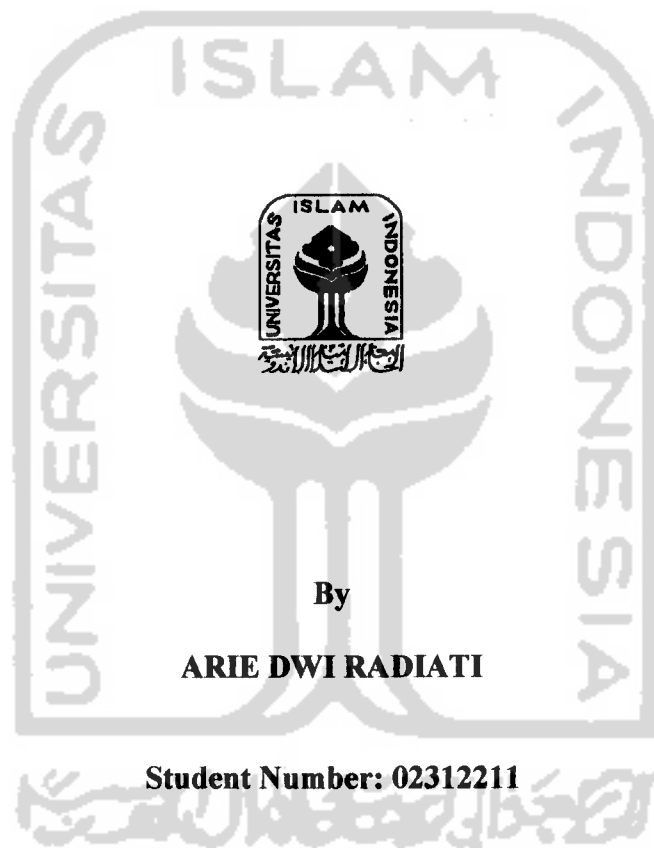


TRADE AND RETURNS AFTER STOCK SPLITS

A THESIS

**Presented as Partial Fulfillment of the Requirements
to Obtain the Bachelor Degree in Accounting Department**



**DEPARTMENT OF ACCOUNTING
INTERNATIONAL PROGRAM
FACULTY OF ECONOMICS
ISLAMIC UNIVERSITY OF INDONESIA
YOGYAKARTA
2006**

TRADE AND RETURNS AFTER STOCK SPLITS

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If in the future this statement is not proven as it supposed to be, I am willing to accept any sanction complying to the determined regulation for its consequence.

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A BACHELOR DEGREE THESIS

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**Defended before the Board of Examiners
On February 27, 2006
and Declared Acceptable**

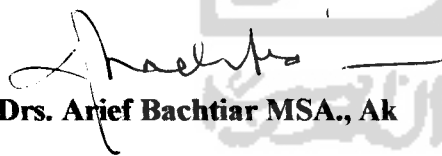
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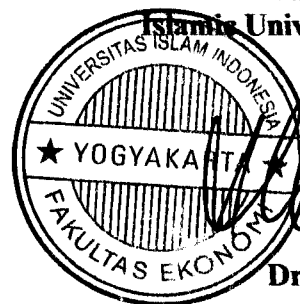
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The Writer

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ABSTRACT

A stock split is a company policy that does not have any economic value. For an efficient market, investors should not react to stock split announcements. If the market reacts to the stock split announcements that does not have an economic value, it means that the market is still not efficient in semi strong form, because the market still can not differentiate between the event which has and has no information content. On the other hand, the market reactions to the stock split announcements can also be inferred that the stock split do have information content.

Some theories in finance literature have emerged as the explanations of the stock split. According to signaling hypothesis, managers declare the stock split to convey favorable information about the value of the firm. According to trading range theory hypothesis, the stock split is used to keep stock price within an optimal trading range.

Some previous studies document that the stock split can cause abnormal returns and convey the increase of earnings performance after the split. However, some other previous studies do not document any abnormal returns because of the stock split announcements.

Based on this controversy, this research is conducted to analyze whether the abnormal return can be explained by signaling, liquidity, or volatility changes around the stock split announcements. The objects of the research are corporations listed in Jakarta Stock Exchange (JSX) that announce stock splits from 1999 until 2004, but they do not have any other events following the stock split announcements, such as issue, stock dividend, bonus stock, and financial report announcement date.

Based on the finding of the research, the stock split is merely an accounting change with changes in the firm value. After the firms split their stock, there are changes on the stock return and returns volatility. This research also finds evidence to support the signaling hypothesis and liquidity hypothesis as incentive for firms to split their stock. As a result, this research concludes that stock split is a company policy that has information content.

Because the stock split has information content, the market reacts to the stock split announcements. It indicates that stock market in Jakarta Stock Exchange (JSX) is not efficient in semi strong form, because the market can not differentiate between the event which has and has no information content.

Keywords: Stock Splits, Abnormal Returns, Signaling Theory, Liquidity Theory, Return Volatility, Information

INTISARI

Stock splits adalah suatu kebijakan perusahaan yang tidak bernilai ekonomis. Dalam pasar yang efisien, *investor* tidak seharusnya bereaksi terhadap pengumuman *stock splits*. Jika *investor* bereaksi terhadap *stock splits* yang tidak bernilai ekonomis, ini berarti pasar masih belum efisien, dalam bentuk *semi strong*, karena pasar masih belum dapat membedakan apakah peristiwa yang terjadi mengandung informasi atau tidak. Di sisi lain, reaksi pasar terhadap pengumuman *stock splits* dapat juga berarti bahwa *stock splits* memang mengisyaratkan informasi bagi *investor*.

