

# ANALYSIS OF THE EFFECT OF LUNAR CYCLE ON LIQUID 45 (LQ45) STOCKS ON THE INDONESIA STOCK EXCHANGE (IDX) FOR THE PERIOD 2005-2020

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## ABSTRACT

This study examines the impact of the moon phase in influencing investors' decisions to invest in the stock market. As an investor, market timing is needed to maximize the return on your investment. Fundamental and technical analysis cannot predict when investors can buy or sell shares to maximize profits. The research was conducted on stocks that never left the Liquid 45 from 2005 to 2020.

**Keywords:** Lunar Cycle, Indonesia Stock Exchange, Liquid 45, Full Moon.

## INTRODUCTION

The purpose of investing is to make a profit. So, to get a profit, a strategy is needed in making investment decisions (Susanto & Malelak, 2021). In the investment world, there are two strategies, namely fundamental and technical (Geraldine & Ottemoesoe, 2022). Fundamental focus on macro and microeconomics, while technical analysis focuses on the history of past prices.

Both strategies cannot determine when an investor should invest or hold cash first. Yet, when is the right time to invest is often associated with financial behavior. In the investment world, dow theory can explain market psychology, and time is explained by financial astrology.

One of the branches of financial astrology is the lunar cycle, which is a phenomenon that affects human behavior (Subandi & Basana, 2021). They researched to answer whether the position of the moon at the time of the full moon, new moon, first-quarter moon, and last quarter moon had a significant effect on differences in returns in LQ45 stock.

## LITERATURE REVIEW

### Financial Behavior

Financial Behavior is a person's behavior in managing their finances (Hira & Mugenda, 1999). Shefrin & Statnam (2000) defines financial behavior as a study that studies how psychological phenomena affects financial behavior. According to Danes and Haberman (2007) financial behavior can be measured from investment allocation. Wicaksono et al. (2015) financial behavior studied how individuals simultaneously behave in financial decisions, where psychological factors can influence financial behavior in financial decisions. Psychology also plays an essential role in making investment decisions (Subandi & Basana, 2021).

Investment decisions are influenced by financial behavior (Geraldine & Ottemoesoe, 2022; Basana and Tarigan, 2021). Principles and theories explaining financial behavior in investing are described in dow theory and financial astrology. Dow theory talks about market psychology, and financial astrology talks about planetary movements that will indirectly affects investing.

### Dow Theory

Dow Theory is common from technical analysis to trade in financial instruments, discovered by Charles Henry Dow in 1889. Dow theory has three main principles: price move in trend, price action discount everything, and history repeats itself (Rhea, 1932).

The price moves in three trends. The first trend is bullish, the price trend is moving up, the second trend is the bearish trend, the price trend is moving down, and the third is a sideways trend, or the price trend is not moving up or down. Price movements already reflect all existing conditions. These conditions are fear, greed, corporate action, publication of financial reports, selling activities, buying actions, and others. Existing price movements will be repeated in the future.

### **Financial Astrology**

Astrology is a branch of science that studies the effects of the movement of objects in the sky on human behavior and nature. Astrology is the art and science of predicting human beings personally, their strengths, weaknesses, and differences in social, cultural, economic, and political affairs (Chaudhri & Shah, 2013). Every celestial body in our solar system emits a vibration. The vibration operates, including intelligence in plants, animals, or humans. Humans have the advantage of being able to consciously receive, modify, add, reduce and replace the effects of the vibrations of celestial bodies (Pesavento, 1987). The vibrations of heavenly bodies in our solar system have an indirect or indirect impact on the movement of current capital market prices. There are three branches of astrology, namely:

- Natal Astrology, astrology that discusses human aspects such as habits, strengths, and weaknesses based on a horoscope or a person's date of birth
- Mundane Astrology, astrology that deals with broad issues, such as city problems, country, and even the world. Predicted aspects are war, politics, economy and business, agriculture, etc. Mundane astrology takes a macro approach.
- Judicial Astrology the science of astrology that predicts individual goals or events.

In analyzing the economy, one branch of Mundane astrology is financial astrology which discusses corporate and business astrology and financial astrology. Corporate and business astrology discusses the predictions of a company in the future, in contrast to financial astrology, which predicts stock prices, commodities, and world currency prices.

Financial astrology is a tool used to predict stock prices, commodities, and world currency prices based on planets, stars, and zodiacs (Chaudhri & Shah, 2013). Financial astrology can predict the movement of capital markets in both stocks, currencies, and commodities. So financial astrology can suggest when an investor can buy or sell the asset to be invested. Timing is at the heart of the branch of financial astrology because doing the right thing at the right time is the key to making healthy profits and is the key to success in the stock market (Susanto & Malelak, 2021).

