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Cumulative Average Abnormal Return and Semistrong Form Efficiency Testing in Indonesian Equity Market over Restructuring Issue

Faizil Ikram¹ -- Anggoro Budi Nugroho¹

¹School of Business and Management, Institut Teknologi Bandung, Indonesia

ABSTRACT

Efficient market hypothesis is important in finance. Investors will expect superior gains from their investment strategies with respect to the risk profile. Event study is an approach to assess the impact of the information on the stock prices. If the market is efficient, the price of securities will be adjusted quickly to the announcement day. The objective of this study is to test the efficiency of Indonesian Stock Market in semi-strong form with respect to 19 recent merger announcements since year 2000. In order to analyze the effect of the announcement, Event Study Methodology is conducted by calculating the Abnormal Returns (AR) of each stock, Average Abnormal Returns (AAR), and Cumulative Abnormal Return (CAR) 30 days prior to the merger announcement and 30 days after the merger announcement (event window). To calculate the Abnormal Return, market model is employed by regressing the daily stock return with the corresponding market return on the estimation period. Parametric and non-parametric test on the AAR is used to test for efficiency. The findings from this research is that Indonesian stock market is efficient in semi-strong form in the case of merger announcements.

Keywords: capital market, Efficient markets hypothesis, Abnormal return, Merger and acquisition, event study, market model

1. Introduction

The change in business environment, such as in information technology and globalization today has made tougher business competition which force some companies to adapt to the business environment quickly in order to survive or increase their performance rapidly. Some strategies are deployed in order to increase their market share and expand their business. One strategy that is commonly used is takeovers of other firms.

Mergers and acquisition are one strategic business decisions to increase the company performance in facing the strong competition in the business environment nowadays. Business expansion is one way to make a firm larger and stronger. According to Payamta and Machfoedz (1999) There are two form of business expansion, internal expansion and external expansion. Increasing the production capacity or develop a new line of business is an example of internal expansion, whereas company takeovers, such as mergers and acquisitions are an example of external expansion.

Mergers is the combination of two companies where a new corporate entity is created, whereas acquisition involves the purchase of another firm's asset or shares where the acquired firm still runs it business as legally owned subsidiary of the acquirer. There are many motives behind takeovers. According to Johnson, Whittington & Scholes in their book Johnson *et al.* (2011), motives of mergers and acquisition can be categorized into three groups, which are strategic motives, financial motives, and managerial motives. Strategic motives is focused on improving and developing the business, such as

extension in products or markets, consolidation, and capabilities. Financial motives focused on the best use of financial resource and concerned more with improved financial performance, such as financial efficiency, tax efficiency, and asset stripping or unbundling. Managerial motives is focused in the selfinterest of managers and usually not the interest of shareholders.

In Indonesia, Mergers and Acquisitions became popular topic in the business environment since the introduction of act number 1 year 1995 about Limited Company ("UU 1/1995"). The term "Merger and Acquisition" became more popular in Indonesia since the merger of four publicly owned banks in 1998, which is known today as Bank Mandiri.

The numbers of mergers and acquisition action in Indonesia has increase due to the growth in the world and domestic economy. According to KPPU (Komisi Pengawas Badan Usaha), the year 2010 and 2011 were the years which mergers wave hits Indonesia. KPPU also predict that the number of mergers will keep increasing over the following years. Graph 1 shows the numbers of successful mergers announcement since year 2000.

For developing countries like Indonesia, Merger and Acquisition wave give a positive impact to its country because it invites foreign investors to invest in Indonesia. This is good for the national economy because Indonesia will receive capital support from foreign investors.

According to KPPU, in 2010 there are 7 notification of mergers/acquisition where three of them involving foreign actors. In 2011 the number of mergers/acquisitions notification increases significantly, from only 7 notification in 2010 to 45 notification in 2011 where 18 of them involving foreign actors.



Graph-1. Number of mergers since year 2000

Mergers and Acquisition are mend to increase the performance and profitability of the company. Thus, the announcement of successful mergers and acquisitions gave a signal to investors to invest in the stocks. Investors will hope that later the price will spike and they will get a positive return from their investments. The measure of investor's return will be calculated using the abnormal return, which is the difference between the actual return and expected return. If the actual return turns out to be larger than the expected return, it means that investors earn profit from their investment. If actual return is smaller, it means that they experienced a loss on their investment.

In an efficient market, price will fully reflect to all available informations. In other word, an information regarding the prospect of the company will affect the stock price to react quickly, which makes impossible for investors to earn excess return or abnormal return. According to Fama (1970), there are three form of market efficiency. First is weak form efficiency where the price reflects historical informations. Second is semi-strong form efficiency where prices not only reflect historical information, but also all public information. The last form is strong form efficiency where the price reflect all public

and private information. In an efficient market, it will be impossible for investors to earn positive abnormal return. In this study, semi-strong form of market efficiency will be tested, using merger announcement as the public information.

2. Literature Study

Efficient Market Hypothesis is one of the most well-known theory in the capital market. There have been a lot of debate among economists and professionals weather this theory holds or not. There are many papers, journals and articles regarding this theory, some of them support this theory and some of them do not. According to chapter 11 in the book Investments and Portfolio Management, efficient market hypothesis (EMH) is defined as "the notion that stocks already reflect all available information is referred to as the efficient market hypothesis (EMH)" (Bodie *et al.*, 2011).

Another definition of efficient market by Eugen Fama (1970). If price is fully reflect available information, then it will be true that the price movement will be random. This is because newly information is unpredictable, it can come out any time, such as dividend announcement, takeover announcement and stock split announcement. And that is why Kendall's study showed that stock price follows a random walk, which is a price could be random or unpredictable.

Any information that can be used to predict the future prices should already be reflected in stock prices. If there is an information that indicates a stock is underpriced, there will be an adjustment from the market. Investors will bid up making the price move up to the fair level. If markets are efficient, the direct implication for group of investors is that it is impossible for them to beat the market because price will be adjusted quickly to new informations.

Efficient market hypothesis will conclude that in a competitive market, price will follow a random walk. If future price could be predicted by previous performance, than it will be easy for investors to gain profit. However, in a competitive market, investor are trying to make use of the new information quickly making the possibility to take profit from past price disappear immediately. Consequently, the information in past prices will be reflected in "today's" prices, not tomorrow.

Economist define three levels of market efficiency. This three level are based on the degree of information reflected in security prices. These three levels are as follows:

1. Weak-Form

This hypothesis implies that stock prices already reflect all information that can be derived by examining market data such as history of past prices, trading volume, or short interest. If market are efficient in weak form, then there is no use for trend analysis because it is impossible to make consistently profits by studying past returns. In other words, price will follow random walks.

2. Semi Strong-Form

Semi strong-form hypothesis states that all publicly available information regarding the firm must be reflected already in the stock price. In this level, price reflect not just the past price but also published information. If markets are efficient in this level, then prices will adjust immediately to public information. These information can be anything regarding the prospect of the firm such as the announcement of takeovers, quarter earnings, a new issue of stock, stock split, and so on.

3. Strong-Form

Strong-form hypothesis implies that stock prices reflects all information regarding the firm, even the information is only available for company insiders. In this kind of market, it will be impossible to beat the market consistently, we will only find those lucky and unlucky investors.

There are two type of analysis that makes the market efficient. The first type is technical analysis. This type of analysis study the past price record and look for patterns or cycle. Technical analyst believe that it is not necessary to know every information regarding the firm. This is because whatever the information is, if the stock price respond slowly enough to the information, the analyst will be able to identify the trend.

The other type of analysis is fundamental analysis. This type of analysis tries to examine various factors that reflect a firm's earnings and dividend. It is the study of the company's business performance. Other than that this kind of analyst will try to uncover information about firm's profitability that can affect the stock performance. Based on chapter 11 in the book Investment it is mentioned as follows:

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"it represents an attempt to determine the present discounted value of all the payments a stockholder receive from each stock. If the value exceeds the stock price, the fundamental analyst would recommend purchasing the stock." (Bodie et al., 2011)

This explains that fundamental analyst will try to study about the past information to predict the future value of the company and discount it to the present in order to be able to be compared

with the actual value. However, fundamental analyst does not care about the stock prices in the past like technical analyst do.

To identify the efficiency of a market, even study can be used to determine if a market is efficient or not. If stock prices fully reflect all current information, then price change must reflect new information. Therefore, it seems to be possible to study about the effect of the event (when information are released) to the stock performance by examining the price change during the period in which the event occurs.

In the book Investments event study is describe as "an event study describes a technique of empirical financial research that enables an observer to assess the impact of a particular event on a firm's stock price." (Bodie et al., 2011). An example of the events are, dividends announcement, stock splits, updated forecast of GDP, interest rates, inflation, Announcement of mergers and acquisitions and any other relevant information that can drive the stock price of the firm.

"Using financial market data, an event study measures the impact of a specific event on the vaue of a firm. The usefulness of such a study comes from the fact that, given rationality in the marketplace, the effects of an event will be reflected immediately in security prices. Thus e measure of the event's economic impact can be constructed using security prices observed over a relatively short time period." (Mackinlay, 1997).

In order to be able to test the impact of an event a measure of abnormal returned should be conducted during the event window. The abnormal return is the actual return of the security in the event window minus the normal return of the firm in the event window. The definition above states that if the abnormal return turns out to be positive, it means that investor gain or their investments because the actual price exceeds the expectation price. In a different manner, if the abnormal returns is negative, it means that investor loss on their investment because the actual price is lower than what they expected. For firm i and date t, the abnormal return is

$$AR_{it} = R_{it} - E(R_{it} \parallel X_t)$$

Where AR_{it} are the abnormal return for stock i, R_{it} are the actual return on stock I, and $E(R_{it} \parallel X_t)$ are the normal returns (expected return) respectively for time period t, X_t is the conditioning information for the normal return model. According to Mackinlay (1997) there are two choices for modeling the normal return. The first model is the *constant mean return model*, this model assume that X_t is constant. The market return overtime on a given security is constant. The second model is the *market model* where X_t is the market return. This model assumes a stable linear relation between the market return and the security return.

In general, there are two kind of approaches to calculate the normal return of a given security. The two approaches are statistical and economic approaches. The first category follows a statistical assumptions concerning the behavior of the asset return that is not take into concern the economic variables. In contrast, the second model rely on the investor's behavior concerning the economic variable and based not on statistical assumptions. Based on Mackinlay (1997), the usual model for calculating the normal return are as follows:

1. Constant Mean Return

 $R_{it} = \mu_i + \delta_{it}$

In this model, μ_i is the mean return for asset i, R_{it} is the period-t return on security i and δ_{it} is the disturbance term for security i. Brown and Warner (1980; 1985) stated that this kind of model are the simplest model, but in some cases they often have the same results with the more sophisticated one.

