | 52 | 140.52 |
| | Thursday | 52 | 131.32 |
| | Friday | 52 | 126.84 |
| | Total | 261 | |
| 2018 | Monday | 52 | 128.13 |
| | Tuesday | 52 | 116.77 |
| | Wednesday | 53 | 150.58 |
| | Thursday | 52 | 132.79 |
| | Friday | 52 | 126.36 |
| | Total | 261 | |

According to the Kruskal Wallis test result that is shown above, the highest mean average return in 2013 is on Friday with 134.6 mean rank, in 2014 is on Wednesday with 134.89 mean rank, in 2011 is on Wednesday with 151.18 mean rank, in 2012 is on Tuesday with 150.35 mean rank, in 2013 is on Tuesday with 141.08 mean rank and in 2014 is on Wednesday with 150.58 mean rank. This result shows that there is an inconsistency of the existence from day of the week effect towards the stock return where Monday showed significantly highest return than any other day of the week. In calendar anomalies, Monday is known as the day where most of investor starting their investing after a two-day breaks during the weekend. Weekend is a leisure time where most of investor postponing their investing activities to enjoy the weekend and will start again on Monday. Monday is known

as hectic day where investor starts to buy and sells their particular stocks. This pattern explains why on Monday return is higher and transaction volume is increase.

According Akrami (2012), the explanation why Monday has high average return compared to other days is because the intention of the trader to do transaction on Monday is relatively higher compared to other trading days. The high level of stock trading on Monday is caused by their intention to sell more rather than purchase more, this as a result affect the stock price on Monday to become lower than other trading days in a week. Furthermore, Dyl & Maberly (1988) through their study found out that unfavorable information regarding the stock market is usually announced when the stock market is closed on Friday, and this causes the stock price on next Monday will be under pressure.

However, the result on this research showed that during period of study that Monday return are stable and normal in LQ 45 Index, the explanation would be since LQ 45 Index is and Index that known as liquid and high transaction Index and most of Investor that hold the stocks of this Index will tend to wait and see of a certain news and event that will influence the stock price thus calendar anomalies of Monday not necessarily influence significantly to investor investing behavior pattern.

Table 3. Statistical Description Summary of Kruskal-Wallis Test on Month of the Year Effect

| Year | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|
| | N | Mean Rank | N | Mean Rank | N | Mean Rank | N | Mean Rank | N | Mean Rank | N | Mean Rank |
| January | 18 | 116.83 | 20 | 124.6 | 20 | 95.5 | 22 | 137.77 | 23 | 135.3 | 23 | 144.13 |
| February | 20 | 115.82 | 20 | 119.32 | 18 | 126.08 | 21 | 132.33 | 20 | 151.62 | 20 | 146.5 |
| March | 22 | 137.7 | 23 | 139.93 | 22 | 134.48 | 22 | 141.05 | 21 | 133.71 | 21 | 143.05 |
| April | 22 | 149.23 | 22 | 137.98 | 20 | 130.55 | 21 | 130 | 22 | 135.86 | 22 | 134.91 |
| May | 21 | 137.38 | 21 | 103.52 | 21 | 120.88 | 23 | 102.22 | 23 | 124.72 | 22 | 136.73 |
| June | 22 | 120.39 | 22 | 145 | 20 | 118.4 | 21 | 128.29 | 20 | 120.4 | 21 | 121.33 |
| July | 23 | 145.65 | 22 | 141 | 20 | 133.9 | 22 | 154.55 | 23 | 111.3 | 23 | 136.48 |
| August | 21 | 121.55 | 22 | 120.93 | 19 | 112.03 | 23 | 120.61 | 22 | 134.05 | 21 | 119.76 |
| September | 22 | 130.64 | 22 | 137.02 | 20 | 115.65 | 20 | 153.15 | 21 | 118.31 | 22 | 120.14 |
| October | 22 | 108 | 21 | 140.9 | 21 | 144.38 | 23 | 125.83 | 23 | 154.26 | 23 | 123.83 |
| November | 21 | 123.93 | 22 | 116.93 | 22 | 117.77 | 21 | 108.95 | 21 | 121.14 | 20 | 124.8 |
| December | 21 | 124.74 | 22 | 130.23 | 22 | 124.41 | 21 | 134.43 | 22 | 131.25 | 23 | 120.74 |

Referring to the table 4.3, highest return that happened in particular month of research period showed that calendar anomalies are happening within LQ 45 Index. News and events are happening during certain period that showing most of investor in LQ 45 Index is following the pattern of behavioural in investing. This result also showed that LQ 45 Index is in efficient in weak form of EMH where it is showed that they are following the semi strong form of EMH.

List of news and event that influencing the return on April 2013 are the introducing of the first global Islamic bond while during October 2014 showed that there is certain concern toward deficit on government budget followed with policy that implemented by Indonesia capital market supervisory board that implementing the master plan for the year of 2015.