Astrology works on the premise that everything in the universe, including the stock market, is influenced by the movement of celestial bodies in the zodiac signs. Astrology can predict human behavior and future events, and on the other hand, the stock market is influenced by human predictions of the future. Humans run companies listed on the stock exchange, and the price of a stock will follow the company's performance so that the stock price can be predicted by astrology. Industrial and business economies follow an economic cycle consisting of four parts: introduction, expansion, maturity, and contraction. The price of a commodity will be affected by the economic process. Stock prices that increase in several sectors that move up or down for several periods are not influenced by fundamentals and technicalities. They occur because of the position of celestial bodies related to stocks. Financial astrology helps identify the strength and gravity of stock price trends and indications reversal trends. One of the heavenly bodies that affect humans is the lunar cycle.

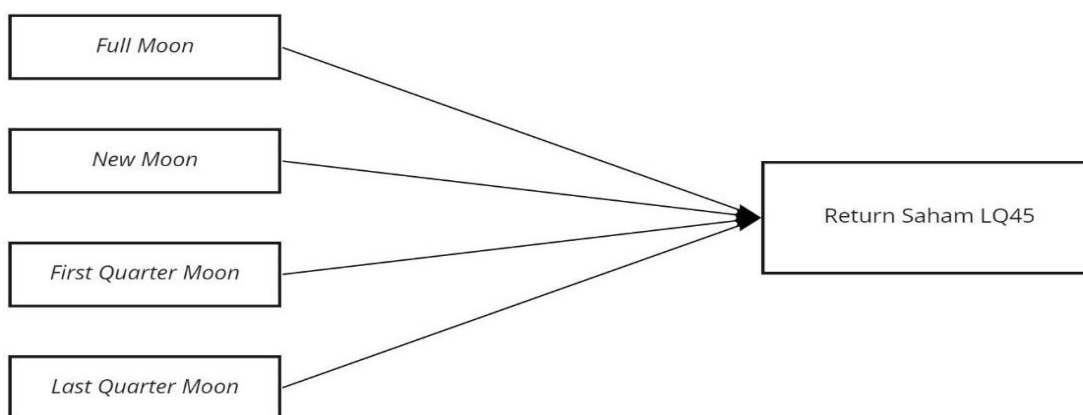
### **Relationship of Lunar Cycle with Returns LQ45**

The moon has a gravity that affects humans because eighty percent of the human body consists of water. The moon produces "biological tides" in the human body through gravity, affecting human habits. "Biological tide" is a situation where the sea level and the water in the body are related and fluctuate when there is a force from the moon and sun when the earth rotates. Weiskott (1974), Tasso and Miller (1976), Lieber (1978), and Hicks-Caskey and Potter (1992) show high crime rates during a full moon. Huston and Passerello (1971) examined the effect of the moon phase on the emotional

stage of humans. It can conclude that the full moon makes humans feel more depressed and emotional (Geraldine & Ottemoesoe, 2022). Dewey (1971) states that the death rate increases during a full moon, while humans tend to be more quiet, analytical, and contemplative.

Over the last few decades, research conducted by behavioral finance tried to prove the relationship between human behavior and capital market developments (Basana and Tarigan, 2021). The moon can influence human behavior. Vance (1995) conducted a study with the conclusion that eighty-one percent of health professionals believe that the full moon changes human behavior. Several researchers studied the relationship between the full moon and the capital market based on these findings. Dichev and Janes (2003) studied the existing returns during the full moon in the US Stock Market and 24 countries over 30 years. New moon phase gives a higher trend of returns than the complete moon phase. Research on the new moon shows the results of returns are higher than the full moon (Gao, 2009)

### Conceptual Framework



**Figure 1.** Conceptual Framework

This study will examine the relationship between lunar and LQ 45 stocks. The variables used are the first, namely the influence of Full Moon on stocks LQ 45, Full Moon to LQ 45 stock, New Moon to LQ 45 stock, First Quarter Moon to LQ 45 stock, Last Quarter Moon to LQ 45 stock.

## METHODOLOGY

### Type of Research

This research was conducted with quantitative methods, and this method is used to explain phenomena using numerical data, which are analyzed using mathematical or statistical methods (Aliaga & Gunderson, 2002). After this research, a theory will be built can use that to explain, predict, and control a phenomenon in research (Siregar, 2015).

### Types of Data Sources and Data Collection

The type of research is quantitative research and the data used in secondary data research. The data will be taken from the company's Initial Public Offering so that the data taken is more accurate, and the company also went through the 2008 crisis. Data returns are taken from yahoo finance. Data on the date of occurrence of certain moon positions are taken from horoscope.astro-seek.com. The data taken from yahoo finance will be adjusted to the schedule for the event of certain month positions, which will be analyzed quantitatively.