2. Market Model

This kind of model assumes a linear relationship between the security return and the market return. A simple linear OLS regression is made to determine the expected return. $R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$ Where R_{it} is the period-t is returns on security i, R_{mt} is the market return on market portfolio, and ε_{it} is the mean disturbance term. The regression is made to estimate the parameters, which are α_i and β_i during the estimation period.

3. Other Statistical Models

Other statistical model that is commonly used is the factor model. Mackinlay describes factor model below:

"Factor models are motivated by the benefits of reducing the variance of the abnormal return by explaining more of the variation in the normal return. Typically the factors are portfolios of traded securities." (1997)

An example of this kind of model is the calculation of normal returns using index model with factors based on industry classification, another example is calculating abnormal return by taking the difference between actual return and portfolio return of firms in the same size.

Another statistical model concerns for the data availability. When using a market model when it is impossible to estimate the parameters using OLS regression because the data is not available, we might want to use the market-adjusted model, this model is a restricted market model where *i* constrained to be one. In this model, an estimation period is not required to obtain parameter estimates. In other word, the calculation of abnormal return in market-adjusted model is simply by just subtracting the market return from the security return.

4. Economic Model

There are two common Economic model that is use to determine the normal return. The first model is the Capital Asset Pricing Model (CAPM). According to Sharpe (1964) and Lintner (1965), CAPM is an equilibrium theory where the expected return of a given asset is determined by its covariance with the market portfolio. The second model is the APT (Arbitrage Pricing Model), according to Ross (1976) APT is an asset pricing theory where expected return of a given asset is a linear combination of multiple risk factors.

To measure and analyze abnormal returns, a framework of timeline must be determined to act as a facility to measure and analyze the abnormal return. In the timeline, return will be indexed in event time using t where t = 0 as the event date, $t = T_1 + 1$ to $t = T_2$ is the event window, $t = T_2 + 1$ to $t = T_3$ is the post-event window.



When using the market model, an OLS regression is performed during the estimation period to determine the parameters, α_i and β_i . These parameters are soon to be used to calculate the normal return in the event window. This normal return are then subtracted from the actual return to determine the abnormal return.

To calculate the total performance, aggregating abnormal return across securities and through time could be done using average abnormal return (AAR) and cumulative abnormal return (CAR). Average abnormal return is the average of abnormal return from all of the securities that are being analyze at time t in the event window. Cumulative abnormal return (CAR) is the sample cumulative abnormal return (CAR) from time t_1 to t_2 where $T_1 < t_1 \le t_2 < T_2$. The CAR from t_1 to t_2 is the sum of the included

abnormal return. Cumulative abnormal return is calculated for an individual security, however, CAR could also be calculated after calculating the average abnormal return (AAR). It is a good idea to aggregate abnormal returns both, across security and through time. AAR will show the real abnormal return in time t, whereas CAR will gives a big picture about the movement of the stock performance.

To support this research, previous findings and journals related to this topic is needed as a references for this research. These journals gave insight for methodology that is commonly used to identify the efficiency in capital markets. More importantly, related journals can be used as a benchmark for the results of this research findings. Below are domestic and international papers that have related topic with this research.

Khan and Ikram (2012) in their paper, "Testing the efficiency of Indian Stock Market Vis-à-vis Merger and Acquisition - A study of Indian Banking Sector", used abnormal return to determine the effect of merger announcement in banking industry in India from the year 2003 until 2009 on stock performance. Khan & Ikram used the market model on 6 merger cases in banking sector to calculate the abnormal return which uses the OLS regression in the estimation period to be able to determine the abnormal return in the event window. The estimation period is -165 days to -15 days prior to the merger announcement. They use 15 days prior and after the announcement day as the event window. One quantitative methods that they use is sample paired t-test to test for difference in actual return and expected return. According to Khan and Ikram (2012), the actual return and expected return should be differ within the event period in order to now the possibility to outperform the market. They also aggregate the abnormal returns (excess returns) across securities and over time to see whether there is an immediate jump on the abnormal return around the announcement date or not. This research founds out that the Indian stock market is efficient in semi-strong form. The sample paired t-test shows that there is no difference between the actual return and the expected return. Thus, it is impossible for investors to beat the market. The Aggregation of abnormal returns also shows that there is no positive cumulative abnormal return (cumulative excess return) around the announcement date.

Gersdorff and Bacon (2009) in their paper, "U.S. Mergers and Acquisitions: A Test of Market Efficiency", also used abnormal return to test the efficiency of the U.S stock market. It analyze the effect of U.S. company mergers and acquisitions announcement on stock price's risk adjusted rate of return using twenty recent mergers from August 31st, 2007. The results of this findings is that there is evidence that support the semi-strong form market efficiency in the U.S. stock market. Gersdorff and Bacon uses market model on the estimation period to estimate the abnormal returns in the event period. Then, they use paired sample t-test to test if there is a difference between the actual return and the normal return. It turns out that there is no difference which support the efficient market hypothesis in the semi-strong form. They also use the cumulative abnormal return to see the movement of abnormal return around the announcement date.

Astria (2013) tries to find out how the capital market reaction of merger and acquisition announcements by using abnormal returns. The period of study is from year 2006 until 2008. She uses 10 days prior and after the announcement date as the event window. Expected return is calculated using economic model with CAPM which includes the economic condition in calculating the normal return (expected return). After the abnormal returns are calculated, Wilcoxon Signed Rank Test is being used to determine if there is difference on the abnormal return before and after the announcement. The results shows that the announcement of merger and acquisition significantly affect the investment decisions of market participants. There also an indication that merger announcement are good news for market participants to invest in the stock market.

3. Problem Identification

This research is to identify the behavior of investors in the Indonesian Stock market, how sensitive are investors react to an information. Semi-strong form efficiency will be tested with merger announcement will be used as the information. The problem that needs to be answered are as follows:

1. Is the Indonesian stock market efficient in semi-strong form in case of mergers announcement?

2. Is there any difference in stock performance before and after merger announcements?

4. Research Objective

According to the problem identification from the above statement, the objective of this study are as follows:

1. To analyze if the Indonesian stock market is efficient in semi-strong form in the case of merger announcements.

2. To see if there is any difference in stock performance before and after merger announcements.

5. Problem Scope and Limitation

This paper will only analyze the efficiency of Indonesian stock market and the effect of mergers announcement to stock performance in the Indonesian stock market from the year 2000 to 2014.

The range of time that is used is based on the statistics from ICAMEL (Indonesian Capital Market Electronic Library) in IDX that only provide mergers announcement date from the year 2000 until 2014. This research is an empirical study that uses abnormal return to test for market efficiency. Abnormal return of daily prices is also used as a tool to measure the stock performance before and after the announcement day. This study will ignore the abnormal volume since it is best used for analyzing the presence of insider information in the strong form efficiency.

6. Hypothesis

This research has hypothesis that concern on Indonesian stock market efficiency. Based on research question and research objective, the hypothesis are as follows:

0: The Indonesian stock market is efficient in semi-strong form in case of merger announcement.

1: The Indonesian stock market is not efficient in semi-strong form in case of merger announcement.

0: There is difference in stock performance before and after merger announcement which is measured by Average Abnormal Return in Indonesian stock market.

1: There is no difference in stock performance before and after merger announcement which is measured by Average Abnormal Return in Indonesian stock market.

7. Data and Methodology

Daily stock prices and IHSG are used to calculate the abnormal return around the merger announcement date from the year 2000 to 2014. Stock prices and IHSG (known also as the Jakarta Composite Index) are obtained from yahoo finance website (<u>http://finance.yahoo.com</u>). Merger announcements date are obtained from Indonesian Capital Market Electronic Library (ICAMEL). The statistics in ICAMEL showed that there are 32 successful merger announcements of public companies from year 2000 to 2014. However, not all of the cases are studied in this research. They are chosen through the following criteria:

a. The stock price and index price are available in yahoo finance.

- b. The stock price and index price of each firm are available for the duration of the event study, which is -120 to +30
- c. The stocks is actively traded, meaning that there is not much zero returns.

Based on that criteria, table 1 are companies that are chosen for analysis. From 32 companies, 19 companies are taken for study.

		1	
Number	Code	Company Name	Annoncement Date
1	IMAS	PT Indosepamas Anggun	30-Jun-02
2	INDR	PT Indo-Rama Synthetics	30-Jun-03
3	IGAR	PT Igar Jaya	12-Dec-03
4	BRPT	PT Barito Pacific	17-Dec-03
5	UNVR	PT Unilever Indonesia	31-Jul-04
6	INPC	Inter Pacific Bank	17-Jun-05
7	SRSN	Sarana Nugraha	05-Oct-05
8	KLBF	Kalbe Farma	16-Dec-05
9	MITI	Siwani Trimitra	24-Apr-06
10	ADES	PT Ades Waters Indonesia	01-Jul-06
11	FREN	PT Mobile-8 Telecom	31-May-07
12	MCOR	PT Bank Windu Kentjana	18-Jan-08
13	BNGA	PT Bank CIMB Niaga	30-Jun-08
14	RMBA	PT Bentoel International Investma	04-Jan-10
15	INPP	PT Indonesian Paradise Property	27-Apr-10
16	NISP	PT Bank OCBC NISP	01-Jan-11
17	TPIA	PT Tri Polyta Indonesia	01-Jan-11
18	SCMA	PT Surya Citra Media	01-May-13
19	EXCL	PT XL Axiata	28-Mar-14

	Table-1.	List	of	chosen	companies
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To analyze the efficiency of Indonesian stock market in case of successful merger announcements, event study method is being used. According to Bodie *et al.* (2011), event study is an empirical research technique that can see the effect of a particular event on a firm's stock price. Event study uses abnormal return over the event window to test for market efficiency. An abnormal return, which implies as the difference between actual return and expected return, will be positive or negative depends on the information if the market is not efficient. In an efficient market, it is not possible to find abnormal returns because it is impossible for investors to earn excess return. As describe before, there are many approach to find abnormal return. In this research statistical model of market model will be used. The steps of conducting event study are as follows:

1. The first step is to define the event and the event window. The event in this research is announcements of successful merger from year 2000 to 2014. Announcements of successful mergers are categorized as a positive news which will make the stock prices to increase after the announcement. The event window is 30 days prior and after the announcement day (-30 to +30). Since market model is used, there is a need to establish estimation window as well. The estimation window differ between companies depend on the availability of the data. Some use 210 days prior to the event window and some use 90 days prior to the event window. Figure 2 depict the timeline of event window which uses day -240/-120 to -30 as the estimation window.



2. Gather the daily historical prices of stocks and IHSG from yahoo finance and calculate the daily stock return (R) and daily market return (Rm). The returns of each stocks along the estimation and event window is calculated using the formula below:

$$R_{it} = \ln(1+R_t) = \ln \frac{P_{it}}{P_{it-1}}$$

Where R_{it} is the return of stock i at day t, P_{it} and P_{it-1} is the closing price of stock i at day t and the closing price of stock i at day t-1. Next is to calculate the market return using IHSG daily price. The corresponding market return is also calculated along the estimation and event window using the formula:

$$R_{mt} = \ln(1 + R_{mt}) = \ln \frac{P_{mt}}{P_{mt-1}}$$

Where R_{mt} is the market return at day t, P_{mt} and P_{mt-1} is the closing price of market return at day t and closing price of market return at day t-1.