Beberapa teori keuangan berusaha menjelaskan alasan perusahaan melakukan *stock splits*. Berdasarkan teori *signaling*, manajemen perusahaan melakukan *stock splits* untuk memberi sinyal bahwa perusahaan mempunyai prospek yang bagus. Berdasarkan teori likuiditas, perusahaan melakukan *stock splits* untuk mengoptimalkan harga saham.

Penelitian sebelumnya menunjukkan bahwa *stock splits* dapat menyebabkan *abnormal returns* dan juga peningkatan kinerja perusahaan setelah *stock splits*. Tetapi pada beberapa penelitian lain, *abnormal returns* yang disebabkan oleh pengumuman *stock splits* tidak ditemukan.

Berdasarkan adanya kontroversi dari hasil penelitian diatas, penelitian ini bertujuan menganalisa apakah *abnormal returns* tersebut dapat dijelaskan oleh perubahan *signaling*, likuiditas dan volatilitas di sekitar pengumuman *stock splits*. Penelitian ini dilakukan pada perusahaan-perusahaan yang terdaftar di Jakarta Stock Exchange (JSX) yang mengumumkan *stock splits* sejak tahun 1999 sampai 2004 tetapi tidak mengeluarkan kebijakan lain seperti *right issue*, *stock dividend*, *bonus stock* dan pengumuman laporan keuangan.

Hasil penelitian ini menyimpulkan bahwa *stock splits* hanya menyebabkan perubahan perlakuan akuntansi yang dapat dilihat dari perubahan di nilai perusahaan. Penelitian ini menemukan adanya perubahan *return* dan volatilitas saham perusahaan yang melakukan *stock splits*. Penelitian ini juga menemukan adanya bukti yang mendukung teori *signaling* dan teori likuiditas sebagai insentif bagi perusahaan untuk melakukan *stock splits*. Dari penelitian ini dapat disimpulkan bahwa *stock splits* adalah kebijakan perusahaan yang bernilai ekonomi.

Oleh karena *stock splits* mengandung informasi, maka pasar bereaksi terhadap pengumuman *stock splits*. Hal ini berarti bahwa pasar modal di Jakarta Stock Exchange (JSX) belum efisien dalam bentuk *semi strong* karena belum dapat membedakan peristiwa yang mengandung dan tidak mengandung informasi.

Kata Kunci : *Stock Splits*, *Abnormal Returns*, Teori *Signaling*, Teori Likuiditas, Volatilitas, Informasi

CHAPTER I

INTRODUCTION

1.1. Research Background

In business environment, especially in stock trading that occurs in capital market, there are so many trading activities which are held by investors to get returns. There are some factors affecting the trading activity in the capital market. One of them is information that enters to the capital market. Information plays an important role to trading transaction in the capital market. Practitioners in the capital market absolutely need all information that is influencing the stock price fluctuations in the capital market. The information is related to decision making which is executed by the investors to select an efficient portfolio investment. Some information or material facts that can be found in the capital market are merger, acquisition, consolidation, stock splits, and stock dividend.

A stock split has been a puzzling phenomenon to financial economists (Brigham and Gapenski, 1994), because it is proved by different evidence theoretically and practically. Theoretically, stock return and returns volatility in the pre and post split periods should not be different. Practically, a stock split itself is merely an accounting change with no changes in the firm value. The stock split can only increase total outstanding shares. It does not alter the total market value of shareholders wealth; hence there should be no effect on the stock return and returns

volatility. On the contrary, some empirical evidence show that the market reacts to the stock split announcements, even some research have found a controversial result regarding on stock split effects.

The first study about the effect of stock splits or returns is done by Fama, Fisher, Jensen, and Roll (1969). They find the increase of shares in the stock price prior to the split announcements; however, abnormal returns after the split announcements are very stable. After they examine both separately splits that are associated with increased dividends and splits that are associated with decreased dividends, they find that the behavior of post-split return will be very different depending on whether or not the increase of dividend occurs. Cumulative average residuals for both dividend classes rise sharply in the few months before the split; for the increased dividend, cumulative average residuals after the split are fallen. Therefore, they interpret that the market reacts not only to the split but also to the dividend information implicitly. The split causes price adjustments merely on the extent that is associated with changes in the anticipated level of future dividends. Thus, the stock price mainly responds to the dividend changes, and not to the split announcements.

Although a stock split is a cosmetic corporate event, some previous studies document the abnormal stock returns during the split announcements. Grinblatt, Masulis, and Titman (Klein and Peterson, 1989) find the significant positive abnormal returns at split announcements and demonstrate that these returns are not

attributable to changes in cash dividend policy. Asquith et.al. (1989) also document 76 percent of their sample firms that do not pay cash dividend have positive abnormal returns at the announcement period. Klein and Peterson (1989) also report that the split announcements by firms that are uncontaminated by earnings announcements, management earnings forecasts, or changes in cash dividend policy conveys information about positive earnings forecasts. This improved earnings expectations may be result in the abnormal return at the split announcements. These findings document that the stock split can cause abnormal returns and convey increasing earnings performance after the split.

On the other hand, Bishara (1988) does not support the hypothesis that the stock split is associated with the abnormal return. His research is done on Canadian stock market, and the stock used in the study all experienced dividend increases. He finds positive cumulative residuals before splits and negative cumulative residuals after splits. It means that there are no abnormal returns after the split announcements. Aggarwal and Chen (1989) also do not find excess returns associated during the stock split announcements, but there is an increased volatility or uncertainty after splits. These findings are consistent with the result of Fama et.al. (1969) study that does not document any abnormal returns because of the stock split announcements.