### Population and Sample

Population is a generalized area consisting of objects or subjects with certain quantities and characteristics determined by researchers to be studied and to draw conclusions from (Siyoto & Sodik, 2015). The population of this study is stock from the LQ45 index.

Sample is a part of the number and characteristics possessed by the population, or a small part of the population members taken according to certain procedures so that they can represent the population (Siyoto & Sodik, 2015). The sample selection method is purposive sampling, a sampling technique based on certain considerations and unique selection (Siyoto & Sodik, 2015). The criteria for the sample that will be included in the study are stocks that are in and have never been removed from the index since 2005.

### Operational Definition of Dependent Variable

Concept : Return Daily Stock

Definition : The difference in stock prices from daily closing prices (Bodie, Kane, and Marcus, 2017).

Indicator :

$$Return Saham = \frac{(P_t - P_{t-1})}{P_{t-1}} \times 100\% \quad Return Saham = \frac{(P_t - P_{t-1})}{P_{t-1}} \times 100\% \dots\dots\dots(1)$$

Description:

$P_t$  : Current share price

$P_{t-1}$  : Period stock price previous

### Operational Definition of Independent Variable

- Concept: Full moon  
Definition: The phase when the moon looks perfectly round because the moon's entire surface facing the earth gets sunlight. Moon phase calendar (2021) Accessed 27 May 2021, from Astro Seek: <https://mooncalendar.astro-seek.com/> The pointer in the form of a binary between 0 and 1.0 means that it is not in the Full moon, and one means it is in the Full moon phase.
- Concept: New moon  
Definition: The phase when the moon is in the middle of the Sun.  
Proxy: Data retrieved from [www.astro-seek.com](http://www.astro-seek.com). The pointer in the form of a binary between 0 and 1.0 means it is not in the New moon and one in the New moon phase.
- Concept: First quarter moon  
Definition: The phase when the moon is visible halfway because half of the moon's surface facing the earth gets sunlight. Moon is next to Earth  
Proxy: Data were taken from [www.astro-seek.com](http://www.astro-seek.com). The pointer in the form of a binary between 0 and 1.0 means that it is not in the First quarter moon, and one means it is in the First quarter moon phase. Again, data were taken from [www.astro-seek.com](http://www.astro-seek.com).
- Concept: Last quarter moon  
Definition: The phase when the moon is visible halfway because half of the moon's surface facing the earth gets sunlight. The moon is next to the earth.  
Proxy: Data retrieved from [www.astro-seek.com](http://www.astro-seek.com). The pointer in the form of a binary between 0 and 1.0 means that it is not in the last quarter month, and one means it is in the last quarter moon phase.

### Data Analysis Techniques

Full moon, new moon, first quarter, and last quarter data are dummy data taken from [www.astro-seek.com](http://www.astro-seek.com). This variable is a dummy which is denoted in numbers 0 and 1. The number 1 means the month's position is in the variable phase, and the number 0 means the month's position is not in the variable phase.

This study will use statistical analysis with the Maximum Likelihood, a technique to find a specific point used to maximize a function. Maximum likelihood technique is used to estimate the distribution parameters of the data and is used to develop new test techniques. The model used in this study uses Ordinary Least Square (OLS); namely, the econometric method where there are independent variables and explanatory variables, and the dependent variable is the variable described in a linear equation. This method minimizes the number of errors.

The linear regression model determines the relationship between two variables, likely the independent and dependent variables. The final result obtained in linear regression is a population regression function obtained from the sample regression function, which can later use for estimation. Several criteria must exist: the line of best fit or the sum of the squares of the deviation between the observation points and the regression line is minimum. The basic assumptions that must be met are blue or homoscedastic, no-multicollinearity and normality. The steps taken in the research are as follows:

- Downloading or retrieving the independent variables, namely the date when a new moon, first-quarter moon, last quarter moon, and full moon occurs
- Calculating the dependent variables, namely the daily stock return that is determined
- Performing regression.
- Performing assumption test
  - Normality test is considered necessary because if the data is normally distributed, then the data can represent the population (Priyatno, 2010). The hypothesis is:  
 $H_0$ : The data is not normally distributed  
 $H_1$ : The data is normally distributed.  
If the p-value is <5%, then it fails to reject  $h_0$ , which means that the data has been normally distributed
  - A multicollinearity test is a condition with a perfect or near-perfect linear relationship between the independent variables in a regression model (Priyatno, 2010). hypothesis is:  
 $H_0$ : there is multicollinearity  
 $H_1$ : there is no multicollinearity
  - The heteroscedasticity test was carried out on the regression model to test whether there is an inequality of variance from the residuals or uneven data distribution (Juliandi et al., 2014). hypothesis is:  
 $H_0$ : Heteroscedasticity occurs  
 $H_1$ : Heteroscedasticity does not occur

