Original Article

Market Efficiency Testing Half Strong Form in Indonesia Stock Exchange

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Abstract - *The purpose of this study is to determine the form of market efficiency in the Indonesia Stock Exchange. The population of this research is all IDX 80 shares for the period August 2019-January 2020, as many as 80 company shares. This study uses secondary data in the form of closing stock prices and closing stock price index, and the announcement of Jokowi's presidential inauguration in 2019. Seventy company stocks were studied and declared free from outliers. The research hypothesis uses a statistical tool—a one-sample t-test.*

The research findings prove that there is a market reaction around events, and the market reacts quickly to absorb information towards a new equilibrium point. The Indonesian Stock Exchange is efficient in its information-strong semi-strong form.

Keywords - *Efficient Market, Efficient Market Hypothesis, Event Study, Excess Return.*

I. INTRODUCTION

The concept of capital market efficiency has become an interesting and controversial debate among academics and the financial community[1]. In general, academics believe in this concept, but not all financial communities believe in it [2]. Even the term capital market efficiency is interpreted differently. The efficiency of the capital market among academics is defined as a market in which no investor can get an abnormal return [1]. However, the financial community defines it as a market that can provide services needed by investors at minimal costs [2].

The basic concept of assessing market efficiency is the relationship between security prices and information. Regarding which information can be used to assess market efficiency. Fama (1970) divides the form of market efficiency informally into three categories, namely the weak form, the semi-strong form and the strong form to classify empirical research on market efficiency. Fama (1970) also divides market efficiency testing into three categories associated with forms of market efficiency, namely weak form testing, half-strong form testing and strong form testing [3].

In the next article, Fama (1991) refined the previous category of testing the form of market efficiency, testing the efficiency of the half-strong form was replaced by an event study that studies market reactions to an event whose information is published as an announcement [3]. The efficient market hypothesis predicts that the market will give a positive reaction as good news and a negative reaction as bad news. This market reaction is reflected in changes in the price of the security concerned. This reaction can be measured by return as a change in price or an excess return[1].

An understanding of the three forms of market efficiency will lead researchers to test market efficiency in a semi-strong form because, in this market, excess returns only occur around the announcement of an event that is responded to by market players or investors [3]. Prolonged abnormal returns reflect part of the response of market players or investors who are late in absorbing or interpreting the information available. Thus the market is considered inefficient in a half-strong form [4].

Research testing the efficiency of the semi-strong form market has been conducted before. The findings are areas in the following table:

Table 1. Previous Research Gap Research

Research Gap	Results	Researcher
There are excess returns around the event	Not Significant	Sonje, et al (2011),Woodard and Bacon (2015), Mirdah and Solikhin (2009) and Dewi and Kartika (2014)
	Significant	Jayaraman and Ramaratman (2011), Sheikhbahaei, Mohd, and Ismail (2012), Kumar and Pandey (2013), Kurnianingsih (2011) and Nurmala and Salmah (2015).

Source: Extracted from previous research results

Regardless of the events and statistical tools used, several research results indicate inconsistencies. However, previous research has focused a lot on non-political events. Researchers are interested in conducting similar research by trying to use political events in the form of the announcement of Jokowi's presidential inauguration in 2019.

Based on the background of the problem above, the problem statement of this study is that there are inconsistencies in the results of previous research so that the research question posed is what is the form of market efficiency on the Indonesia Stock Exchange, while the research objective is to find out and explain the form of market efficiency on the Indonesia Stock Exchange.

II. STUDY OF THEORY AND HYPOTHESIS DEVELOPMENT

A. Efficient Capital Market Theory

An efficient capital market is a market in which the prices of the securities have reflected all relevant information. Tandelilin (2001) states that in an efficient market, not one investor can get an excess return from the market because in an efficient market, all information is obtained simultaneously at a low and easy cost by all parties in the market, so the price is formed. Is the equilibrium price so that no investor can get an abnormal return by utilizing the information he has. In this case, the information held can be in the form of past information, current information, as well as information that is a rational opinion or opinion that is circulating that, can affect price changes.