If the stock split does not have any economic value, the question is why certain companies still split their stock. Some theories in finance literature have emerged as the explanation of the stock split. Brennan and Copeland (1988) indicate

that managers believe that if future shares price will increase; they may not be willing to split the increased cost of trading a lower priced stock. According to signaling hypothesis, a split is a signal to the market that the firm's managers are optimistic about the future. Although managers may not explicitly intend for the split to be a positive signal about the future prospects of the firms, the split still conveys information to the market. According to trading range hypothesis, the stock split is used to keep stock price within an optimal trading range. It is a means to realign price per share to preferred price range so that the price is not overpriced. Favorable price range can improve the marketability or liquidity of the firm's shares.

Despite the supporting argument for the stock split, some authors argue that shareholders do not receive any tangible benefits for stock splits while there are certain costs that are associated with stock splits, for example the decreasing liquidity and increasing volatility are costs that must be born by companies that split their stock.

This controversy is an interesting topic to examine the linkage between split ratio, total outstanding shares, trading volume, bid-ask spread, and volatility associated with stock splits and whether the abnormal return can be explained by these variables. Then, this research will take a title:” **TRADE AND RETURNS AFTER STOCK SPLITS**”.

1.2. Problem Formulation

A stock split is a company policy that does not have any economic value. For efficient market, investor should not react to stock split announcements. If the market reacts to the stock split announcements that does not have any economic value, it means that the market is still not efficient in semi-strong form, because the market still can not differentiate which event has and has no information content. On the other hand, the markets' reaction to the stock split announcements can also be interpreted that the stock split does have information content.

Although the stock split does not have economic value, some authors suggest that the stock split can provide a credible signal of future performance of a company. Klein and Peterson (1989), for example, document that on average, split companies future earnings expectations are negative, with the difference in means approximately 3 percent to 4 percent. If this signaling function is true then the market will react during the announcement of stock splits that are measured by abnormal returns.

Therefore, from the above controversy, the research attempts to answer the following questions:

1. Is there any change in the abnormal return because of the difference of split ratio after the stock split announcements?
2. Is there any change in the abnormal return because of the difference of total outstanding shares after the stock split announcements?

3. Is there any change in the abnormal return because of the difference of trading volume after the stock split announcements?
4. Is there any change in the abnormal return because of the difference of bid-ask spread after the stock split announcements?
5. Is there any change in the abnormal return because of the difference of returns volatility after the stocks split announcements?
6. What is the effect the change of split ratio, total outstanding shares, trading volume, bid-ask spread and volatility on abnormal returns around the dates of stock splits announcements?

1.3. Research Objectives

This research is conducted to analyze whether the dependent variable, the abnormal return, can be explained by independent variables that consist of split ratio, total outstanding shares, trading volume, bid-ask spread, or volatility changes around the stock split announcements.

1.4. Expected Research Benefits

This research is expected to give benefits to public as follows:

1. To give information to the investors as one of considerations in determining the investment decision in the stock market.
2. To enlarge knowledge and intelligence about capital market in Indonesia.

3. To provide reference to other future researchers in exploring the stock split decisions.

1.5. Flow of Research Analysis

The researcher analysis will be presented in five consecutive chapters, which consist of:

CHAPTER I (Introduction)

This chapter consists of research background, problem formulation, research objective, research expected benefits, and flow of research analysis.

CHAPTER II (Literature Review)

This chapter discusses the theories that support the flow of analyses of this research. The literature review is expected to be a reference for any body that will use this research report, in terms of helping them to understand the flow of logic supporting the research.

CHAPTER III (Research Methodology)

This chapter contains a detail description of research materials, research instruments, research procedures, and methods in resolving the problem encountered.

CHAPTER IV (Data Analysis)

This chapter integrates the findings of the research in terms of data description, and the analysis of these findings use statistical tests.

CHAPTER V (Conclusions and Recommendations)

This chapter is divided into two separate sections. They are conclusions and recommendations. In conclusions, there will be some brief and precise statements drawn from the findings of the research, and the recommendations are made based on the authors experience and opinions referred to other researchers in a similar field. Hopefully, they can follow up or develop the result of this research further.



CHAPTER II

LITERATURE REVIEW

2.1. Stock Splits Definition

A stock split involves the issuance of a large number of shares in proportion to the existing shares outstanding. With the stock split, the book value and par value of the equity are changed (Jones, 2000:40). However, the total market value of shares after splits is still the same. A splitting company is merely increasing the number of shares outstanding. Therefore, in theory, a stock split is a neutral event.

There are two kinds of stock splits, they are split up and split down or reverse split. Split up is the rising of shares outstanding by decreasing the par value of shares, for examples, company that splits 2-for-1, 3-for-1, 3-for-2, 5-for-1, etc. And, split down is the decreasing of shares outstanding by increasing the par value of shares, for example, company that splits 1-for-5, 1-for-10, etc. The companies usually split up their shares because the shares are believed to have quite the opposite effect. Therefore, the companies seldom split down their stock.

A split up occurs when the company feels that their price has reached a point where it is unaffordable for many investors to buy round lots of the stock. Therefore, the split up will lower the price of the stock, and since the low price stock appears more affordable investors will be able to buy more shares. Thus, a stock split can help the increase of the stock demand.

Baker and Gallagher (Bishara, 1988:57) also provide the following reasons for the stock split:

1. Stock splits increase marketability of company shares as they facilitate the purchase of round lots by small share holders.
2. They provide investors with information regarding the superior investment opportunities available to the firms with the stock split.
3. They may result in increased product sales.
4. By increasing the number of shareholders, after the stock split, merger can be avoided.
5. They may lead to an improvement in employer-employee relations.