## Research Model

The research was conducted on the index LQ45. The main assumption of the proposed model is that the difference of returns depends on previous returns and differences in the past because investors are usually tempted by returns (Murgea, 2016), according to the principle of Dow Theory, namely Price move in trend. Therefore, the variables used are returns mining stock dummy when there is a certain month position. The formula used in this study is:

$$DR_n Stock_t = c + \beta Stock_{t-1} + \sum_{n=2}^m \alpha_n DR_n Stock + \gamma Full\ moon_t + \delta New\ moon_t + \varepsilon$$

$$DR_n Saham_t = c + \beta Saham_{t-1} + \sum_{n=2}^m \alpha_n DR_n Saham + \gamma Full\ moon_t + \delta New\ Moon_t + \eta First\ quarter\ moon_t + \kappa Last\ quarter\ Moon_t + \varepsilon$$

Information:

Stock  $RS_t$  = (Closing Price of Stock  $t$  - Closing Price of Stock  $t-1$ ) / Closing Price of Stock  $t-1$

$DR_n Stock_t$  = ( $RStock_t - RStock_{1n}$ ) - ( $RStock_{1n} - RStock_{t-2n}$ )

$\varepsilon$  = Error

$c$  = Constant

$\beta, \alpha, \gamma, \eta, \kappa$  = Coefficient

Changes in stock returns are influenced by previous stock returns ( $t-1$ ) and changes in stock returns during the last two periods, the last three periods, four periods, and five the previous period, and the moon's position at that time. The period taken is daily.

## ANALYSIS AND DISCUSSION

### Analysis

#### Research Object

The object of this research is stock data included in the LQ45 category from 2005 to 2020. The next date is the date of the new moon's position, first-quarter moon, last quarter moon, and full moon. The selected stocks must meet the criteria, namely LQ45, which has never been removed from the index, including:

- ASII (PT. Astra International, Tbk)
- BBKA (PT. Bank Central Asia, Tbk)
- BBRI (PT. Bank Rakyat Indonesia, Tbk)
- BMRI (PT. Bank Mandiri, Tbk)
- INDF (PT. Indofood Sukses Makmur, Tbk)
- PGAS (PT. Perusahaan Gas Negara, Tbk)
- PTBA (PT. Bukit Asam, Tbk)
- TLKM (PT. Telekomunikasi Indonesia, Tbk)
- UNTR (PT. United Tractor, Tbk)

#### Descriptive Analysis

Descriptive statistics are statistics used to describe the sample data used in research (Sugiyono, 2013). This study uses the average value (mean), median, minimum, maximum, and standard deviation values. There are 11 research objects, namely ASII, BBKA, BBRI, BMRI, INDF, PGAS, PTBA, TLKM, UNTR, JCI, and LQ45. The following are the statistical results from ASII.

**Table 1.** Descriptive Statistics

| ASII     | DR1     | Rstock  | DR2     | DR3     | DR4     | DR5     |
|----------|---------|---------|---------|---------|---------|---------|
| Mean     | 0.0000  | 0.0006  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Median   | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  | 0.0000  |
| Maximum  | 0.2231  | 0.1813  | 0.2231  | 0.2852  | 0.3153  | 0.2866  |
| Minimum  | -0.2132 | -0.2231 | -0.2559 | -0.2539 | -0.2866 | -0.2403 |
| Std. Dev | 0.0334  | 0.0246  | 0.0353  | 0.0355  | 0.0360  | 0.0349  |
| Skewness | 0.0971  | 0.1018  | 0.0814  | 0.0217  | 0.1338  | 0.2634  |
| Kurtosis | 3.5415  | 5.7666  | 3.6748  | 5.9090  | 6.8586  | 5.7996  |

The variables used are six, namely: the difference returns in stock  $t$  with stocks  $t-1$  (DR1), returns, differences returns in stock with stocks  $t-2$  (DR2), differences returns in stock with stocks  $t-3$  (DR3), the difference returns shares $_t$  with  $t-4$  (DR4), and the differences return shares $_t$  with  $t-5$  (DR5). The mean variable return on UNTR issuers with a value of 0.0007, and the mean is found in the variable return  $t$  with  $t-5$  on PTBA issuers of -1.98<sup>5</sup>. Other stock data are in the appendix.

#### Autocorrelation Test

An autocorrelation test was performed by comparing Durbin Watson statistical numbers and Durbin Watson table 2.