3. A regression analysis is conducted using the actual daily return of each stock (R) as dependent variable and the corresponding daily market return (Rm) of IHSG as independent variable over the estimation window (some stock uses 90 days prior to the event window and some uses 210 days prior to the event window) to obtain the intercept alpha and slope beta for each stock separately. Table 2 shows alpha, beta, and estimation period that is ued for each stocks.

Code	Alpha	Beta	Estimation window
SCMA	0.001964	0.106163	210
TPIA	0.000166	0.524556	210
NISP	0.001758	0.24393	210
RMBA	0.00024	0.380218	210
MITI	-0.00047	0.105069	210
INPP	0.000455	-0.32017	90
BNGA	-0.00105	1.210479	210
FREN	-0.00148	1.057271	90
MCOR	-0.00397	0.86012	90
ADES	-0.00117	1.015818	210
KLBF	-0.00016	1.10974	210
SRSN	0.001036	0.530258	210
INPC	0.001103	1.635667	210
UNVR	0.000506	0.762795	90
IGAR	0.000454	1.540521	210
BRPT	0.004915	1.332116	210
INDR	-0.00011	0.709932	210
IMAS	0.00123	0.123966	90
EXCL	-0.00047	0.644648	210

Table-2. Alphas, Betas, and estimation period of each stocks

4. Calculate the expected return of each stock for each day during the event window (day -30 to +30) using the formula:

$$\hat{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt}$$

Where \hat{R}_{it} is the expected return on stock I at time t and R_{mt} is the corresponding market return i.e. IHSG. Then, the Abnormal Return is calculated as:

$$AR_{it} = R_{it} - \hat{R}_{it}$$

Where R_{it} is the actual return on stock i at time t. the next step is aggregating the abnormal returns across stocks and over time during the event window.

5. Average Abnormal Return (AAR) is the average of abnormal return of all stocks at time t during the event window. AAR is calculated each day using the formula:

$$\overline{AR}_t = \frac{1}{N} \sum_{i=1}^N AR_{it}$$

Where N is the number sample companies. In this research the N is 19.

6. Cumulative Average Abnormal Return (CAAR) is calculated by adding AAR for each day from - 30 to +30 or simply describe in the following formula:

$$\overline{CAR}(t_1, t_2) = \sum_{t=t_1}^{t_2} \overline{AR}_t$$

7. To see the movement of aggregated Abnormal return across stocks and over time, CAAR and AAR is then plotted through time during the event window (day-30 to +30).

8. To test for market efficiency, a number of parametric and non-parametric test is used, such as the paired sample T-test, one sample T-test, Wilcoxon matched-pairs signed-rank test and Wilcoxon signed-rank test.

Non-parametric test serves as a conjunction to parametric tests. Inclusion of non-parametric test provides a check of robustness of the conclusion that is made by performing parametric test because non-parametric tests are more relaxed to the statistical assumptions especially normality assumptions. However, if assumptions are met, parametric test is a very strong test to use.

8. Quantitative Analysis Test and Results

After AAR is calculated, statistical test is conducted to see the significance of AAR each day during the event window. First, Parametric test is conducted which uses one-sample T-test. This test assumes the null hypothesis that the mean of abnormal returns at time t is equal to zero. To support the conclusion made by parametric test, non-parametric test is also conducted.

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As describe before, non-parametric test is more relaxed to the statistical assumptions especially normality assumptions. For non-parametric test, Wilcoxon signed-rank test is used under the null hypothesis that states the AAR at time t is equal to zero. Table 3 shows Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR) together with the T-value and Z-value which is obtained from conducting one-sample T-test and Wilcoxon signed-rank test.

Graph 2 shows the relationship Average Abnormal Return (AAR) to time and graph 3 shows the relationship of Cumulative Average Abnormal Return (CAAR) to time during the event window (day -30 to +30 days).

Table-3. Results of Average Abnormal Return, Cumulative Average Abnormal Return, and statistical tests.

	Average	Cumulative Average		
Day	Abnormal Return	Abnormal Return	T-value	Z-value
•	(AAR)	(CAAR)		
-30	0.00405	0.00405	0.39026	-0.362
-29	0.00075	0.00480	0.08866	-0.161
-28	0.00878	0.01358	1.17451	0.926
-27	-0.01255	0.00103	-1 21075	-1.328
-26	0.00422	0.00525	0.56288	0.026
-20	0.00422	0.00020	0.74550	0.320
-23	0.00/15	0.01239	0.74550	0.445
-24	-0.01041	0.00199	-1.21000	-1.528
-23	-0.00489	-0.00290	-1.31401	-1.09
-22	0.00493	0.00203	0.78804	0.885
-21	-0.00437	-0.00234	-0.47093	-0.322
-20	0.01112	0.00877	1.03140	0.845
-19	-0.01157	-0.00280	-1.66243	-1.529
-18	0.01187	0.00907	1.62568	0.644
-17	0.00326	0.01233	0.45508	-0.201
-16	-0.01931	-0.00698	-1.52368	-2.455
-15	0.01951	0.01253	1.97603	1.368
-14	-0.02481	-0.01228	-1.05696	0
-13	-0.00472	-0.01700	-0.45447	-1.167
-12	-0.00614	-0.02314	-0.81967	-0.644
-11	0.00920	-0.01394	1.41017	0.885
-10	-0.00428	-0.01821	-0.85302	0.04
-9	-0.00312	-0.02133	-0.24145	-0.443
-8	0.01350	-0.00784	0.75933	1 046
-7	-0.00814	-0.01598	-0.95981	-2.536
6	0.02576	0.04173	2 26576	2.556
-5	0.00557	-0.03616	0.36455	-0.121
	0.00574	0.04100	0.38407	0.362
	0.01040	0.02250	1 1/713	0.002
	0.01940	-0.02250	0.44664	0.402
-2	-0.01739	-0.03408	-1.87182	0.724
0	-0.00133	-0.03540	-0.10012	-0.08
1	0.04756	0.01216	0.83622	-0.282
2	0.00105	0.01321	0.09645	-0.523
3	0.00951	0.02272	0.37322	-0.121
4	-0.00403	0.01869	-0.37061	-0.161
	-0.01561	0.00308	-1.86610	0.492
7	0.00000	0.00968	0.07404	2 0.694
~	-0.00704	0.00204	-0.7404	0 0121
-	0.00087	0.00032	0.0861	1 -0.644
10	-0.01035	-0.00856	-1.0695	5 -0.523
11	-0.01106	-0.01961	-1.3929	1 -1.288
12	0.01027	-0.00935	0.9716	4 1.087
13	0.01611	0.00677	1.3103	5 0.604
14	-0.00092	0.00584	-0.0551	9 0.523
15	-0.01272	-0.00688	-1.3617	8 -1.046
10	-0.00330	-0.01018	-0.2880	0 -0.443
18	-0.00213	-0.01316	-0.1906	6 0 644
19	0.00406	-0.00911	0.6141	5 -0.04
20	-0.04132	-0.05042	-2.5183	3 -2.294
21	0.01940	-0.03102	1.4913	2 -0.483
22	0.01610	-0.01492	1.6716	1 1.087
23	-0.00541	-0.02033	-1.0685	9 -0.966
24	0.00447	-0.01586	0.6647	3 -0.121
25	-0.004/9	-0.02066	-0.6653	3 -1.207
20	-0.04089	-0.00979	-1 53/4	4 .1 207
28	0.00432	-0.04636	0 6924	7 0322
29	-0.00557	-0.05193	-0.3400	4 -0.966
30	0.01225	-0.03967	1.2447	7 0.926



Graph-2. Shows the relationship of AAR to time during the event period (day -30 to +30)

Graph-3. Shows the relationship of CAAR to time during the event period (day -30 to +30)



The results shows that there is only a few AAR that is significant in 10% level of significance using parametric and non-parametric test. To see the effect of merger announcements to abnormal return, we might be interested in the AAR at day zero which is the announcement day and days after the announcement. In graph 2, we can see that the abnormal return is moving randomly and there is an immediate jump on the announcement day (day 0) and the day after. Based on the graph there is a possibility of shareholders to earn abnormal return. However, based on the statistical test there are no AAR that is significance on and after the announcement day except for day 5 but it shows a negative number where we expect to be positive since merger announcements is categorized as a positive news. The movement in AAR is reflected in graph 3. It shows the tendency of Average Abnormal Return movement. After the announcement day, there is more negative AAR which is showed by the declining pattern in CAAR. Based on hypothesis testing on AAR each day, we can conclude that the market is efficient because the presence of abnormal return around the announcement day is not significant.

To support the conclusion of one sample statistical test that is conducted before, it is important also to test for the presence of abnormal return in each stock around the announcement day. Paired sample statistical tests is conducted to see the presence of abnormal return. In this part of test, event window is narrowed to 15 days prior and after the announcement day to identify the presence of abnormal return closely around the announcement day. Actual and expected return within the narrowed event window should differ in order to know the possibility to outperform the stock market in the case of merger announcement, shareholders will expect to gain on their investment after the announcement day. Therefore, a test of difference in actual return and expected return on the

announcement day to 15 days after the announcement day is also conducted to see if shareholders could earn excess return. First, Jarque-Barra test of normality is conducted to see how the data are distributed. This test assumes that the data is normally distributed under the null hypothesis. Normal data is best to be observed using parametric test. In the other hand, non-normal data is best to use non-parametric test because the distributional assumption is more relaxed if using non-parametric tests. However, in this research both parametric and non-parametric test will be applied to normal and non-normal data to act as a comparison and for stronger conclusion. As describe before, non-parametric test is serve as a conjunction to parametric test, it support the conclusion that is made after conducting parametric test. Paired sample T-test is used as parametric method and Wilcoxon matched-pairs signed-rank test is used as non-parametric method. Both of this test have the null hypothesis of expected return is the same as actual return which make it impossible to outperform the market. Table 4 shows the result of normality test, paired sample t-test and Wilcoxon matched-pairs signed-rank test during the narrowed event window.