Previous studies such as Fama et.al. (1969) that divide sample into increased dividend and decreased dividend following splits, and Bishara (1988) with all sample experienced dividend increased do not document abnormal returns associated with the stock split announcements. Unlike these two studies, Aggarwal and Chen (1989) separate contaminated and non contaminated announcements of splits to give a pure stock split effects. Aggarwal and Chen still find no abnormal returns associated with the stock split announcements.

Other previous studies are Klein and Peterson (1989) and Asquith et.al. (1989). Both studies take firms that do not pay cash dividend for certain period as samples and suggest that there are abnormal returns associated with the stock split announcements. Although in theory, stock return in the pre and post splits period

should not be different; those empirical studies document the abnormal return associated with the stock split announcements.

Therefore, this research attempts to do empirical study to examine whether the stock split announcements contain information content about profitability, measured in terms of signaling theory and trading range theory. The study is done in Jakarta Stock Exchange and uses the firms that do not pay cash dividend and other events following the stock split announcements, such as right issue, stock dividend, bonus stock, and financial report announcement date for certain period as research object. The two theories –the signaling theory and the trading range theory- have been proposed to explain positive excess returns that are associated with the stock split announcements.

2.2. Split Ratio

Signaling theory argues that splits are a means of passing information from managers to stockholders. By announcing a stock split, a company intends to reduce information asymmetries, which are likely to exist between the stockholders and management.

According to signaling theory, the stock split is associated with positive announcement excess returns because the managers use the stock split to convey favorable private information about their firms' future prospects. Signaling hypothesis may be a more plausible reason with split ratio.

The signaling hypothesis suggests that the stock split is a credible signal; any information content about earnings should be reflected in earnings that the market does not expect to use all available information when the split is announced. If the signaling hypothesis holds, the split signal will be positively related to future earnings and, moreover, add explanatory power to predict future earnings.

2.2.1. Related Research and Hypothesis Formulation

Brennan and Copeland (1988) provide some evidence that support the signaling hypothesis. Their research posits that the split ratio is related to strength of the signal. These models suggest a positive relation between the stock split announcement returns. More recently, Dennis and Strickland (1998) find a positive relation between the stock split abnormal returns and the split ratio. Both study results seem to support the view that a split reflects management's optimism about the future. In contrast to the signaling hypothesis, Ikenberry, Rankine, and Stice (1996) find a negative excess returns for a sample of 52 firms that have a negative stock price run-up prior to splitting. Their major finding leads them to conclude that stock splits may contain a false signal. Therefore, based on above argument and various research results, then this research proposes following hypothesis:

HA1: there is a difference in abnormal returns because of the difference of the split ratio

HO1: there is no difference in abnormal returns because of the difference of split ratio

2.3. Total Outstanding Share

Trading range theory suggests that a stock split or a stock dividend changes the stock price to a more optimal trading range, such that the stock is affordable for a larger group of investors. This, in turn, can increase the demand for the stock, leading to a positive stock price effects.

According to the trading range theory, the stock split will make the stock price in a preferred trading range. Then, it will increase stock trading liquidity. An investment that can be bought or sold quickly is considered liquid.

Firms split their equity shares to increase the liquidity of the stock. Splitting shares will improve the liquidity by enlarging investors, and hence reduce the trading cost of the stock. Management of most firms assures that the splitting share affects on a relationship to society. Then, the purpose of returning shares' price to the preferred trading range is able to achieve.

This research measures the level of liquidity in terms of abnormal returns and examines the relationship between the abnormal return and total outstanding shares. This research calculates the total outstanding shares effects by comparing the total outstanding shares before and after the stock split.

2.3.1. Related Research and Hypothesis Formulation

The evidence provided in Brennan and Hughes (1991) suggests that the number of security following a firm is positively related to the magnitude of stock splits. They interpret positive drift following the stock split as an indication that the

market reacts to the split announcements. More recently, Powell and Baker (1993/1994) argument that management may prefer to bring smaller investors into the firm to create a more controllable ownership mix. Therefore, based on the above argument and various research results, this research proposes the following hypothesis:

HA2: there is a difference in abnormal returns because of the difference of the total outstanding shares

HO2: there is no difference in abnormal returns because of the difference of the total outstanding shares

2.4. Trading Volume

Level of liquidity can be measured by using level of trading volume in the market. If the trading range theory is true, the trading volume after splits will increase and vice versa. Firms may prefer their shares traded within a particular price range. The management might have this preference because when the stock price is too high, many small or uniformed investors cannot afford to trade in round lots, thereby affecting the liquidity of the stock. Therefore, this research proposes hypothesis that the trading volume as measurement of liquidity will be increased after the firms split their stock.

2.4.1. Related Research and Hypothesis Formulation

In a study that examines the relation between the abnormal return and trading volume, Muscarella and Vetsuypens (1996) suggest that the positive drift following a

split announcement is related to increasing liquidity. This is confirmed by Angel et.al. (2004). They find the increase of trading activity by retail shareholders after the split. According to the results, the activity done by small-size shareholders doubled over a 40-day period following a split. Whereas, large-volume traders considerably have lowered their engagement. In contrast, Conroy (1990) provides evidence which suggests that the post-split market is actually less liquid. Therefore, based on the above argument and various research results, then this research proposes the following hypothesis:

HA3: there is a difference in abnormal returns because of the difference of the trading volume

HO3: there is no difference in abnormal returns because of the difference trading volume

2.5. Bid-Ask Spread

Many previous researchers try to relate information exist in capital market with bid-ask spread. The smaller the spread indicates the bigger abnormal return, and vice versa. The smaller bid-ask spread can induce more volume of the transaction in the market. The increasing volume of transaction is indicating increasing liquidity; therefore bid-ask spread can also be used as an indicator of liquidity. This research also proposes hypothesis that bid-ask spread as measurement of liquidity will be decreased after the split indicating increased liquidity of stock and consistent with information effects sent out by managers.