**Table 2.** Autocorrelation Test

| Total Data | Variable | dL      | dU      |
|------------|----------|---------|---------|
| 2000       | 2        | 1.92548 | 1.92747 |
| 2000       | 3        | 1.92447 | 1.92847 |
| 2000       | 4        | 1.92347 | 1.92947 |
| 2000       | 5        | 1.92246 | 1.93049 |
| 2000       | 6        | 1.92146 | 1.93149 |
| 2000       | 7        | 1.92046 | 1.93249 |
| 2000       | 8        | 1.91945 | 1.93350 |
| 2000       | 9        | 1.91844 | 1.93451 |
| 2000       | 10       | 1.91744 | 1.93552 |
| 2000       | 11       | 1.91643 | 1.93652 |
| 2000       | 12       | 1.91542 | 1.93753 |
| 2000       | 13       | 1.91441 | 1.93854 |
| 2000       | 14       | 1.91340 | 1.93957 |
| 2000       | 15       | 1.91239 | 1.94058 |
| 2000       | 16       | 1.91137 | 1.94159 |
| 2000       | 17       | 1.91036 | 1.94261 |
| 2000       | 18       | 1.90934 | 1.94363 |
| 2000       | 19       | 1.90833 | 1.94464 |
| 2000       | 20       | 1.90731 | 1.94566 |
| 2000       | 21       | 1.90629 | 1.94668 |

The autocorrelation test is said to be successful if it is above dU, which is 1.93652. The autocorrelation test was carried out in the eviews software.

**Table 3.** Durbin-Watson Stats

| Stock | Durbin-Watson Stats |
|-------|---------------------|
| ASII  | 2.15                |
| BBCA  | 1.98                |
| BBRI  | 2.15                |
| BMRI  | 2.93                |
| INDF  | 2.24                |
| PGAS  | 2.9                 |
| PTBA  | 2                   |
| TLKM  | 2.53                |
| UNTR  | 1.99                |
| IHSG  | 2.91                |
| LQ45  | 2.91                |

Values Durbin Watson Stat were at a level of more than 1.93, meaning that there was no autocorrelation and passed the autocorrelation test. The autocorrelation test is in the appendix.

### **Heteroscedasticity Test**

The second test is Heteroscedasticity. In this classical assumption test, the writer wants the data are taken to be homoscedastic or the same data distribution. The probability value of each variable must be greater than 0.05 to pass the heteroscedasticity assumption test. If the probability variable is more than 0.05, then the variable is discarded and retested until there is no heteroscedasticity variable. The heteroscedasticity test is in the Appendix. Table 4 represents the remaining variables after eliminating variables with a probability of less than 0.05.

**Table 4.** Heteroscedasticity Test

| Stock | Number of Variables |
|-------|---------------------|
| ASII  | 8                   |
| BBCA  | 5                   |
| BBRI  | 6                   |
| BMRI  | 3                   |
| INDF  | 6                   |
| PGAS  | 3                   |
| PTBA  | 6                   |
| TLKM  | 7                   |
| UNTR  | 6                   |
| IHSG  | 3                   |
| LQ45  | 3                   |

The number of variables after the heteroscedasticity test and elimination was carried out.

### **Normality Test**

The next classic assumption test is the Normality Test using Jarque Bera. The distribution data is normally distributed. The probability value of each variable is less than 0.05.

**Table 5.** Normality Test

| Stock | Normality Test |
|-------|----------------|
| ASII  | 0.00           |
| BBCA  | 0.00           |
| BBRI  | 0.00           |
| BMRI  | 0.00           |
| INDF  | 0.00           |
| PGAS  | 0.00           |
| PTBA  | 0.00           |
| TLKM  | 0.00           |
| UNTR  | 0.00           |
| IHSG  | 0.00           |
| LQ45  | 0.00           |

The table shows that all data have a probability of less than 0.05, so the data is normally distributed.

### **Multicollinearity Test**

The last assumption test is the Multicollinearity Test. The multicollinearity test that passed is shown by the VIF Centered of less than 10. This means variables that there is no correlation between theThe results of the heteroscedasticity test show that the value of the VIF Centered is less than 10, which means that the variables for each stock are not correlated with each other.