	Norm va	ality (P- alue)	Mean	Paired sa	mple t- t	Wilcoxon s	signed-rank est
Code	Actual	Expected	Differece	t -Value	P- Value	z -Value	P-Value
SCMA	0.0014	0.3453	-0.0004	0.1472	0.8835	0.6717	0.5018
TPIA	0.0059	0.2704	0.0043	1.4262	0.1590	1.0450	0.296
NISP	0.021	0.2704	-0.0058	1.4711	0.1465	1.9213	0.0547
RMBA	0.0146	0.018	-0.0070	0.6864	0.4951	1.4905	0.1361
MITI	0.9925	0	-0.0070	0.7726	0.4428	0.7793	0.4358
NIPP	0	0.0076	0.0059	0.6110	0.5435	2.1876	0.0287
BNGA	0	0.0854	0.0073	1.9287	0.0585	1.7991	0.072
FREN	0.0005	0.5275	0.0007	0.2150	0.8305	0.4705	0.638
MCOR	0.0023	0.002	0.0031	0.4466	0.6568	0.7218	0.4704
ADES	0.0009	0.0147	-0.0015	0.2592	0.7964	0.1401	0.8886
KLBF	0	0.702	0.0113	1.4438	0.1540	0.8727	0.3828
SRSN	0	0.0404	0.0126	0.6453	0.5212	0.4705	0.638
INPC	0.8245	0.817	-0.0126	1.2888	0.2024	1.5552	0.1199
UNVR	0.254	0.1251	-0.0037	2.1149	0.0386	1.7991	0.072
IGAR	0.7369	0.7812	-0.0066	1.6489	0.1044	1.6415	0.1007
BRPT	0.1146	0.7828	-0.0094	2.3801	0.0205	2.6693	0.0076
INDR	0.0611	0.8572	-0.0034	1.0333	0.3056	1.0307	0.3027
IMAS	0	0.9499	-0.0034	0.2909	0.7721	1.1888	0.2345
EXCL	0.0416	0.0136	0.0015	0.5479	0.5858	0.3914	0.6955

Table-4. Results of paired sample statistical test on the actual return and expected return during the narrowed event window (-15 to +15).

Using parametric test, there are only three companies that have significant difference in actual and expected return using 10% level of significance. Those companies are BNGA, UNVR, and BRPT. From three of them, only two of them are significant in 5% level of significance which are UNVR and BRPT. Using Non-parametric test, there are 5 companies that are significant in 10% level of significance. Those companies are NISP, NIPP, BNGA, UNVR and BRPT. From 5 of those companies, there are two companies that are significant at 5% level of significance, which are NIPP and BRPT. Parametric test and non-parametric test both identify BNGA, UNVR, and BRPT to have a difference in actual and expected return from day -15 to +15, making investors investing in those companies are possible to beat the market. Table 5 shows the result of normality test, paired sample t-test and Wilcoxon matched-pairs signed-rank test after the announcement day where day zero is included.

	Norm V	ality (P- alue)	Maan	Paired sam	ple t-test	Wilcoxo	n signed-
Code	Actual	Expected	Difference	T -Value	P- Value	z -Value	P-Value
SCMA	0.6275	0.2892	0.0012	0.2570	0.8007	0.2069	0.8361
TPIA	0.0112	0.5637	0.0088	1.2039	0.2473	1.0860	0.2775
NISP	0.0126	0.5637	-0.0156	1.7030	0.1092	1.4997	0.1337
RMBA	0.0046	0.1526	0.0012	0.0748	0.9414	0.8274	0.408
MITI	0.2038	0.0005	-0.0119	0.5708	0.5766	0.2585	0.796
NIPP	0.0934	0.679	0.0236	2.7770	0.0141	2.2751	0.0229
BNGA	0.0005	0.3859	0.0030	0.5251	0.6072	0.6205	0.5349
FREN	0.9536 0.3109		-0.0056	1.0343	0.3174	0.9307	0.352
MCOR	0.4794	0.2634	-0.0088	0.4111	0.6868	0.3619	0.7174
ADES	0.0813	0.2462	0.0037	0.3383	0.7398	0.2585	0.796
KLBF	0	0.8418	0.0303	1.1364	0.2736	0.9307	0.352
SRSN	0	0.2282	0.0556	0.8347	0.417	0.1035	0.9176
INPC	0.6346	0.8712	-0.0234	1.0074	0.3297	0.8274	0.408
UNVR	0.0519	0.5724	-0.0059	1.7491	0.1007	1.6546	0.098
IGAR	0.8325	0.9978	-0.0122	1.6329	0.1233	1.4997	0.1337
BRPT	0.2105	0.813	-0.0109	1.6737	0.1149	1.4477	0.1477
INDR	0.5552	0.9334	-0.0011	0.1752	0.8633	0.1035	0.9176
IMAS	0.941	0.4859	-0.0100	0.6683	0.5141	0.9307	0.352
EXCL	0.8246	0.0039	0.0086	2.0808	0.055	1.6546	0.098

Table-5. Results of paired sample statistical test on the actual return and expected return after the announcement day (0 to +15).

Both Parametric and non-parametric test states that there is a significant difference in actual return and expected return in 10% level of significance in NIPP, UNVR and EXCL. NIPP is also significant in 5% level of significance. This results shows that shareholders are able to earn excess abnormal return in stocks NIPP, UNVR and EXCL.

Table 4 and 5 shows that merger announcements does not have significant effect on the performance of the stock price, which is represent by abnormal return. Within the narrowed event window, there are only three companies that are significant using parametric test and five companies that are significant using non-parametric test. But, these companies that is identified to be significant in table 4 may not be in the case of merger announcements, it could be other events regarding the prospect of the company. To identify the real effect of merger announcement, the focus is more on table 5, which represent the ability of investors to earn abnormal return after the announcements of mergers. If the market is not efficient, it is possible for investors to earn abnormal return after the announcement day. Table 5 shows that the market is efficient because there are only 2 stocks from 19 stocks being analyze where the shareholders are able to earn abnormal return. The two statistical tests, one sample and paired statistical test, 0: Therefore we conclude that Indonesian stock market is efficient in case of merger announcement.

To see whether there is a difference in stock performance before and after the announcement day during the event window, two independent sample parametric and non-parametric statistical test is used. This test is performed to find out the second hypothesis of this research. Two independent samples t-test and Mann-Whitney test are both conducted after a test of normality is performed using Jarque-Barra test. Both of the data are normally distributed using 5% level of significance but the after data is appeared to be not normal using 10% level of significance. Both parametric and non-parametric test indicates that there is no significant difference in stock performance before and after the announcement day. P-value from T-test and Mann-Whitney are 0.790 and 0.7117 which are above 5%. Thus, we cannot reject the null hypothesis that the Average Abnormal Return (AAR) before and after the announcement day is equal. Table 6 shows the result of parametric and non-parametric tests and also provides additional information about the normality of the data.

Cumulative Average Abnormal Return and Semistrong Form

Table-6. The result of tests of the difference in abnormal return before (day -30 to -1) and after (day +1 to +30) the announcement day

Period	Normality (P-Value)	Mean Difference	Parametric independ	test (t test of ent data)	Non-Parametric test (Mann-Whitney test)		
	(I - Value)		T-value	P-value	z- value	P-value	
Before	0.695	0.000004	0.268	0.700	0.270	0.7117	
After	0.0576	-0.000994	-0.208	0.790	-0.370	0.7117	

1: There is no difference in stock performance before and after merger announcement which is measured by Average Abnormal Return (AAR) in Indonesian stock market which may be due to the efficiency of Indonesian stock market.

9. Conclusion

Generally shareholders and investors will view announcement of successful merger as something positive. This study has empirically examined the efficiency of Indonesian stock market in case of merger announcement. After testing, the research shows that the possibility of shareholders gaining abnormal return cannot be realized with public information especially successful merger announcement. The research proved that the Indonesian stock market is efficient in semi strong form. And due to the fact that Indonesian stock market are efficient in semi-strong form, this study also examined that there is no difference in stock performance before and after the announcement day because in efficient market it is impossible for investors to outperform the market at any time.

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APPENDICES

Appendix 1. List of Normal return (expected return) and actual return during the event window (day -30 to +30)