2.5.1. Related Research and Hypothesis Formulation

Previous studies have found a decline percentage in bid-ask spread in the short run Glosten and Milgrom (1985). A decline percentage in bid-ask spread interprets as positive information which contains stock under value to market practitioners. Copeland (1979) measures liquidity in terms of bid-ask spread. He interprets the increase of the percentage bid-ask spread after splits as evidence that the market is actually less liquid following stock splits. Then, he comes to a conclusion that the liquidity has worsened after the split. Therefore, based on the above argument and various research results, then this research proposes the following hypothesis:

HA4: there is a difference in abnormal returns because of the difference of the bid-ask spread

HO4: there is no difference in abnormal returns because of the difference of bid-ask spread

2.6. Volatility

Volatility is variability or dispersion in the return of stock. Volatility is measured by standard deviation (variance) (Butler, 2000:482). Stock return volatility can imply risk of the stock because stock return variability caused by variability of stock price. The stock price varies primarily because investors are uncertain about the future of their companies. A company whose stock return fluctuates relatively widely; its future return is relatively unpredictable. Thus, the widely dispersion of the stock

return or the volatility of stock can indicate that the stock are considered to have higher risks.

2.6.1. Related Research and Hypothesis Formulation

A stock split itself is merely an accounting change with changes in the firm value. It is altering the total market value of stockholders wealth; hence, there should be effects on the stock return and return variance.

However, Aggarwal and Chen (1989) that uses variance of returns to find the changes in the variability of stock return that accompanies stock splits document variance increase as an indication that stock splits are associated with a period of risk increase and disturbance. Variance increases may reflect the increase of market speculative activities during the period of the stock split announcements. Ohlson and Penman (1985) measure the volatility in terms of stock return. They have reported the volatility increase after split ex-date. Standard microstructure theory argues that the increase in volatility leads to the increase in market makers' inventory risk, which in turn leads to a decrease in abnormal returns. Therefore, based on the above argument and various research results, then this research proposes the following hypothesis:

HA5: there is a difference in abnormal returns because of the difference of the volatility

HO5: there is no difference in abnormal returns because of the difference of volatility

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Object

In this research, there are 81 companies that are eligible as the objects of the research (table 4.1). Those objects are the companies that split their stock from 1999 until 2004, but they do not have any other events following the stock split announcements, such as right issue, stock dividend, bonus stock, and financial report announcement date. The following table shows the object distribution from 1999 until 2004:

Table 3.1
Object Distribution from 1999 until 2004

Period	Companies	Percentage
Jan 1999-Dec 1999	21	27%
Jan 2000-Dec 2000	23	29%
Jan 2001-Dec 2001	13	17%
Jan 2002-Dec 2002	8	11%
Jan 2003-Dec 2003	8	11%
Jan 2004-Dec 2004	8	11%
Total	81	100%

This research uses purposive data in determining which data need to be included. The following criteria must be met by the firms in order to be included as the data of this research:

1. The firm splits the stock during 1999 until 2004.
2. The firm does not have any other events following the stock split announcements, such as right issue, stock dividend, bonus stock, and financial report announcement date.
3. The firm publishes stock split announcement letters.
4. Daily trading volume, bid price, ask price, stock closing price must be available for at least five days before and after stock splits.

The first criterion is determined to focus this research on examining the newest stock split events in the Jakarta Stock Exchange. The second criterion is necessary to avoid the confounding effect on the result of this study because the announcement is considered to be significant in contaminating the results of stock splits study. The third criterion is necessary to enable this research to test liquidity and signaling changes. The fourth criterion is necessary to enable this research to test liquidity and volatility changes.

3.2. Data Source

The research is conducted by using all relevant data which is collected from various reliable sources, such as MM UGM Library Database, BEJ UII Database, and JSX Monthly Statistics.

For each firm in the initial sample the following additional data are collected:

1. Stock split announcement letters of sample firms following the split announcements.
2. Stock price of sample firms five days for before and five days following the split trading date.
3. Daily trading volume of sample firms five days for before and five days following the split trading date.
4. Bid price and ask price of sample firms five days for before and five days following the split trading date.
5. IHSB during 1999 until 2004

3.3. Research Variables

Market reaction to stock splits is indicated by abnormal returns which is defined as the difference between actual return and expected return. According to Brown and Warner (Jogiyanto, 2000: 46), there are several methods to estimate expected return i.e. mean adjusted model, market model, and market adjusted model. This research will use market adjusted model and indeks harga saham gabungan (IHSB) as proxy for the market.

Signaling changes is examined by split ratio of newly issued shares to old shares. Liquidity changes are examined by comparing total outstanding shares, trading volume and bid-ask spread before and after stock splits. Total outstanding shares changes are examined by comparing the old outstanding shares and the newly

outstanding shares in the quarter prior to the split announcements. Volatility changes are examined by comparing variance of stock return before and after stock splits.