B. Semi-Strong Market Efficiency

Fama (1970) divides three types of market efficiency forms based on past information, current information that is being published and private information, namely weak-form market efficiency, semi-strong form and strong form [2]. The current stock market price reflects not only past prices but all published information. Investors are unable to obtain excess returns based on the published information.

C. Excess Return

Excess return is the difference from the actual return that occurs to a normal return. Normal return is the expected return. That is the expected return. Mathematically, excess returns are as follows [3]:

$$RTN_t = R_{i,t} - E(R_{i,t})$$

Where:

RTN_t: Excess return of stock I in the event period t

$R_{i,t}$: The actual return that occurs for stock-i in the event period t

$E(R_{i,t})$: Return of stock i expectations for event period t

t: Daily time period

D. Return Expectations

The expected return is a return that must be estimated. Borwn and Warner (1985) explain that expected returns can be estimated with a market model, market-adjusted model and mean adjusted model [3]. Calculation of expected returns with a market model, first making an expectation model using historical data during the estimated period, then using the model to estimate the expected return in the event period. The expectation model can be calculated using the Ordinary Least Square regression technique with the following equation [3]:

$$E(R_{i,t}) = \alpha_i + \beta_i + R_{m,t} + \varepsilon_{i,t}$$

Where:

$E(R_{i,t})$: return on a stock realization I in the estimated period t

α_i: constants for stocks i

β_i: stock beta i

$R_{m,t}$: market return in the estimated period t

ε_i: residual error of stock I in period t

E. Event Studies

An event study is a study that studies the market's reaction to an event whose information is published as an announcement. In addition to being used to test the information content of an announcement, event studies are also used to test the efficiency of the information-strong semi-strong form market [3].

Testing the information content is intended to see the reaction of an announcement. If the announcement contains information, it is expected that the market will react when the market receives the announcement, but a semi-strong market efficiency test is intended to see how quickly the market reacts. If investors quickly absorb excess returns, the market is said to be an informally strong semi-efficient form. On the other hand, it is said to be inefficient as a semi-strong form of information [3].

F. Hypothesis

An efficient market is a market where no investor can get an excess return on the information held Tandelilin 2001(2001). Sonje et al. (2011), Woodard and Bacon (2015),

Mirdah and Solikhin (2009) and Dewi and Kartika (2014) proved that there was no investor reaction to the dividend payment announcement. Based on the theory and previous findings, the following hypothesis is proposed:

Ha: There is an excess return around the announcement of Jokowi's inauguration in 2019.

III. RESEARCH METHODOLOGY

This research is census research because it examines all elements contained in the population, namely all stocks that are members of the IDX 80 for the period August 2019- January 2020.

The variable of this research is investors' reactions which are proxied with excess returns, which is the difference between realized returns and expected returns. The expected return is the return expected by investors. The extra return formula is as follows:

$$RTN_{,t} = R_{i,t} - E(R_{i,t})$$

Where:

$RTN_{,t}$: the excess return of stock I to t period

$R_{i,t}$: the real return of stock I to t period

$E(R_{i,t})$: the expected return of stock I to t period

This study uses secondary data collected from www.IDX.co.id and the mass media. The data collected are:

- The date of the 2019 presidential inauguration event was obtained from the mass media.
- Shares that are members of IDX 80 during the research period are acquired from www.IDX.co.id.
- The closing price for trading shares that are members of IDX 80 33 days prior to 2 days after the event is obtained by www.IDX.co.id.

This study uses an estimated period of 30 days, starting from September 5, 2019 (t-33) to October 16, 2019 (t-3), which is 3 days of stock trading before the event occurs, while the event period is 5 days around the event starting on 17 - 23 October 2019.