Day	scma_actual	scma_normal	tpia_Actual	tpia_normal	rmba_actual	rmba_normal	miti_actual	miti_normal	nipp_actual	nipp_normal	bnga_actual	bnga_normal
-30	-0.0196	0.0016	-0.0083	0.0027	0.0146	0.0028	0.0870	-0.0015	0.0000	0.0017	0.1560	0.0141
-29	-0.0100	0.0024	-0.0339	0.0007	0.0000	0.0013	0.0800	0.0000	0.0000	0.0001	0.0000	-0.0008
-28	0.0100	0.0022	0.0000	0.0068	-0.0146	0.0067	0.0000	0.0002	0.0000	-0.0098	0.0328	0.0083
-27	0.0196	0.0013	0.0086	0.0024	-0.0148	0.0010	0.0000	-0.0008	0.0000	0.0027	-0.0553	0.0194
-26	0.0838	0.0002	0.0085	-0.0087	0.0148	0.0018	-0.0800	-0.0003	0.0000	-0.0002	0.0000	-0.0089
-25	-0.0364	0.0032	-0.0085	-0.0026	0.0000	-0.0021	0.0800	-0.0006	0.0000	0.0052	-0.0230	0.0034
-24	0.0092	0.0034	0.0085	0.0063	-0.0299	0.0031	0.0000	0.0020	0.0000	-0.0017	-0.0355	-0.0196
-23	0.0091	0.0038	-0.0345	-0.0083	0.0445	-0.0007	0.0000	0.0021	0.0000	-0.0058	-0.0244	-0.0240
-22	0.0090	0.0022	0.0174	-0.0015	0.0144	-0.0012	0.0000	0.0015	0.0000	-0.0023	0.0364	-0.0125
-21	0.0179	0.0019	-0.0531	-0.0144	-0.0144	-0.0014	0.0000	-0.0007	0.0000	-0.0011	0.0690	0.0174
-20	0.0088	0.0024	0.0531	0.0131	0.0000	-0.0104	-0.0800	-0.0025	0.0000	0.0025	0.0645	0.0055
-19	0.0000	0.0025	0.0000	0.0110	0.0144	0.0038	0.0000	-0.0002	0.0000	0.0001	0.0000	-0.0226
-18	-0.0177	0.0007	-0.0087	0.0004	0.0142	0.0060	0.0000	0.0000	0.0000	0.0029	0.0206	-0.0220
-17	-0.0272	0.0020	0.0172	0.0039	0.0000	0.0032	0.0000	-0.0004	0.0000	-0.0056	0.0000	0.0178
-16	-0.0092	0.0013	-0.0086	0.0068	-0.0142	0.0046	0.0000	0.0006	0.0000	-0.0060	0.0000	0.0002
-15	0.0000	0.0020	0.0000	0.0024	0.0000	0.0020	0.0000	-0.0007	0.0000	0.0012	-0.0103	0.0029
-14	0.0092	0.0015	0.0086	-0.0052	-0.0290	-0.0040	0.0000	-0.0005	-0.4132	-0.0015	0.0103	-0.0194
-13	0.0000	0.0030	0.0000	-0.0077	-0.0451	0.0003	0.0000	0.0000	0.0000	0.0058	0.0000	-0.0006
-12	-0.0092	0.0022	0.0000	-0.0002	0.0153	-0.0002	0.0000	-0.0007	0.0000	0.0011	0.0000	0.0163
-11	-0.0093	0.0010	0.0336	-0.0043	0.0000	0.0010	0.0000	0.0010	0.0116	-0.0036	-0.0103	-0.0064
-10	0.0093	0.0042	0.0164	-0.0045	-0.0465	0.0052	0.0000	0.0003	0.0000	0.0001	0.0103	-0.0012
	0.0000	0.0023	-0.0164	0.0016	0.0000	-0.0017	-0.0870	0.0002	0.1202	0.0004	0.0000	-0.0112
	0.0274	0.0017	0.0164	-0.0017	_0 1010	-0.0017	0.0870	-0.0002	0.2332	-0.0013	0.0000	-0.0070
-7	0.0000	0.0010	0.0161	0.0102	-0.0202	0.0045	0.0000	0.0005	0.0000	0.0020	0.0000	0.0022
-/	0.0000	0.0015	0.0000	.0.0022	0.0000	-0.0017	0.0000	0.0003	.0 1744	0.0025	0.0000	-0.0017
~	0.0000	0.0013	0.0000	0.0010	0.0000	0.0017	0.0000	0.0003	0.1001	0.0047	0.0200	0.0057
	0.0000	0.0027	0.0257	-0.0012	0.2311	-0.0118	0.0000	-0.0001	-0.1001	-0.0032	0.0000	-0.0037
	0.0090	0.0016	0.0438	0.0022	-0.2311	0.0039	0.0000	0.0018	0.0000	-0.0019	0.0000	0.0005
	0.0000	0.0016	0.0000	0.0052	0.2151	0.0014	0.0000	0.0022	-0.1112	-0.0010	0.0104	-0.0134
-2	0.0000	0.0024	0.0294	0.0038	0.0023	0.0030	-0.0870	0.0003	0.1112	0.0007	0.0204	0.0039
-1	0.0000	0.0027	-0.0073	0.0008	-0.0155	0.0040	0.0000	-0.0008	0.0000	-0.0017	-0.0102	-0.0108
	-0.0304	0.0025	0.0973	0.0030	-0.0473	0.0003	0.0000	-0.0017	0.1001	0.0010	-0.0200	0.0077
	0.0000	0.0006	0.0201	0.0047	0.0000	0.0040	0.08/0	0.0007	0.0405	0.0044	-0.0211	0.0012
	0.0000	0.0005	0.0317	0.0035	-0.0490	0.0000	0.0000	0.0012	0.0445	-0.0021	-0.0324	-0.0012
	0.0000	0.0034	0.0000	-0.0005	-0.0702	-0.0022	-0.0870	-0.0010	0.0000	-0.0044	-0.0110	-0.0487
-	0.0092	0.0050	-0.0382	-0.0148	0.0870	0.0043	-0.0955	-0.0012	0.0000	0.0010	0.0110	0.0138
	0.0272	0.0029	0.0005	-0.0224	-0.0513	0.0028	-0.1054	0.0004	0.0000	0.0007	0.0109	-0.0068
	0.0204	0.0023	0.0000	-0.0034	0.0345	0.0042	0.0000	-0.0005	0.0000	0.0129	-0.0220	-0.0142
	0.0172	0.0009	0.0192	0.0151	0.0333	-0.0036	0.0000	0.0012	0.0000	0.0045	0.0000	0.0027
-	-0.0080	0.0025	0.0120	0.0017	-0.0333	0.0020	0.0000	-0.0015	0.0420	0.0087	0.0000	-0.0002
- 10	0.0080	0.0021	-0.0253	0.0008	0.0333	-0.0001	0.1054	-0.0006	0.0800	-0.0123	-0.0112	-0.0007
	0.0000	0.0017	-0.0004	-0.0048	-0.0333	0.0050	-0.1034	0.0013	0.0377	0.0047	0.0000	-0.0103
	0.0085	0.0034	-0.0005	0.0021	0.0000	0.0004	-0.1178	0.0012	0.0074	-0.0035	-0.0227	-0.0252
12	-0.0083	0.0034	0.0230	-0.0043	0.0000	-0.0039	0.11/8	0.0000	0.0000	-0.0008	0.0114	0.0007
13	-0.0260	0.0014	-0.0322	-0.0093	-0.0522	-0.0038	0.1054	0.0005	0.0301	0.0048	-0.0114	-0.0289
14	0.0345	0.0024	0.0000	-0.0113	0.1942	-0.0010	-0.1034	-0.0023	0.0141	-0.0012	0.0000	-0.0100
15	0.0000	0.0002	-0.0198	-0.0051	-0.0148	-0.0020	0.0000	-0.0073	0.0000	0.0125	0.0774	0.0291
10	0.0108	0.0027	0.0203	0.0138	-0.0938	-0.0018	-0.11/8	-0.0006	0.0070	0.0040	0.0000	0.0087
17	-0.0253	0.0005	-0.0131	0.0104	-0.0000	0.0083	0.1178	0.0020	0.0130	0.0090	0.0100	0.0150
18	0.0200	0.0038	0.0215	0.0021	0.0000	-0.0010	-0.11/8	-0.0030	0.0000	0.0021	0.0208	0.0072
19	0.0000	0.0025	-0.0315	-0.0039	0.0005	-0.0032	0.0000	-0.0011	0.0000	0.0124	0.0000	-0.0073
20	-0.0253	0.0005	-0.0260	-0.0118	-0.1989	-0.0008	-0.1335	-0.0070	0.0000	-0.0220	0.0000	0.0152
21	-0.0080	0.0007	0.0000	0.0053	0.1484	0.0038	0.0000	0.0009	0.0000	-0.0010	-0.0104	0.0005
22	-0.0262	-0.0001	0.0000	0.0060	-0.0351	-0.0014	0.1335	-0.0007	0.0606	-0.0092	-0.0105	-0.0171
23	0.0348	0.0030	0.0000	0.0025	0.0000	-0.0108	0.0000	0.0004	0.0000	0.0088	-0.0213	-0.0124
24	-0.0086	0.0015	0.0000	-0.0011	-0.0180	-0.0064	0.0000	0.0020	0.0000	-0.0006	0.0213	-0.0241
25	-0.0087	-0.0010	-0.0199	-0.0040	0.0702	0.0024	0.0000	-0.0033	0.0404	-0.0085	0.0000	-0.0002