3.4. Assumption about Regression Model

Theoretically, a regression model analysis will give a reliable estimated model parameter providing it fulfills the classical assumption of normal linear regression which is normality assumption and passes the test of auto-correlation, multi co linearity, and heteroscedasticity (Gujarati, 1995). Therefore, this section discusses test of auto-correlation and multi co linearity.

Auto-correlation is a correlation among members of series of observations ordered in time (as in time series data) or space (as in cross-sectional data). Auto-correlation is likely to occur in time series data. When the data are temporarily ordered, the error from one observation in one period can affect error in other time periods. To indicate whether there is auto-correlation or not in regression model, this research will use Durbin Watson Test (DW). The following formula is used:

$$DW = \frac{\sum_{t=2}^N (e_t - e_{t-1})^2}{\sum_{t=1}^N e_t^2}$$

DW = Durbin Watson

Where:

e = Residual the difference between expected actual rate of return and expected rate of return.

According to Singgih Santoso (2000), if the value of Durbin Watson Test lies between -2 until +2 so that variable is said to be highly collinear.

Multi co linearity exists when there is a linear correlation among the independent variables in the regression model. The regression model is considered good if there is no multi co linearity. To support the indication whether there is auto-correlation or not in regression model, this research will use matrix correlation. In addition, according to Singgih Santoso (2000), if the value of matrix correlation lies under 0.6 so it is assumed there is no auto-correlation.

3.5. Research Model

This research examines whether there is a cross sectional relation between the market reactions at the announcement of a stock split (using average abnormal return), the changes of signaling, liquidity, and volatility.

The dependent variable is average of abnormal returns and the independent variables are split ratio, total outstanding shares, trading volume, bid-ask spread, and volatility.

$$AR = \alpha + \beta_1 SR + \beta_2 TOS + \beta_3 TV + \beta_4 BAS + \beta_5 VOL$$

Where:

AR = Abnormal Returns

SR = Ratio of newly issued shares to old shares

TOS = The change in total outstanding shares before and after the stock split

TV = The change in trading volume of stock during the periods before and

after the stock split

BAS = The change in bid-ask spread of stocks before and after the stock split

VOL = The change in volatility of stock before and after the stock split

3.6. Analysis Procedure

3.6.1. Abnormal Returns

Abnormal Returns is the difference between actual rate of return and expected rate of return.

3.6.1.1. Calculating the actual rate of return for five days before, at the day, and five days after the stock split announcements (eleven days window period) using the following formula:

$$R_{i,t} = \frac{W_{t+1} - W_t}{W_t}$$

W_{t+1} = Stock price today

W_t = Stock price the day before

3.6.1.2. Calculating expected rate of return using market adjusted model with IHSG as proxy for the market using the following formula:

$$E(R_{i,t}) = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}$$

$IHSG_t$ = IHSG today

$IHSG_{t-1}$ = IHSG the day before

3.6.1.3. After adjusting for the company expected return, any remaining portion of the actual return is an abnormal return representing the impact of the stock split event. The abnormal return is calculated as:

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

$R_{i,t}$ = Actual Rate of Return for firm I during period t

$E(R_{i,t})$ = Expected Rate of Return for firm I during period t

3.6.1.4. Calculating the average of the abnormal return of all samples for each day in the eleven day window period by using the following formula:

$$AAR_t = \frac{\sum_{i=1}^k AR_{i,t}}{k}$$

$AR_{i,t}$ = The abnormal rate of returns for stock I during period t

k = Number of securities

3.6.2. Split Ratio

With the split ratio, the book value and par value of the equity are changed (Jones, 2000:40). Split ratio can be measured by computing the ratio of newly issued shares to old shares:

$$SR_i = LN(SR.i)$$

SR.i = Split Ratio after the stock split

3.6.3. Total Outstanding Shares

The first measurement of liquidity is total outstanding share changes. The total outstanding shares involve the issue of a large number of shares in proportion to the existing shares outstanding. The total outstanding share changes can be measured by computing the change of the total outstanding shares before and after the stock split:

$$TOSi = \text{Log}(TOSi.post) - \text{Log}(TOSi.pre)$$

$TOSi.post$ = Total outstanding shares before the stock splits

$TOSi.pre$ = Total outstanding shares after the stock splits

3.6.4. Trading Volume

The second method to calculate the change of liquidity is by using the average of daily trading volume of stock during the period before and after the stock split. The computation of the change in the trading volume can be seen as follows (Berkman and Eleswarapu, 1998: 348):

$$TVi = TVi.post - TVi.pre$$

$TVi.post$ = Average daily trading volume during post stock splits period

$TVi.pre$ = Average daily trading volume during pre stock splits period

3.6.5. Bid-Ask Spread

The third method to calculate the change of liquidity is by using the change of bid-ask spread before and after stock splits. The change of bid-ask spread is measured by:

$$\text{SPREAD}_i = \text{SPREAD}_{i,\text{post}} - \text{SPREAD}_{i,\text{pre}}$$

$$\text{SPREAD}_{i,\text{post}} = \text{Average bid ask spread during post stock splits periods}$$

$$\text{SPREAD}_{i,\text{pre}} = \text{Average bid ask spread during pre stock splits periods}$$

3.6.6. Volatility Changes

Volatility is variability or dispersion in the return of stock. Volatility is measured by standard deviation (variance) (Butler, 2000:428). Volatility changes can be measured by computing the change in variance of stock daily return before and after the stock split.

$$\text{VOL}_i = \text{VOL}_{i,\text{post}} - \text{VOL}_{i,\text{pre}}$$

$$\text{VOL}_{i,\text{post}} = \text{Variance of stock daily return during five days after the stock split}$$

$$\text{VOL}_{i,\text{pre}} = \text{Variance of stocks daily return during five days before the stock split}$$

3.7. Hypothesis Test

The step to execute the hypothesis of the test will describe as follows:

1. Specified 5% significant level.

2. Propose a conclusion from hypothesis testing.

If t value is smaller than 5% significant level, then it can be concluded that H_0 is rejected or H_A is accepted. In the other words, this research finds the significant differences among the variable tested. When t value is bigger than 5% significant level, then it can be concluded that H_0 is accepted or H_A is rejected. In the other words, this research doesn't find the significant differences among variable tested.