Determination of the event period is taken 2 days before and after the President's inauguration to avoid the effects of other events that may affect the events being observed. The inauguration of President Jokowi in 2019 was carried out on October 20, 2019, which falls on a Sunday (which is not an exchange day). Thus the determination of event day (t0) uses the trading date after the event (Suryawijaya and Setiawan, 1998), namely October 21, 2019. If described, this research period is as shown below:
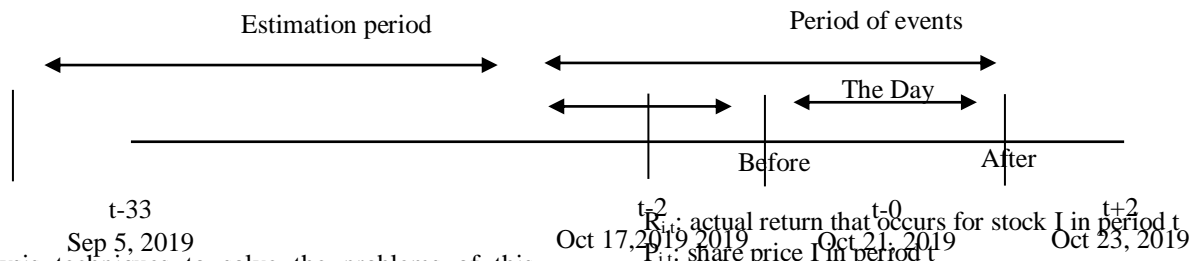
Data analysis techniques to solve the problems of this research are as follows:

A. Descriptive statistics

Descriptive statistics provide an overview or description of data seen from the maximum, minimum, average, and standard deviation values [14]. The data description from descriptive statistics in this study illustrates how the excess return value of each day in the event period.

B. Inferential statistics

The inferential statistics of this study use the event study analysis technique, namely the market reaction when there is an announcement of the announcement of Jokowi's resident inauguration on 20 October 2019. Testing of market reactions around the event is used One sample t-test on the grounds that the data is a ratio scale with a parametric type. The steps are as follows:

1. Calculate the real return

$$R_{i,t} = \frac{P_{i,t} - P_{I,t-1}}{P_{I,t-1}}$$

Where:

$R_{i,t}$: actual return that occurs for stock I in period t

$P_{i,t}$: share price I in period t

$P_{i,t-1}$: the actual price that occurs for share I in period t-1 (previous).

2. Calculate the daily market return with the formula (Hartono in Wibowo and Darmanto):

$$R_{m,t} = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}$$

Where:

$R_{m,t}$: market return at time t

$IHSG_t$: Composite Index period t

$IHSG_{t-1}$: Composite Index period t-1 (previous)

3. Calculating excess returns using the market model for each issuer with the formula:

$$RTN_{,t} = R_{i,t} - E(R_{i,t})$$

Where:

$RTN_{,t}$: the excess return of stocks to I to t period

$R_{i,t}$: the real return of stock to I to t period

$E(R_{i,t})$: the expected return of shares to i to t period

While the formula for the expected return of stock-i in period t is as follows:

$$E(R_{i,t}) = \alpha_i + \beta_i + R_{m,t} + \varepsilon_{i,t}$$

Where:

$E(R_{i,t})$: return on a stock realization I in the estimated period t

α_i: constants for stocks i

β_i: stock beta i

$R_{m,t}$: market return in the estimated period t

ε_i: residual error of stock I in period t

4. Calculating the average excess return with the formula:

$$RRTN_{i,t} = \frac{\sum_{i=1}^{n} RTN_{i,t}}{n}$$

Where:

$RRTN_{i,t}$: the average excess return on stock I for day t in the period event.

$RTN_{,t}$: the excess return of stock I for day t of the event period

n: number of shares

5. Test data normality

The normality of data on the average excess return is tested by skewness and kurtosis with the following formula [14]:

$$A_{skew} = \frac{S-0}{\sqrt{6/N}} \qquad \text{dan } Z_{kurt} = \frac{K-0}{\sqrt{24/N}}$$

Where:

S: skewness value

N: number of cases

K: The value of kurtosis

If the Z value of skewness and the Z value of kurtosis is between the critical value of $\pm 1,96$, then the average data return is not normal with a normal distribution. On the other hand, it is said to be not normally distributed.

6. Testing the hypothesis with the one-sample t-test statistical tool with the following formula:

$$t = \frac{\overline{RTN}}{KSA_t}$$

Where:

t: t count.