Highest return in July 2016 is most likely caused by the new regulation by Bank Indonesia about bank ownership in Indonesia where most of the several of companies that listed in

LQ 45 are from banking industry. According to the summary of the Kruskal-Wallis test, it is obvious the highest mean return in the months during the year of observation seems to be different one with another. Thus, it shows that there is no indication of the consistency of the occurrence of month of the year effect in particular month of the year.

Table 4. **One Way Anova Test Descriptive Statistic Summary of Day of the Week Effect**

| Year | Day | N | Mean | S.Dev |
|------|-----------|-----|-----------|---------|
| 2013 | Monday | 50 | 0.0019 | 0.2044 |
| | Tuesday | 52 | 0.003 | 0.0168 |
| | Wednesday | 52 | 0.0037 | 0.0162 |
| | Thursday | 51 | 0.0029 | 0.0175 |
| | Friday | 50 | 0.0033 | 0.0103 |
| | Total | 255 | 0.0033 | 0.0165 |
| Year | Day | N | Mean | S.Dev |
| 2014 | Monday | 52 | 0.0035 | 0.018 |
| | Tuesday | 52 | -0.0004 | 0.014 |
| | Wednesday | 52 | 0.0033 | 0.016 |
| | Thursday | 52 | 0.0012 | 0.0118 |
| | Friday | 51 | 0.006 | 0.0119 |
| | Total | 259 | 0.0016 | 0.0149 |
| Year | Day | N | Mean | S.Dev |
| 2015 | Monday | 50 | -0.0031 | 0.1743 |
| | Tuesday | 49 | -0.000702 | 0.1686 |
| | Wednesday | 48 | 0.006 | 0.1441 |
| | Thursday | 49 | -0.0022 | 0.2048 |
| | Friday | 50 | -0.0066 | 0.1688 |
| | Total | 246 | -0.000064 | 0.0175 |
| Year | Day | N | Mean | S.Dev |
| 2016 | Monday | 53 | -0.0034 | 0.0122 |
| | Tuesday | 52 | 0.0028 | 0.008 |
| | Wednesday | 52 | 0.0026 | 0.0102 |
| | Thursday | 52 | -0.0011 | 0.0072 |
| | Friday | 51 | 0.009 | 0.1001 |
| | Total | 260 | 0.004 | 0.0004 |
| Year | Day | N | Mean | S.Dev |
| 2017 | Monday | 52 | -0.0033 | 0.0174 |
| | Tuesday | 53 | 0.0009 | 0.01402 |
| | Wednesday | 52 | 0.0014 | 0.0145 |
| | Thursday | 52 | 0.0009 | 0.0144 |
| | Friday | 52 | -0.0002 | 0.0135 |
| | Total | 261 | -0.000049 | 0.0148 |
| Year | Day | N | Mean | S.Dev |
| 2018 | Monday | 52 | 0.0004 | 0.0117 |
| | Tuesday | 52 | -0.0008 | 0.0098 |
| | Wednesday | 53 | 0.0032 | 0.0084 |
| | Thursday | 52 | 0.0006 | 0.0107 |
| | Friday | 52 | 0.0002 | 0.0113 |
| | Total | 261 | 0.0007 | 0.0104 |

Based on the table 4.4 One Way Anova Test descriptive statistic summary showed volatility toward return on day of the week effect of LQ 45 Index. The diversity of the returns also explains that changes in external factor or economy wide risks such as unanticipated

inflation or unanticipated changes in exchange rates will change the term structure or default risk premiums that cannot captured by the model, it may have reduced the variations in daily returns. Data will also contribute to the differences of return between days. On specific days, such as Monday, investor tend to have frequent trading, implementing buying and selling in small number of frequencies, whether it is in term of profit and loss.

Frequent trading on Monday occur due to Monday is the beginning of trading day after holiday or weekend where most of investor are postponing their investing activity and making investment decision on Monday which can cause higher return on Monday, while low return on Monday is due to most of companies that listed in LQ 45 are postponing their announcement that related to the companies condition until Friday where most of investor are slowing down their investment activity that caused high and low frequency of buying and selling of LQ 45 stocks Index.

Conclusion

To overcome the existence of seasonal anomalies in LQ 45, Indonesia stock exchange particularly policy maker in capital market need to set up regulation that prohibited the action of gambling or speculation and making sure that every investor whether it is institutional or individual investor can absorb information by establishing regulated trading mechanism. In certain seasonal anomalies, investor proves to obtained abnormal return during seasonal anomalies in LQ 45, particularly in month of the year, the existence of seasonal anomalies proves that LQ 45 Index in Indonesia are not purely efficient, since investor can benefit of certain time for securing abnormal profit.

The efficiency of LQ 45 Index in Indonesia stock exchange (IDX) also determined by the whole trading system. Trading system in should be ensuring to provide a fair and transparent trading system for investor. However, since stock market also following the news and event that happening during certain times, makes the dynamism and volatility also changing as well according to policy by government and economic growth of one country.

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