CHAPTER IV
DATA ANALYSIS

4.1. Descriptive Analysis

Stock split announcement letters for each firm is collected to examine the linkage between split ratio and total outstanding shares to abnormal returns for firms which announce a stock split. Daily trading volume and daily bid-ask price for five days before and after splits for each object are collected to test the level of liquidity after the split. Daily stock return is also collected to test its volatility that is increasing after the split. The following table describes the statistics of the collected data.

Table 4.1
The Result of Mean and Standard Deviation
Research Variables

	AR	SR	TOS	TV	BAS	VOL
Min	-0.091	1.250	6.778	-5.783	-1.963	-0.089
Max	0.089	10.000	10.791	6.433	1.733	0.166
Mean	-0.030	2.802	8.785	0.039	-0.108	0.038
Std. Dev	0.040	2.234	0.826	1.341	0.460	0.056
SKEWNESS	0.515	2.176	0.149	0.196	-0.989	0.926
Count	81	81	81	81	81	81

The above table shows the abnormal return five days before and after the split announcements. The abnormal return is -0.030. The mean of the abnormal return around the split announcements is strongly negative, it means that the level of returns that the investor or stockholder have are lower than the level of the market returns. The difference of the mean return is -0.030, or the stock price will decrease 3%

comparing with the stock price before. It is normal because the stock split process will increase the total outstanding share in the same market value, so that stock price value will fall or decrease equal with the split ratio. Value standard deviation of 0.040 that is bigger than the mean shows that data on the abnormal return variable is not homogeneous. These results are also supported by the minimum value range of -0.091 and the maximum value of 0.089.

This value range is high enough and supports the statement that data is distributed or is not homogeneous. The balance of the data distribution above is supported by the skewness value of 0.515 which is smaller than its standard deviation. This means that data doesn't have extreme value.

Split ratio is the ratio of the newly issued shares to the old shares. The bigger split ratio will show the bigger total outstanding shares that will be splits and the smaller split ratio will show the smaller total outstanding shares that will be splits. Split ratio variable has a mean of 2.802. It means that, on the average, the companies will split their total outstanding shares 2.8 times from the total outstanding share before the stock split. With the standard deviation of 2.234 that is smaller than its mean, it shows that the data is grouping and homogeneous distributed. This is supported by the minimum value of 6.778, and the maximum value of 10.791 which has a low range enough. Based on the skewness value of 2.176 that is low enough, it shows that the distribution of the split ratio variable is not normal.

The mean of the total outstanding share changes is big enough i.e. 8.785, while its standard deviation of 0.826 is small enough. This shows that the data is grouping, and it supports the minimum value of 6.778 and the maximum value of 10.791 with the range of value is low enough. Based on the skewness value of 0.149 which is too low to compare with the standard deviation, it shows that the data collected in the total outstanding share variables has a normal distribution.

While on the trading volume variable, which is the change of the average daily trading volume of stock during the periods before and after the stock split, the variable has a low mean of 0.039. It means that on the average, the firms only has changes in trading transaction after doing the stock splits of 3.9% from the total outstanding share. The standard deviation value of 1.341 that is much bigger than the mean shows that the data of the trading volume is not grouping or not homogenous. This is supported by the range on the minimum value of -5.783 and the maximum value of 6.433. The range was very high and supports the statement that data distribution on the trading volume is not homogenous. However, if we see the skewness value of 0.196 that shows very low value, it means that the distribution of the data is still normal. This is caused by the data grouping on the middle, while the distribution is far away on each left and right side in small amounts.

The bid-ask spread variable, which is defined as the difference between bid values and ask value of stock price, shows that on the average the change of bid-ask spread is too small i.e. -0.108. It means that the bid value and ask value of the stock

price is fallen after the split. The standard deviation of 0.460 is much bigger than the mean; it shows that data is not grouping and not homogenous. It is supported by the range value between the minimum value of 1.963 and maximum value of 1.733 which is far enough. With the skew ness of -0.989, it shows that this value is big enough compared with its standard deviation. This means that the data still has a normal distribution.

Likewise with volatility variable, which shows the mean of 0.038 that is low enough and the standard deviation that is bigger than the mean, it means that the data is not grouping and not homogenous. This is supported by the range that is big enough with the minimum value of -0.089 and the maximum value of 0.166. The skew ness value of 0.926 is strengthening the data that the volatility has a normal distribution.

4.2. Regression Analysis

The dependent variable is the average of abnormal returns, and the independent variables are the change of split ratio, total outstanding shares, trading volume, bid-ask spread, and volatility. The following regression equation is estimated:

$$AR = \alpha + \beta_1 SR + \beta_2 TOS + \beta_3 TV + \beta_4 BAS + \beta_5 VOL$$

Where:

AR = Abnormal Returns

SR = Ratio of newly issued shares to old shares

TOS = The difference in total outstanding shares before and after the stock split

TV = The difference in trading volume of stock during the periods before and after the stock split

BAS = The difference in bid ask-spread of stock before and after the stock split

VOL = The difference in variance of stock before and after the stock split

4.2.1. Auto-correlation Test

Theoretically, a regression model analyses will give a reliable estimated model parameter that provides the fulfillment of the classical assumption of normal linear regression, which is normality assumption and passes the test of auto-correlation. To indicate whether there is auto-correlation or not in the regression model, this research will use Durbin Watson Test (DW).