Cumulative Average	Abnormal	Return	and	Semistrong	Form

Day	fren_actual	fren_norma l	mcor_actua l	mcor_norma l	ades_actua 1	ades_norma l	klbf_actua l	klbf_norma l	srsn_actua l	srsn_norma l	inpc_actua l	inpc_norma l
-30	0.0000	-0.0006	0.0000	-0.0105	-0.0215	-0.0447	0.0000	-0.0059	0.0000	-0.0040	0.0465	0.0264
-29	-0.0180	-0.0046	0.0520	0.0103	-0.0146	-0.0069	0.0177	0.0082	0.0000	-0.0144	-0.0465	0.0300
-28	-0.0183	-0.0240	0.0494	0.0050	-0.0451	-0.0643	0.0000	-0.0015	0.1335	0.0144	0.0000	0.0193
-27	0.0000	0.0259	0.0754	-0.0076	0.0077	0.0121	-0.0357	-0.0129	-0.1335	-0.0055	0.0465	-0.0127
-26	0.0000	0.0081	0.0056	0.0083	-0.0077	-0.0036	-0.0183	-0.0098	0.0000	-0.0270	0.0000	-0.0205
-25	0.0183	-0.0042	0.0488	0.0042	0.0077	0.0070	-0.0572	-0.0159	0.1335	0.0245	-0.0465	0.0115
-24	0.0000	0.0012	0.0000	0.0007	0.0301	0.0231	-0.0400	-0.0124	-0.1335	0.0062	0.0465	-0.0059
-23	0.0000	0.0140	-0.0106	0.0045	-0.0377	-0.0284	-0.0103	0.0046	0.0000	-0.0045	-0.0465	-0.0152
-22	-0.0183	0.0004	0.0316	-0.0090	0.0000	-0.0076	-0.0104	0.0039	0.0000	-0.0007	0.0465	-0.0036
-21	0.0000	-0.0123	0.0256	-0.0005	-0.0077	0.0187	0.0606	0.0079	0.0000	0.0090	-0.0953	-0.0075
-20	0.0000	-0.0004	0.0588	0.0024	-0.0156	-0.0002	0.0000	0.0229	0.1335	0.0049	0.0488	0.0093
-19	0.0000	0.0024	-0.1001	-0.0086	0.0078	-0.0256	0.0385	0.0077	0.0000	0.0115	-0.0488	0.0052
-18	0.0000	0.0075	-0.0053	-0.0164	-0.0157	-0.0244	0.0728	0.0038	0.1178	0.0008	0.0000	-0.0035
-17	0.0183	0.0025	0.1005	-0.0080	-0.0405	-0.0380	-0.0177	-0.0056	0.0000	0.0045	0.0000	0.0072
-16	-0.0183	0.0004	-0.0103	-0.0270	0.0000	0.0258	0.0177	0.0176	-0.2513	-0.0086	0.0000	0.0003
-15	0.0183	0.0080	0.0031	-0.02/9	0.0164	-0.00258	-0.0357	-0.0041	0 1335	-0.0000	0.0000	0.0121
-15	0.0103	0.0064	0.0330	0.0002	0.0161	0.0207	0.0702	0.0067	0.1335	0.0029	0.0000	0.0024
-17	0.0264	0.0022	0.0220	-0.0002	0.0101	-0.0307	0.0702	0.0007	0.1335	-0.0028	0.0000	0.0304
-13	0.0000	0.0032	0.0220	0.0040	0.00245	0.0031	0.0351	0.0011	0.0000	0.0040	0.0000	0.0059
-12	0.0000	-0.0143	-0.0223	0.0040	-0.0082	0.0049	0.0331	0.0004	0.0000	0.0000	-0.0313	-0.0008
-11	0.0000	0.0099	0.0223	-0.0020	0.0000	0.0329	0.01/1	0.0004	0.0000	-0.0043	0.0000	0.0139
-10	0.0000	-0.0048	0.0000	-0.0085	0.0000	-0.0125	0.0108	0.0229	0.0000	-0.0048	0.0000	0.0027
-9	0.1001	0.00119	-0.0690	-0.0092	0.0164	-0.0012	-0.0559	0.0010	-0.1555	-0.0150	0.0000	0.0076
-0	-0.0160	0.0024	0.0233	0.0005	-0.0247	-0.0023	0.0171	0.0027	0.0000	-0.0010	0.0000	-0.0049
-/	-0.0165	0.0025	-0.0476	-0.0003	0.0000	0.0008	-0.01/1	0.0271	0.1333	0.0125	0.0000	0.0001
-0	0.0000	0.0114	0.0000	-0.0011	0.0083	-0.0116	0.0000	0.0065	-0.1333	0.0026	0.0000	-0.0009
	-0.0555	-0.0144	0.0000	0.0097	-0.0085	-0.0001	0.0000	0.0013	0.0000	-0.0040	-0.0341	0.0032
-4	0.0496	-0.0108	0.0000	-0.0100	-0.0690	0.0002	0.01/1	0.0140	0.0000	0.0115	0.0000	0.0070
	0.0317	0.0069	-0.0247	-0.0289	-0.0180	-0.0120	0.0000	0.0064	0.1333	0.0165	0.1042	0.0085
-2	0.0458	-0.0107	-0.0235	-0.0485	0.0870	0.0010	0.0000	-0.0080	0.0000	0.0051	-0.1001	0.0212
-1	-0.0458	-0.0032	0.0255	0.0147	-0.0780	0.0268	0.0168	-0.01/1	-0.1555	0.0097	0.0000	0.0101
	0.0308	0.0155	0.0000	-0.0164	0.0534	0.0125	-0.0108	-0.0125	-0.1342	0.0024	0.0315	0.0245
	-0.0308	0.0125	-0.1555	-0.0402	0.1220	0.0005	0.0000	0.0180	0.0000	-0.0027	-0.1054	0.0095
	-0.0480	-0.0109	-0.1342	-0.0729	-0.0/1/	-0.0008	0.0000	0.0005	0.0000	0.0002	0.1034	-0.0195
	0.0163	0.0032	0.0953	0.0616	-0.0083	0.0001	0.4217	-0.0025	0.0000	0.0050	-0.1625	0.0031
4	0.0000	-0.0038	0.0299	0.0100	0.0000	0.0048	0.0000	0.0031	0.0000	0.0024	-0.1252	0.0050
<u> </u>	-0.0163	-0.0215	-0.0238	0.0308	0.0000	-0.00/3	0.0107	-0.0056	0.0000	-0.0002	-0.0690	-0.0014
- 0	0.0000	0.0136	0.0179	-0.0167	0.0000	0.0019	0.0106	0.0031	0.0000	-0.0050	0.1335	-0.0218
	-0.0165	0.0109	-0.0240	0.0046	-0.0426	0.0003	0.0513	0.0022	0.0000	0.0040	-0.1335	0.0126
	-0.0168	-0.0115	-0.0122	-0.0031	0.0426	-0.0101	-0.0101	-0.0016	0.0000	-0.0022	-0.0/41	-0.0003
- 10	0.0000	0.0085	0.0420	0.0016	-0.0780	-0.0246	-0.0102	0.0085	0.0000	0.0038	-0.0800	-0.0054
10	0.0168	0.0046	-0.0299	0.0024	0.0090	-0.0166	0.0102	0.0121	0.0000	-0.008/	0.0800	0.0251
	0.0000	0.0014	-0.0625	0.0137	-0.0090	0.0005	0.0000	0.0249	0.0000	0.0008	0.0000	0.0009
12	0.0000	0.0063	0.1214	-0.0031	0.0267	-0.0056	0.0101	-0.0008	0.0000	0.0013	0.0000	-0.0100
-13	0.0000	0.0078	0.1335	-0.0249	0.0000	0.0263	0.0000	0.0101	0.0000	-0.0004	0.0000	-0.0183
14	0.0328	-0.0058	-0.2231	-0.0203	0.0087	-0.0019	0.0296	0.0203	0.0000	-0.0044	0.0000	-0.0127
- 15	-0.0328	-0.0015	0.0000	-0.0031	0.0000	-0.0100	0.0381	0.0142	0.0000	0.0010	0.0000	0.0043
16	-0.0168	-0.0015	0.0000	0.0022	0.0087	0.0024	0.0000	-0.0046	0.0000	0.0018	0.0741	0.0200
1/	0.0168	-0.0008	0.0606	0.01/1	0.0000	0.0027	0.0808	-0.0053	0.0000	-0.0017	-0.1542	0.0093
18	-0.0168	-0.0154	-0.0544	0.0001	0.0171	0.0125	0.0000	-0.0137	0.0000	0.0050	0.0800	0.0064
19	-0.01/1	-0.0077	-0.0062	-0.0051	0.0656	0.0040	-0.0087	-0.0205	0.0000	0.0004	0.0000	0.0066
20	0.0000	0.0117	0.0243	0.0047	-0.1823	0.0096	-0.0264	-0.0183	-0.0000	-0.0000	-0.1671	-0.0003
21	0.0000	0.0125	-0.0241	-0.0112	0.0996	0.0155	0.0177	0.0055	0.0000	-0.0036	0.10/1	-0.0033
22	-0.0171	0.0089	0.0000	0.0103	0.0339	0.0135	0.01/4	-0.0066	0.0606	-0.0065	0.0741	0.0063
23	0.0171	0.0019	-0.0247	-0.0018	0.0000	-0.0119	-0.0351	-0.0210	0.0000	-0.0048	0.0000	0.0135
24	0.0333	0.0104	-0.0126	-0.0006	0.0000	0.0059	0.0177	0.0064	0.0000	0.0033	0.0000	0.0251
25	0.0000	0.0014	-0.0256	-0.0080	0.0165	0.0091	0.0429	0.0207	0.0000	0.0030	0.0000	0.0218
26	0.0163	0.0193	-0.0263	-0.0036	-0.0165	-0.0065	0.0572	-0.0033	0.0000	0.0049	0.1335	-0.0024
27	0.0160	0.0036	0.0198	0.0011	0.0000	0.0111	-0.0323	0.0026	0.0000	0.0121	-0.1335	0.0126
28	0.0157	-0.0056	-0.0537	-0.0148	0.0328	-0.0217	0.0635	0.0022	0.0000	0.0048	0.0000	0.0013
29	-0.0157	0.0039	-0.0139	-0.0263	-0.0581	0.0115	-0.0155	0.0074	0.0000	0.0029	-0.0741	0.0129
30	0.0000	0.0062	-0.0070	-0.0097	-0.0086	0.0082	0.0232	0.0023	-0.0606	-0.0016	0.0000	-0.0048