### **Research Results of ASII Stocks**

**Table 6.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.4683   | 3968   | 0.0000           |

**Table 7.** Multicollinearity Test ~ Probability Value

| ASII               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | -0.0006     | 0.1764      | 0.0004    |
| Rstock             | 0.9440      | 0.0000      | 0.0355    |
| DR2                | 0.0786      | 0.0000      | 0.0158    |
| DR3                | -0.0342     | 0.0310      | 0.0158    |
| DR4                | -0.0278     | 0.0799      | 0.0159    |
| DR5                | -0.0665     | 0.0000      | 0.0158    |
| New Moon           | -0.0009     | 0.6852      | 0.0023    |
| First Quarter Moon | 0.0007      | 0.7480      | 0.0021    |
| Last Quarter Moon  | -0.0007     | 0.7444      | 0.0021    |

The table shows that the month's position has no significant difference in returns stock  $t$  -stock  $t_{-1}$  ASII. However, while returns, the difference returns in stock  $t$  with stocks  $t_{-2}$ , stock returns  $t$ ,  $t$  with stocks  $t_{-3}$ , and returns in stock  $t$  with stocks  $t_{-5}$  significantly affect the difference in returns stock  $t$  with stocks  $t_{-1}$ .

#### a. BBKA Stock

**Table 8.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.5049   | 3964   | 0.0000           |

**Table 9.** Multicollinearity Test ~ Probability Value

| BBKA               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | -0.0009     | 0.0048      | 0.0003    |
| Rstock             | 1.0181      | 0.0000      | 0.0227    |
| DR2                | -0.0089     | 0.5737      | 0.0158    |
| New Moon           | 0.0011      | 0.5535      | 0.0018    |
| First Quarter Moon | 0.0017      | 0.3207      | 0.0016    |
| Last Quarter Moon  | -0.0014     | 0.4203      | 0.0016    |

After the classic assumption test, the independent variable of BBKA stock leaves five variables: return stock, stock return  $t$  – stock  $t_{-2}$ , the position of new moon month, first-quarter moon, and last quarter moon. The table shows that the position of the full moon effect significantly on the difference in stock  $t$  returns with  $t_{-1}$  BBKA. While returns affect stock returns  $t$  and stock  $t_{-2}$ .

#### b. BBRI Stocks

**Table 10.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.4695   | 3968   | 0.0000           |

**Table 11.** Multicollinearity Test ~ Probability Value

| BBRI               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | -0.0008     | 0.0675      | 0.0004    |
| Rstock             | 0.9099      | 0.0000      | 0.0275    |
| DR2                | 0.0825      | 0.0000      | 0.0158    |
| DR3                | -0.0681     | 0.0000      | 0.0158    |
| New Moon           | 0.0010      | 0.6611      | 0.0023    |
| First Quarter Moon | 0.0012      | 0.5876      | 0.0021    |
| Last Quarter Moon  | -0.0012     | 0.5811      | 0.0021    |

After the classic assumption test, the independent variable of BBRI stocks leaves five variables, namely returns stock, stock returns  $t-1$ , and stock  $t_{-2}$ . It returns stock  $t$  and stock  $t_{-3}$  and the new moon's position, first-quarter moon, and last quarter moon. The table shows that the month's position does not

significantly affect the difference in stock  $t$  returns with  $t_{-1}$  BBRI. However, while returns stock, stock returns  $t_t$  - stock  $t_{-2}$  and returns in stock  $t_t$  with stock  $t_{-3}$  have a significant difference in stock  $t_t$  with stock  $t_{-1}$ . This is reinforced by the dow theory, which says that the price moves in the trend.

### c. BMRI Stocks

**Table 12.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.0001   | 3968   | 0.9374           |

**Table 13.** Multicollinearity Test ~ Probability Value

| BMRI               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | 0.0001      | 0.8883      | 0.0005    |
| New Moon           | -0.0008     | 0.8049      | 0.0032    |
| First Quarter Moon | 0.0000      | 0.9928      | 0.0029    |
| Last Quarter Moon  | -0.0018     | 0.5483      | 0.0029    |

After testing the classical assumption, the independent variable of BMRI stocks leaves three variables: the new moon's position, first-quarter moon, and last quarter moon. The table shows that the month's position does not significantly differ between return stock  $t_t$  and  $t_{-1}$  BMRI.

### d. INDF Stock

**Table 14.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.349    | 3968   | 0.0000           |

**Table 15.** Multicollinearity Test ~ Probability Value

| INDF               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | 0.0001      | 0.8673      | 0.0004    |
| DR3                | 0.2635      | 0.0000      | 0.0153    |
| DR4                | -0.2089     | 0.0000      | 0.0156    |
| DR5                | 0.2307      | 0.0000      | 0.0157    |
| New Moon           | 0.0000      | 0.9858      | 0.0025    |
| First Quarter Moon | -0.0007     | 0.7802      | 0.0023    |
| Last Quarter Moon  | 0.0014      | 0.5459      | 0.0023    |

After the classical assumption test, the independent variable of INDF stock leaves six variables. Namely, the difference returns in stock  $t_t$  with stock  $t_{-3}$ , return in stock  $t_t$  - stock  $t_{-4}$ , return in stock  $t_t$  with stock  $t_{-5}$ , and the position of the new moon, first-quarter moon, and last quarter moon. The table shows that the month's position does not significantly differ months position does not significantly differ between return stock  $t_t$  and  $t_{-1}$  INDF. Meanwhile, stock  $t_t$  and stock  $t_{-3}$  return stock  $t_t$ , and stock  $t_{-4}$  return stock  $t_t$  and stock  $t_{-5}$ . This is reinforced by the dow theory, which says that the price moves in the trend.