$\overline{RTN}$: the average excess return for day t in the event period.

Kur_t: the estimated standard error for day t in the event period.

The formula calculates the standard estimation error:

$$Kur_t = \sqrt{\frac{\sum_{i=1}^{n}[RTN_{i,t} - \overline{R}_i]^2}{n-1}} \cdot \frac{1}{\sqrt{n}}$$

Where:

Kur_t: the estimated standard error for day t in the event period.

$RTN_{,t}$: the excess return of stock I for day t in the event period.

R_i: the expected return of stock I for day t in the event period.

N: number of shares.

7. Calculating the significance of the excess return that occurs with the t-test, with the formula:

$$t = \frac{\overline{RTN}}{KSA_t}$$

Where:

t: t count.

$\overline{RTN}$: average excess returns for day t in the event period.

Kur_t: the estimated standard error for day t in the event period.

IV. RESULTS AND DISCUSSION
A. Description of Excess Return

The results of the descriptive statistical calculation of the average excess return of stocks around the event are presented in Table 2 below. From the table, it can be seen that the average return is not normal before the event is positive; this shows that there has been a reaction from investors. In contrast, when and after the event is negative, this shows that there is no investor response to the announcement of Jokowi's presidential inauguration in 2019.

Table 2. Descriptive Statistics Average Excess Return Around Events

Period	N	Mean	Standard Deviation	Information
t-2	70	0,0025	0,0147	Positive excess returns indicate there is investor reaction
t-1	70	0,0027	0,0243	
t0	70	-00009	0,0161	Negative and positive excess returns indicate no reaction from investors
t1	70	-0,0059	0,0134	
t2	70	0,0048	0,0182	

Source: Secondary data processed, 2020

B. Normality test

Before the statistical test is carried out, the data is screened first so that data is normally distributed. The results of data screening are presented in Table 3. From this table, it can be seen that the data is normally distributed.

Table 3. Results of Normality Test on Average Excess Return with Skewness and Kurtosis

Variable	N	Z_Skewness	Z_Kurtosis	Z_Kritis	Conclusion
AAR_t_2	70	1,819	0,758	± 1,96	Normal distributed
AAR_t_1	70	1,296	-0,078	± 1,96	Normal distributed
AAR_t0	70	0,981	1,720	± 1,96	Normal distributed
AAR_t1	70	-0,511	1,578	± 1,96	Normal distributed
AAR_t2	70	0,535	-0,214	± 1,96	Normal distributed

Source: Secondary data processed, 2020

C. One Samples T-Test

The results of hypothesis testing using the one-sample t-test around and on the day of the announcement of Jokowi was the presidential inauguration in 2019 is presented in the table below.

Table 4. One-Sample T-Test Results

Period	Average Excess Return	t-count	Sig	Information
t-2	0,0025	1,405	0,164	not significant
t-1	0,0027	0,937	0,352	not significant
t0	-0,0009	-0,467	0,642	not significant
t+1	-0,0059	-3,649	0,001	Significant
t+2	0,0005	0,219	0,827	not significant

Source: Secondary data processed, 2020

The results in Table 4 show that during the event period, the mean statistically significant excess returns only occurred on day +1. However, the average excess return value is negative, so the hypothesis is rejected.

The results of this research prove that the announcement of Jokowi's presidential inauguration in 2019 has an impact on the stock price of IDX 80, which means that market players or investors react to the announcement so that the IDX80 share price in the market reaches a new price equilibrium point.

An excess return occurs with a quick and non-prolonged reaction, so the Indonesia Stock Exchange is declared to be efficient, semi-strong form informally, the announcement is widely available to all market players at the same time, and the price for obtaining the announcement is obtained cheaply and easily. Market players get the announcement through print or electronic media so that the announcement can be received at the same time by all market players. Investors or market players react by using information fully and quickly so that the price of shares should change accordingly to reflect the announcement of Jokowi's presidential inauguration event in 2019, reaching a new equilibrium.