Day	unvr_actual	unvr_normal	igar_actual	igar_normal	brpt_actual	brpt_normal	indr_actual	indr_normal	imas_actual	imas_normal	nisp_actual	nisp_normal	excl_actual	excl_normal
-30	-0.0405	-0.0076	-0.0290	-0.0015	-0.0183	0.0000	-0.0314	-0.0085	-0.0715	0.0001	-0.0061	0.0029	0.0077	0.0019
-29	0.0069	-0.0029	-0.0299	-0.0361	-0.0377	0.0119	-0.0324	-0.0135	0.0715	0.0009	0.0181	0.0020	-0.0133	0.0063
-28	0.0068	0.0021	0.0000	0.0092	0.0000	0.0001	0.0217	0.0105	-0.0351	-0.0020	0.0411	0.0049	0.0011	-0.0004
-27	-0.0137	0.0100	-0.0308	-0.0130	-0.0594	-0.0129	0.0000	0.0001	0.0000	-0.0007	-0.0471	0.0028	0.0022	0.0047
-26	0.0205	0.0109	-0.0317	-0.0049	0.0594	0.0247	0.0000	-0.0019	0.0351	0.0020	-0.0368	-0.0024	-0.0056	0.0003
-25	0.0397	0.0121	0.0317	-0.0052	0.0000	0.0246	-0.0108	0.0105	0.0000	0.0026	0.0308	0.0005	0.0067	0.0062
-24	-0.0131	0.0008	0.0000	0.0085	-0.0392	-0.0014	0.0000	0.0093	0.0000	0.0014	0.0240	0.0046	-0.0123	-0.0036
-23	0.0000	0.0024	0.0000	-0.0052	-0.0202	-0.0079	0.0000	0.0026	0.0000	0.0029	-0.0059	-0.0022	-0.0170	-0.0070
-22	0.0324	0.0111	-0.0645	-0.0201	-0.0417	-0.0093	0.0529	0.0182	-0.0351	0.0017	0.0000	0.0010	-0.0104	-0.0068
-21	-0.0324	-0.0022	-0.0339	0.0388	0.0211	-0.0001	-0.0421	0.0027	0.0690	0.0032	-0.0302	-0.0050	0.0104	0.0047
-20	0.0260	0.0163	0.0000	-0.0144	0.0206	0.0095	0.0000	0.0154	-0.0690	-0.0004	-0.0123	0.0078	0.0621	0.0067
-19	0.0127	0.0239	-0.0715	-0.0160	-0.0417	-0.0064	0.0000	-0.0048	0.0000	0.0001	0.0000	0.0068	-0.0361	-0.0055
-18	0.0000	0.0039	0.0364	-0.0054	0.0000	-0.0044	0.0000	0.0029	0.0000	0.0016	0.0000	0.0019	-0.0123	0.0019
-17	0.0063	-0.0114	0.0000	0.0058	-0.0435	-0.0007	0.0421	0.0092	0.0000	-0.0004	0.0185	0.0035	0.0000	0.0076
-16	-0.0190	0.0019	-0.0364	-0.0126	-0.0225	0.0005	0.0103	-0.0008	0.0000	0.0013	0.0121	0.0049	0.0000	0.0035
-15	0.0000	-0.0051	0.0304	-0.0104	0.0000	-0.0056	0.0498	0.0002	0.0000	0.0006	0.0057	0.0028	-0.0034	-0.0007
-14	-0.0127	-0.0005	0.0377	-0.0046	0.0225	0.0134	-0.1001	-0.0054	0.0000	0.0025	-0.0037	-0.0007	-0.0148	0.0032
-12	-0.0064	0.0016	-0.0770	-0.0094	-0.0435	0.0324	0.0105	-0.0195	0.0690	0.0050	-0.0117	0.0016	0.0137	-0.0032
-11	-0.0065	0.0114	0.0770	0.0103	0.0645	0.0129	0.0104	0.0121	0.0645	0.0024	-0.0359	-0.0003	0.0023	0.0053
-10	0.0000	-0.0013	0.0364	0.0289	0.0206	0.0260	-0.0104	0.0030	-0.0645	0.0011	0.0000	-0.0041	-0.0011	0.0200
-9	0.0065	0.0029	0.0351	0.0322	0.0594	-0.0007	-0.0426	-0.0052	0.0000	0.0002	0.0000	0.0024	-0.0057	-0.0008
-8	-0.0065	0.0051	0.0339	0.0097	0.0918	-0.0016	-0.0332	-0.0083	0.0000	0.0000	-0.0123	0.0009	0.0023	-0.0099
-7	-0.0131	0.0008	0.0000	0.0249	-0.0357	0.0251	0.0000	0.0091	0.0000	0.0002	0.0000	0.0064	0.0034	0.0017
-6	-0.0066	0.0053	-0.0339	-0.0060	-0.0561	-0.0019	-0.0113	0.0021	-0.0339	0.0003	-0.0124	0.0006	-0.0206	-0.0171
-5	0.0000	-0.0041	0.0339	-0.0070	0.0377	0.0080	-0.0585	-0.0073	0.0339	-0.0004	0.0000	0.0011	-0.0390	-0.0003
-4	0.0132	-0.0020	0.0000	0.0238	0.0000	0.0200	0.0000	-0.0087	0.0953	0.0008	0.0000	0.0027	0.0191	0.0023
-3	0.0065	0.0014	0.0000	-0.0074	0.0000	0.0119	-0.0244	0.0000	-0.0308	-0.0020	0.0839	0.0041	-0.0559	-0.0028
-2	0.0065	0.0013	0.0000	0.0040	-0.0187	0.0085	0.0123	-0.0036	-0.0645	0.0021	-0.0233	0.0044	0.0476	0.0030
-1	-0.0261	-0.0035	0.0000	0.0179	-0.0190	0.0017	0.0241	0.0126	-0.0339	0.0008	0.0000	0.0020	0.0224	-0.0012
0	0.0066	-0.0071	-0.0339	0.0085	0.0377	0.0025	-0.0364	-0.0019	0.0339	-0.0019	-0.0544	0.0033	0.0253	0.0057
1	0.0131	0.0084	-0.0351	0.0046	-0.0187	0.0234	-0.0377	0.0001	-0.0690	-0.0009	0.0366	0.0039	0.0225	0.0137
_ 2	-0.0065	0.0015	0.0351	-0.0033	0.0551	0.0197	0.0500	0.0005	0.0000	-0.0001	0.0000	0.0033	-0.0225	-0.0010
3	-0.0132	0.0042	0.0000	-0.0024	0.0000	0.0091	0.0121	0.0023	0.0000	0.0038	-0.0181	-0.0013	0.0324	0.0023
4	0.0066	-0.0076	0.0000	0.0219	-0.0180	0.0146	0.0120	-0.0053	0.0690	0.0023	0.0181	-0.0052	-0.0055	-0.0049
-5	-0.0334	-0.0034	0.0000	0.0175	0.0000	0.0316	0.0000	0.0101	-0.0339	-0.0008	-0.0304	-0.0087	0.0391	0.0078
6	0.0000	0.0029	-0.0715	0.0053	-0.0183	0.0027	0.0118	0.0097	0.0000	0.0001	-0.0124	0.0001	0.0085	-0.0004
-7	0.0068	0.0121	0.0000	0.0116	0.0000	0.0290	0.0460	0.0016	0.0000	0.0005	0.0247	0.0087	0.0000	-0.0005
-	-0.0008	-0.0035	0.0364	0.0313	0.0341	0.0440	-0.0113	-0.0022	0.0000	-0.0005	-0.0510	0.0023	0.0120	-0.0212
- 10	-0.0008	-0.0018	-0.0364	-0.0021	-0.01//	0.0022	0.0115	0.0087	0.0000	0.0033	0.0005	0.0020	0.0032	0.0064
	0.0000	0.0033	0.0000	0.0285	0.0000	0.0446	-0.0227	-0.0016	-0.1092	0.0015	-0.0189	-0.0003	-0.0143	0.0000
12	0.0000	-0.0001	0.0000	-0.0027	0.0000	0.0460	-0.0116	-0.0010	-0.0770	0.0006	0.0064	-0.0004	-0.0145	-0.0001
13	-0.0069	-0.0028	0.0000	-0.0310	-0.0177	-0.0150	0.0000	-0.0011	0.1133	0.0035	-0.0456	-0.0027	0.0135	0.0027
14	-0.0209	-0.0006	0.0339	0.0463	-0.0180	0.0060	-0.0235	0.0025	0.0000	0.0004	0.0000	-0.0036	0.0194	-0.0011
15	-0.0432	-0.0103	0.0328	0.0479	0.0357	0.0288	0.0000	-0.0063	-0.1133	-0.0012	-0.1203	-0.0007	0.0111	0.0003
16	-0.0299	-0.0069	-0.0328	-0.0226	-0.0177	0.0170	-0.0364	-0.0058	0.1133	0.0017	0.0149	0.0081	-0.0050	-0.0011
17	0.0075	0.0042	0.0000	0.0018	-0.0180	0.0169	-0.0250	-0.0058	0.0000	-0.0033	0.0074	0.0065	-0.0050	-0.0007
18	0.0149	0.0124	0.0000	0.0280	-0.0183	-0.0018	0.0000	-0.0107	-0.1133	-0.0006	0.0572	0.0027	0.0101	0.0004
19	0.0000	0.0069	-0.0339	0.0144	0.0364	0.0164	0.0126	0.0069	0.0770	-0.0019	-0.0140	-0.0001	-0.0151	-0.0109
20	-0.0074	0.0022	0.0339	0.0143	0.0000	0.0104	0.0000	0.0037	0.0000	0.0049	-0.0432	-0.0038	-0.0195	-0.0003
21	0.0148	0.0209	0.0000	-0.0073	0.0000	0.0213	-0.0126	-0.0019	0.0000	0.0033	-0.0074	0.0041	0.0690	0.0023
22	0.0073	0.0056	0.0000	0.0137	0.0000	0.0066	0.0000	-0.0046	0.0000	0.0015	0.0147	0.0045	0.0144	-0.0007
23	0.0217	0.0066	0.0000	0.0068	-0.0364	-0.0197	0.0000	-0.0004	-0.0770	0.0006	0.0000	0.0028	-0.0144	0.0000
24	-0.0144	-0.0011	0.0000	0.0193	-0.0187	-0.0044	0.0614	0.0009	0.0770	-0.0001	-0.0372	0.0012	0.0144	-0.0015
25	0.0000	0.0024	0.0000	0.0024	-0.0190	-0.0081	-0.0241	-0.0068	-0.0770	-0.0015	-0.0545	-0.0002	-0.0096	0.0080
26	0.0072	0.0029	-0.0339	-0.0280	0.0000	-0.0069	-0.0373	-0.0222	0.2469	0.0025	-0.0161	-0.0013	0.0096	0.0015
27	-0.0218	-0.0058	0.0000	-0.0103	0.0000	-0.0357	0.0250	0.0084	-0.4700	0.0003	0.0630	-0.0014	-0.0096	0.0006
28	0.0146	0.0151	0.0000	-0.0146	-0.0194	0.0048	0.0123	0.0195	0.0000	0.0015	0.0000	0.0031	-0.0392	0.0138
29	0.0072	0.0112	0.0000	-0.0132	0.0194	0.0162	-0.0123	-0.0042	0.2231	0.0020	-0.0310	0.0035	0.0198	-0.0026
30	0.0072	0.0066	0.0000	-0.0465	0.0377	0.0449	0.0123	-0.0008	0.0000	0.0027	0.0000	0.0018	-0.0049	-0.0160

A	n	pendix-2.	List	of	Abnormal	return	during	the	event	wind	ow
	- 1	penuin 2	LIGU	O1	riononiu	roturn	auning	uic	e v ente	** 1110	