### e. PGAS Stock

**Table 16.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.0004   | 3968   | 0.5939           |

**Table 17.** Multicollinearity Test ~ Probability Value

| PGAS               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | 0.0001      | 0.8692      | 0.0006    |
| New Moon           | -0.0025     | 0.5217      | 0.0038    |
| First Quarter Moon | 0.0022      | 0.5370      | 0.0035    |
| Last Quarter Moon  | -0.0036     | 0.3005      | 0.0035    |

After testing the classical assumption, the independent variable of BMRI's stock leaves three variables: the new moon's position: the new moon's position, first-quarter moon, and the last quarter moon. The table shows that the month's position has no significant difference in stock  $t$  returns with  $t_{-1}$  PGAS.

#### f. PTBA Stocks

**Table 18.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.4779   | 3962   | 0.0000           |

**Table 19.** Multicollinearity Test ~ Probability Value

| PTBA               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | -0.0008     | 0.0955      | 0.0005    |
| Rstock             | 0.9646      | 0.0000      | 0.0275    |
| DR4                | -0.0070     | 0.6607      | 0.0158    |
| DR5                | -0.0023     | 0.8838      | 0.0159    |
| New Moon           | -0.0019     | 0.5140      | 0.0028    |
| First Quarter Moon | 0.0026      | 0.3081      | 0.0025    |
| Last Quarter Moon  | 0.0021      | 0.4199      | 0.0025    |

After the classical assumption test, the independent variable from PTBA stocks leaves five variables, namely returns stock, stock returns  $t_t$  and stock  $_{-4}$ , and returns stock  $t_t$  and stock  $_{t-5}$ , as well as the position of the new moon, first quarter moon and last quarter moon. The table shows that the position of the month and the returns stock  $t_t$  - stock  $_{t-4}$  and returns in stock  $t_t$  with stock  $_{t-5}$  do not significantly affect the difference in stock  $t$  returns with  $t_{-1}$  PTBA. Meanwhile, returns stock have a significant the difference between returns stock  $t_t$  and stock  $_{t-1}$ .

#### g. TLKM stock

**Table 20.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.3869   | 3968   | 0.0000           |

**Table 21.** Multicollinearity Test ~ Probability Value

| TLKM               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | 0.0001      | 0.8504      | 0.0003    |
| DR2                | 0.2442      | 0.0000      | 0.0152    |
| DR3                | 0.1450      | 0.0000      | 0.0156    |
| DR4                | 0.1942      | 0.0000      | 0.0156    |
| DR5                | 0.1869      | 0.0000      | 0.0156    |
| New Moon           | 0.0009      | 0.6801      | 0.0021    |
| First Quarter Moon | 0.0000      | 0.9923      | 0.0019    |
| Last Quarter Moon  | -0.0028     | 0.1511      | 0.0019    |

After testing the classical assumption, the independent variable of TLKM stock leaves seven variables; namely, the difference returns stock  $t_t$  and stock  $_{t-2}$ , stock returns  $t_t$  and stock  $_{-3}$ , returns in stock  $t_t$  - stock  $_{t-4}$ ,  $t_t$  return stock, and stock  $_{t-5}$  and the position of a new moon, first quarter moon and last quarter moon.

The table shows that the month's position has no significant difference in stock  $t$  returns with  $t_{-1}$  TLKM. Meanwhile, stock  $t$  and stock  $t_{-3}$  return stock  $t$ , and stock  $t_{-4}$  returns stock  $t$  and stock  $t_{-5}$ .