V. CONCLUSION

From the results of the research, t can be concluded. First, the announcement of Jokowi's presidential inauguration in 2019 contains information, the two markets react quickly to absorb information, and the three markets are already efficient in their semi-strong form of information. His research is expected to be useful for market players or investors, and future researchers. Based on the conclusion, it is suggested as follows: First, investors should use passive investment strategies such as buy and hold strategies and index funds strategies. For future researchers, it is hoped that other events such as cabinet reshuffles or events originating from policies issued by the government are expected. In addition, further researchers are expected to use estimation models such as the mean adjusted model and the market adjusted model as a comparison of market reactions to a political event.

REFERENCES

[1] E. Tandelilin., Analisis Investasi dan Manajemen Portofolio,Pertama. Yogyakarta: BPFE, (2001).

[2] S. Husnan., Dasar-Dasar Teori Portofolio dan Analisis Sekuritas, Kelima. Yogyakarta: UPP STIM YKPN,Yogyakarta, (2015).

[3] J. Hartono., Teori Portofolio dan Analisis Investasi,Kesebelas. Yogyakarta: BPFE, (2017).

[4] W. Dwipayana., Pengujian Efisiensi Pasar Di Bursa Efek Indonesia, E-Jurnal Manaj. Univ. Udayana, 6(4) 246943(2017).

[5] Z. Sonje, Velimir, Alajbeg, Denis and Bubas., Efficient Market Hypothesis: Is The Croatian Stock Market as (in) Efficient as The U.S. Market.,Financ. Theory Pract., 35(3) (2011) 301–326.

[6] J. H. Woodard and F. Bacon., Government Shutdown: A Test of Market Efficiency, Proceedings of ASBBS, 22(1) (2015) 480–490.

[7] A. Mirdah and A. Solikhin., Analisis Dampak Pengumuman Dividen Terhadap Reaksi Pasar (Studi Empiris pada Bursa Efek Jakarta Periode Tahun 2008),J. Penelit. Univ. Jambi Seri Hum., 11(2) (2009)17–24, 2009.

[8] M. H. U. Dewi and L. P. Kartika, Pengujian Pasar Setengah Kuat di Bursa Efek Indonesia,E-Jurnal Manaj. Unud, 3(12) (2014) 3540–3557, 2014.

[9] R. Jayaraman and M. . Ramaratman, A Study on Testing of Efficient Market Hypothesis with Special Reference to Selective Indices in The Global Context: an Empirical Approach, J. Arts Sci. Commer., 2(1) (2011) 17–32, 2011.

[10] A. Sheikhbahaei, H. M. O. Mohd, and A. R. Ismail, Information Content in Dividend Announcements, a Test of Market Efficiency in Malaysian Market,Int. Bus. Sch. Univ. Technol. Malaysia, 5(12) (2012) 38–45, 2012.

[11] B. Kumar and A. Pandey., Market Efficiency in Indian Commodity Futures Markets,J. Indian Bus. Research,5(2) (2013) 101–121, 2013.

[12] H. Kurnianingsih., Analisis Reaksi Pasar Terhadap Pengumuman Dividen pada Perusahaan Manufaktur (Studi pada Perusahaan Manufaktur di Bursa Efek Indonesia),Graduasi,25 (2011) 61–67, 2011.

[13] Nurmala and N. N. A. Salmah, Reaksi Pasar Terhadap Pengumuman Right Issue di Bursa Efek Indonesia, J. Manaj. dan Bisnis Sriwij., 13(3) (2015) 331–342, 2015.

[14] I. Ghazali., Aplikasi Analisis Multivariate Dengan Program SPSS,(2007).

[15] A. Wibowo and S. Darmanto., Empirical Test of the Capital Asset Pricing Model (CAPM): Evidence from Indonesia Capital Market,Int. J. Econ. Manag. Stud., 7(5) (2020) 180–185, 2020, doi: 10.14445/23939125/ijems-v7i5p126.

[16] Mardianto, Willy Arafah., Antecedent And Consequences From Ceo Turnover Rate In Indonesia, SSRG International Journal of Economics and Management Studies 6(5) (2019): 47-51.