Day	SCMA	TPLA	NISP	RMBA	MITI	NIPP	BNGA	FREN	MCOR	ADES	KLBF	SRSN	INPC	UNVR	IGAR	BRPT	INDR	IMAS	EXCL
-30	0.02121	0.01098	0.00901	0.01177	0.08855	0.00165	0.14191	0.00061	0.01052	0.00390	0.00585	0.00404	0.02016	0.03292	0.02751	0.01837	0.02291	0.07160	0.00586
-29	0.01235	0.03462	0.01611	0.00126	0.08001	0.00008	0.00081	0.01343	0.04166	0.00862	0.00955	0.01443	0.07651	0.00980	0.00629	0.04961	0.01896	0.07060	0.01957
-28	0.00779	0.00685	0.03620	0.02134	0.00019	0.00977	0.02447	0.00567	0 04442	0.00963	0.00148	0 1 1 9 1 4	0.01927	0.00468	0.00917	0.00007	0.01122	0.03304	0.00147
-27	0.01828	0.00614	0.04988	0.01584	0.00079	0.00267	0.07469	0.02593	0.08303	0.00388	0.02284	0.12805	0.05918	0.02371	0.01777	0.04657	0.00012	0.00071	0.00244
-26	0.08358	0.01726	-	0.01297	0.07972	0.00021	0.00890	0.00814	0.00272	0.00340	0.00853	0.02704	0.02054	0.00959	0.02683	0.03474	0.00188	0.03306	0.00589
-25	0.03955	0.00590	0.03030	0.00213	0.08059	0.00523	0.02642	0.02258	0.04459	0.00648	0.04123	0 10901	0.05803	0.02762	0.03696	0.02461	0.02128	0.00265	0.00048
-25	0.00583	0.00330	0.01033	0.03204	0.00108	0.00172	0.01596	-	0.00074	0.02062	- 0.02764	0.13078	0.05344	-	0.00850	0.02701	-	-	0.00869
-24	0.00521	0.00218	0.00274	0.04512	0.00198	0.00172		0.00124	0.00074	0.02062		0.00448	0.03244	0.00336	0.00515	0.03781	0.00350	0.00142	0.01006
-23	0.00551	0.02015	0.003/4	0.01561	0.00209	0.00384	0.04994	0.01403	0.01062	0.02009	0.01403	0.000448	0.05130	0.00230	0.00515	0.01228	0.00205	0.00293	0.01000
-22	0.01507	0.01894	0.00030	0.01302	0.00071	0.00234	0.05161	0.01373	0.02605	0.000000	0.05276	0.00001	0.05015	0.02120	0.07368	0.03233	0.03472	0.05592	0.00560
20	0.00642	0.04005	-	0.01041	0.07759	0.00255	0.05905	0.00042	0.05645	0.01311	- 0.03200	0.12959	0.03953	0.00973	0.01/30	0.01108	0.01542	-	0.05538
10	- 0.00248	0.01100	0.00679	0.01041	0.00021	- 0.00005	0.03305	0.00042	- 0.09148	0.02346	0.02250	- 0.01148	-	0.003/3	- 0.05543	- 0.03530	0.00476	0.000006	0.03061
10	0.00240	0.001100	-	0.00872	0.00001	0.00000	0.04260		0.01112	0.02340	0.06902	0.10708	0.00353		0.04176	0.00444	-	-	0.01426
-10	0.01840	0.00900	0.01400	0.00822	0.00001	0.00286	0.04200	0.00747	0.10046	0.00078	0.00895	0.10798	0.00332	0.00387	0.00581	0.00444	0.0028/	0.00020	0.00750
-17	0.02919	0.01539	0.00726	0.00518	0.00045	0.00506	0.00005	0.01380	0.00956	0.01084	0.00012	0.00400	0.00721	0.01/08	0.00381	0.04282	0.03294	0.00039	0.00739
-10	0.01030	0.001342	0.00728	0.018/8	0.00059	0.00390	0.00025	0.013//	0.10211	0.02010	0.00012	0.14500	0.00955	0.02090	0.02577	0.02300	0.01105	0.00150	0.00349
-15	0.00201	0.01276	0.0500	0.00198	0.00047	0.00115	0.02065	0.02/25	0.00014	0.02427	0.05100	0.12060	0.01215	0.00307	0.04073	0.00004	0.03790	0.000354	0.00205
12	0.00775	0.00366	-	0.04528	0.00047	0.00577	0.00056	0.02476	0.02214	0.03437	-	0.12057	0.00000	-	0.04226	0.01200	0.01303	-	0.00554
-13	0.00298	0.00020	0.01328	0.04338	0.00003	0.00111	0.01628	0.01433	0.02644	0.02025	0.02063	0.00596	0.03944	0.00798	0.04230	0.01399	0.09472	0.06401	0.00304
-11	0.01035	0.03793	0.03561	0.00103	0.00096	0.01517	0.00388	0.00779	0.02452	0.02476	0.01753	0.00446	0.01392	0.01790	0.06666	0.05163	0.00169	0.06218	0.00298
-10	0.00511	0.02879	0.00408	0.05172	0.00034	0.00008	0.01149	0.00481	0.00847	0.00884	0.00612	0.00479	0.00266	0.00133	0.00749	0.00542	0.01332	0.06566	0.02113
-9	0.00226	0.01800	0.00243	0.00168	0.08718	0.12879	0.01121	0.08817	0.05983	0.01946	0.03489	0.12052	0.00757	0.00354	0.00286	0.06013	0.03738	0.00016	0.00490
-8	0.02574	0.01810	0.01316	0.19036	0.08773	0.23446	0.00789	0.01836	0.01176	0.02098	0.01443	0.00101	0.00490	0.01157	0.02421	0.09337	0.02489	0.00001	0.01215
-7	0.00193	0.00597	0.00640	0.04367	0.00047	0.00288	0.00329	0.01859	0.04714	0.00105	0.04418	0.12124	0.00514	0.01386	0.02488	0.06079	0.00914	0.00018	0.00176
-6	0.00150	0.00226	0.01305	0.00172	0.00027	0.17909	0.01892	0.01141	0.00112	0.01669	0.00653	0.13613	0.00087	0.01195	0.02786	0.05418	0.01344	0.03416	0.00358
-5	0.00273	0.02488	0.00114	0.24291	0.00012	0.09486	0.00567	0.01889	0.00971	0.00270	0.00151	0.00396	0.05926	0.00406	0.04094	0.02973	0.05122	0.03435	0.03869
-4	0.00737	0.04365	0.00268	0.23698	0.00182	0.00192	0.00031	0.06036	0.01003	0.06668	0.00306	0.01146	0.00698	0.01518	0.02377	0.02001	0.00874	0.09452	0.01680
-3	0.00162	0.00517	0.07980	0.21376	0.00215	0.11018	0.02376	0.02488	0.00422	0.00944	0.00645	0.11705	0.14562	0.00509	0.00744	0.01187	0.02441	0.02873	0.05307
-2	0.00242	0.02366	0.02762	0.05697	0.08735	0.11057	0.01654	0.05650	0.02317	0.08895	0.00799	0.00306	0.12131	0.00519	0.00404	0.02721	0.01589	- 0.06660	0.04463
-1	0.00269	0.00805	0.00204	0.01923	0.00085	0.00172	0.00060	0.04261	0.01059	0.08928	0.03389	0.14319	0.01011	0.02264	0.01791	0.02070	0.01153	0.03468	0.02357
0	0.03890	0.09374	0.05773	0.05360	0.00166	0.09904	0.02836	0.01748	0.01644	0.03151	0.00455	0 15658	0.02702	0.01371	0.04240	0.03528	0 03446	0.03584	0.01965
1	0.00055	0.02142	0.03271	0.00462	0.08633	0.04212	0.03522	0.04311	0.08728	0.12168	0.01530	1 04412	0 11488	0.00464	0.03971	0.04213	0.03786	0.06807	0.00882
		0.02142	-	-	-	0.04650	0.03322	-	-	0.02000		-	0.12499	-	0.03941	0.03520	0.03766	0.00010	0.00302
	0.00030	0.02829	0.00329	0.04933	0.00117	0.04638	0.03122	0.03713	0.08128	0.00888	0.00031	0.00020	0.12488	0.00804	0.03841	-	0.04934	0.00012	0.02131
	0.00338	0.00645	0.01681	0.06804	0.08603	0.00436	0.03767	0.01304	0.033/1	0.00392	0.42425	0.00496	0.16558	0.01739	0.00239	0.00909	0.00985	0.00384	0.03011
4	0.00618	0.02346	0.02331	0.08276	0.09411	0.00157	0.00271	0.00583	0.01989	0.00003	0.00314	0.00240	0.13020	0.01423	0.02187	0.03260	0.01724	0.06674	0.00063
5	0.02421	0.02887	0.02166	0.05412	0.10575	0.00066	0.01770	0.00528	0.05460	0.00618	0.01629	0.00024	0.06758	0.03001	0.01753	0.03155	0.01007	0.03306	0.03120
6	0.02412	0.00338	0.01253	0.03032	0.00051	0.01290	0.00781	0.01363	0.03459	0.00144	0.00752	0.00498	0.15530	0.00294	0.07674	0.02109	0.00209	0.00012	0.00890
7	0.01635	0.00409	0.01600	0.03693	0.00117	0.00449	0.00270	0.02743	0.02853	0.04027	0.04914	0.00402	0.14616	0.00531	0.01163	0.02896	0.04434	0.00047	0.00047
8	0.01112	0.01091	0.03342	0.03535	0.00151	0.03388	0.00625	0.00526	0.00906	0.05021	0.00846	0.00217	0.07382	0.00150	0.00511	0.01008	0.00906	0.00049	0.03377
9	0.00645	0.02610	0.00422	0.03347	0.10592	0.09232	0.01046	0.00850	0.04047	0.06287	0.01861	0.00384	0.07463	0.00505	0.03431	0.01989	0.00264	0.00352	0.00118
10	0.00173	0.00166	0.01839	0.03695	0.10664	0.03304	0.01028	0.01217	0.03227	0.01993	0.00191	0.00871	0.05491	0.00351	0.02826	0.02226	0.03638	0.11076	0.01354
11	0.00516	0.00855	0.00904	0.00041	0.11902	0.01085	0.00250	0.00143	0.07618	0.00679	0.02486	0.00078	0.00095	0.00284	0.02582	0.02690	0.00161	0.03629	0.01456
12	0.01189	0.03014	0.00680	0.00390	0.11779	0.00075	0.01069	0.00630	0.12449	0.03196	0.01085	0.00131	0.01001	0.00006	0.00269	0.04596	0.00139	0.07757	0.01339
13	0.02740	0.02282	0.04295	0.04836	0.10490	0.03126	0.01744	0.00780	0.15848	0.01108	0.01010	0.00039	0.01833	0.00411	0.03097	0.00271	0.00107	0.10983	0.01079
14	0.03213	0.01128	0.00357	0.19574	0.10303	0.01530	0.01597	0.03855	0.20282	0.01217	0.00921	0.00438	0.01272	0.02029	0.01244	0.02406	0.02606	0.00037	0.02050
15	0.00018	0 01475	0 11962	0.01220	0.00732	0.01251	0.04832	0 03130	0 00307	0.00760	0 02380	0 00104	0.00429	0.03201	0.01513	0.00696	0.00634	0 11208	0.01075
16	0.01415	0.01256	0.00685	0.00201	0.11710	0.06208	0.00067	0.031507	0.00307	0.00084	0.02303	0.00100	0.05411	0.03204	0.01000	0.00000	0.02061	0.11162	0.00000
10	0.01413	0.01236	0.00085	0.09201	0.11/18	0.00298	0.0086/	0.0132/	0.00222	0.00384	0.00460	0.001/9	0.00411	0.02294	0.01022	0.03409	0.03001	0.000000	0.00400
1/	0.02583	0.02350	0.00085	0.02484	0.115/6	0.00398	0.00449	0.01763	0.04348	0.00102	0.08608	0.00168	0.16346	0.00337	0.001/6	0.03488	0.01915	0.00328	0.00429
18	0.0214/	0.05543	0.05450	0.00103	0.11281	0.02963	0.00502	0.00139	0.05445	0.01311	0.013/1	0.00501	0.07362	0.00257	0.02802	0.01659	0.01069	0.11269	0.00966
19	0.00246	0.02767	0.01386	0.01969	0.00106	0.01239	0.00734	0.00938	0.00115	0.06596	0.01180	0.00040	0.00655	0.00688	0.04832	0.01996	0.00564	0.07885	0.00418
20	0.02582	0.01421	0.03938	0.19802	0.12653	0.02200	0.01520	0.00543	0.04410	0.18482	0.00813	0.05559	0.16079	0.00963	0.01963	0.01038	0.00365	0.00488	0.01913
21	0.00928	0.00527	0.01151	0.14462	0.00090	0.00157	0.01091	0.01253	0.01293	0.09498	0.01590	0.00358	0.17032	0.00604	0.00726	0.02125	0.01064	0.00332	0.06673
22	0.02611	0.00597	0.01025	0.03367	0.13425	0.06982	0.00658	0.02595	0.01029	0.02838	0.02404	0.06712	0.06782	0.00175	0.01374	0.00659	0.00463	0.00146	0.01505
23	0.03175	0.00247	0.00283	0.01080	0.00038	0.00885	0.00884	0.01521	0.02291	0.00855	0.01408	0.00479	0.01354	0.01510	0.00678	0.01671	0.00044	0.07755	0.01442
24	0.01012	0.00110	0.03835	0.01165	0.00204	0.00061	0.04540	0.02293	0.01196	0.00060	0.01132	0.00330	0.02509	0.01324	0.01935	0.01430	0.06047	0.07707	0.01593
25	0.00770	0.01591	0.05430	0.06783	0.00329	0.04882	0.00017	0.00143	0.01761	0.01428	0.02223	0.00298	0.02179	0.00235	0.00239	0.01093	0.01731	0.07548	0.01753
26	0.03543	0.02625	0.01488	0.16483	0.00114	0.02329	0.02675	0.00308	0.02275	0.01073	0.06046	0.00487	0.13591	0.00434	0.00594	0.00690	0.01511	0.24438	0.00809
27	0.02558	0.02006	0.06440	0.06582	0.13512	0.00884	0.01344	0.01235	0.01871	0.00329	0.03486	0.01206	0.14613	0.01603	0.01031	0.03570	0.01657	0.47033	0.01020
28	0.01438	0.02369	0.00307	0.00422	0.00037	0.00299	0.03572	0.02139	0.03894	0.04637	0.06132	0.00478	0.00126	0.00051	0.01462	0.02426	0.00721	0.00152	0.05302
29	0.04642	0.00402	0.03456	0.01924	0.15115	0.04874	0.03445	0.01960	0.01237	0.06156	0.02285	0.00294	0.08697	0.00396	0.01321	0.00326	0.00808	0.22116	0.02240
30	0.06799	0.00639	0.00176	0.00639	0.15702	0.00218	0.00244	0.00621	0.00266	0.01038	0.02092	0.05906	0.00485	0.00059	0.04652	0.00717	0.01311	0.00268	0.01104