#### h. UNTR Stock

**Table 22.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.4848   | 3968   | 0.0000           |

**Table 23.** Multicollinearity Test ~ Probability Value

| UNTR               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | -0.0008     | 0.0748      | 0.0004    |
| Rstock             | 1.0306      | 0.0000      | 0.0276    |
| DR4                | -0.0247     | 0.1194      | 0.0158    |
| DR5                | -0.0377     | 0.0175      | 0.0158    |
| New Moon           | 0.0007      | 0.7034      | 0.0026    |
| First Quarter Moon | 0.0024      | 0.3099      | 0.0024    |
| Last Quarter Moon  | -0.0018     | 0.4487      | 0.0024    |

After the classical assumption test, the independent variable of UNTR stock leaves five variables, namely returns stock, stock returns  $t$  and stock  $t_{-4}$ , and returns stock  $t$  and stock  $t_{-5}$ , as well as the position of the new moon, first quarter moon and last quarter moon. The table shows that the position of the month and the returns stock  $t$  - stock  $t_{-4}$  and returns in stock  $t$  with shares of  $t_{-5}$  do not significantly affect the difference in stock  $t$  returns of with  $t_{-1}$  UNTR. Meanwhile, returns stock has a significant difference between returns stock  $t$  and stock  $t_{-1}$ .

#### i. JCI

**Table 24.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.0006   | 3968   | 0.4793           |

**Table 25.** Multicollinearity Test ~ Probability Value

| JCI                | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | 0.0001      | 0.7502      | 0.0002    |
| New Moon           | -0.0015     | 0.3747      | 0.0016    |
| First Quarter Moon | 0.0004      | 0.7827      | 0.0015    |
| Last Quarter Moon  | -0.0020     | 0.2003      | 0.0015    |

After the classical assumption test, the independent variable of the JCI leaves three variables, namely the position of the new moon, first-quarter moon, and last quarter moon. Table 4.15 shows that the month's position has no significant effect on the difference in stock  $t$  returns with  $t_{-1}$  JCI.

#### j. LQ45

**Table 26.** Multicollinearity Test ~ R Square

| R-Square | Sample | Prob F-Statistic |
|----------|--------|------------------|
| 0.0006   | 3968   | 0.4311           |

**Table 27.** Multicollinearity Test ~ Probability Value

| LQ45               | Coefficient | Probability | Std Error |
|--------------------|-------------|-------------|-----------|
| c                  | 0.0001      | 0.7452      | 0.0003    |
| New Moon           | -0.0019     | 0.3504      | 0.002     |
| First Quarter Moon | 0.0006      | 0.7352      | 0.0018    |
| Last Quarter Moon  | -0.0025     | 0.1811      | 0.0018    |

After testing the classical assumption, the independent variable from LQ45 leaves three variables: the new moon's position, first-quarter moon, and last quarter moon. Table 4.16 shows that the month's position has no significant effect on the difference in stock  $t$  returns with  $t-1$  LQ45.

## Discussion

Overall, the position of the month that occurs does not affect the difference in return of stocks in the index, and only BBCA is affected by the full moon. BBCA is the issuer with a big market cap in the JCI. This shows that the BBCA price is not easily manipulated by several parties, so when a full moon occurs, the generated return of BBCA is an average of negative 0.09% for the last 15 years. The next thing that influences the difference between returns  $t$  and  $t-1$  is the return itself and the difference between returns  $t$  and  $t_n$ . This is reinforced by the dow theory which says that the price moves in the trend. The difference returns in stock returns. Prices move in certain phases, so price movements are not random and predictable.

The results from ASII, BBCA, BBRI, INDF, PTBA, TLKM, and UNTR stocks are in line with the dow theory, which says that price moves in trend. The difference returns in stock returns. Prices move in certain phases, so price movements are not random and predictable. These results strengthen the conclusion of Campbell and Beets (1978) that the error full moon returns to stock, but the full moon does not affect returns stock.

The phase of the moon is not a factor that influences decision-making by investors, although the phase of the moon is one of the influences on human psychology. This study confirms that the phase of the moon does not affect the behavior of investors. In accordance with previous research, the phase of the moon has no significant effect on investor decisions (Brahman, Hooy, Ahmad, 2010). Humans can intervene or reduce the effects caused by the moon, according to research by Pesavento (1977), the vibrations of the planetary system affect the movement of the earth, including grains, plants, animals, or humans. Humans have the advantage of being able to accept, modify, strengthen, reduce, or change the effects of planetary system consciously.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the research results, the conclusion that can be drawn is that the position of the moon on a full moon only has a significant effect on differences in returns BBCA shares  $t$  with  $t-1$  and has no effect on other LQ45 stocks. The moon's position on the new moon does not significantly affect the difference in returns of LQ45  $t$  with  $t-1$ . The moon's position on the first moon has no significant effect on the difference in returns of LQ45  $t$  with  $t-1$ . Finally, the moon's position on the last moon has no significant impact on the difference in returns of LQ45  $t$  with  $t-1$ .

Based on the research results that have been done, the suggestions that can be given for further research are research focusing on days associated with the moon's position and eliminating days without the month position variable. Also, seeing a potential reversal trend at a certain month position is suggested. The potential reversal trend can be seen from the difference in average returns when the month's position occurs until the next month's position.

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