By using Microsoft Excel 2000, it can be found the value of Durbin Watson Test is 1.24468. According to Singgih Santoso (2000), if the value of Durbin Watson Test lies between -2 until +2 so it is assumed that there is no auto-correlation. The results of Durbin Watson Test indicate that there is no auto-correlation among the variables in the regression model.

Table 4.2
Matrix Correlation

	AR	SR	TOS	TV	BAS	VOL
AR	1					
SR	-0.02741	1				
TOS	-0.50849	0.408306	1			
TV	0.247058	0.047191	-0.17099	1		
BAS	-0.29417	0.299295	0.220022	0.04585306	1	
VOL	-0.57826	0.501789	0.570869	-0.129013116	0.3115402	1

The matrix correlation above presents that all variables in the regression model have weak relations because they are below 0.6 levels. Singgih Santoso (2000) adds that if the value of correlation matrix lies below 0.6, so it is assumed that there is no auto-correlation. Overall, the above auto-correlation matrix is strongly supported by Durbin Watson Test in which indicates that there is no auto-correlation among the variables in the regression model.

4.2.2. Regression Test

Table 4.3
Test of Abnormal Return Using F-Test

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	5	0.0665	0.0133	15.7793	0.0000
Residual	76	0.0640	0.0008		
Total	81	0.1305			

From the table above, it is found that the value of F is 15.7793 with the probability of 0.0000. The results regarding the effect of splits on the signaling, liquidity, and volatility hypothesis are strongly significant.

To shows the percentage of abnormal returns which can be explained by all independent variables (split ratio, total outstanding shares, trading volume, bid-ask spread and volatility), it can be seen in the table below.

Table 4.4
The Result of Regression Analyses

<i>Regression Statistics</i>	
Multiple R	0.71369
R Square	0.50935
Adjusted R Square	0.47037
Standard Error	0.02903
Observations	81

The above table presents the correlation with coefficient (R) is 0.71369. This number shows the relation of the pooled data between dependent variable and independent variables which can be explained by the relation between the abnormal return and five independent variables of 0.71369 that has strong relations. While the value of adjusted R square 0.47037 shows that 47.037% variation of dependent variable (abnormal return) can be explained by independent variables (split ratio, total outstanding shares, trading volume, bid-ask spread and volatility).

This coefficient determination is big enough so that the regression model is very good. The value of standard error of 0.02903 shows that the accuracy of the regression model is better in the predicted dependent variable, because the value of the standard error is smaller than the standard deviation of the abnormal return. So, those five independent variables are more accurate in the predicted value of the abnormal return.

4.3. Empirical Results

The statistical test results of independent variable are presented in following table:

Table 4.5
Test of Independent Variable Using T-test

	<i>Coefficients</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.09298	2.30909	0.02369
SR	0.02884	4.48439	0.00003
TOS	-0.01528	-3.19917	0.00202
TV	0.00340	1.40281	0.16480
BAS	-0.01661	-2.25784	0.02686
VOL	-0.38557	-5.17507	0.00000

Based on the table above, the intercept value of 0.09298 shows that when the split ratio, the change of the total outstanding shares, the change of trading volume, bid-ask spread, and volatility are still on zero value so the value of the abnormal returns that the investor/stockholder has is 0.09298. This intercept has a significant value of 0.02369 so that it can be categorized as moderate significant or close to strong significant. Based on the intercept variable which is significant, the estimated model above can be categorized as a regression model which is not good enough. Because of that, the regression equation will be passed to point 0.0 to make the regression equation better. Besides, there is no theory that supports the explanation.

Table 4.6
Revision of T-Test Result

	<i>Coefficients</i>	<i>T Stat</i>	<i>P-value</i>
Intercept	0	#N/A	#N/A
SR	0.027676	4.198146	0.000072
TOS	-0.004369	-6.139337	0.000000
TV	0.004224	1.711319	0.091101
BAS	-0.018124	-2.406044	0.018557
VOL	-0.457669	-6.580757	0.000000

4.3.1. Split Ratio

The results of the split ratio independent variable with the significant level of 0.000072 indicate that the relation between the split ratio variable and abnormal returns variable is strongly significant. This indication means that the split ratio has a major effect on the magnitude of the markets' reaction to the announcement of the stock split. The estimated coefficient suggests a positive relation between the split ratio and the abnormal return. It means that the bigger number of firms' split ratio, the higher abnormal returns the firms will be have. Thus, this result rejects HO1. On the other words, this research finds the difference of the abnormal return because of the difference split ratio. By conditioning the difference of split ratio to a split, however, this research finds significantly positive abnormal returns around the stock split announcements. Investors tend to be wealth constrained, and, therefore, cannot afford to acquire a round lot of a firm's stock if the price is too high. The firms typically announce the stock split when their price is relatively high in the market. The stock will be priced high if the stock is considered as a good stock. Generally, a

stock will be categorized as a good stock based on the stock performance on the stock exchange. Here, the stock performance denotes for profitable stock and credible company. Consequently, investors will perform outstanding reaction to the stock split announcements which proved by any abnormal returns around the stock split announcements.

The firm's purpose to split their good stock to lower price is to make their stock more affordable for their investors. With the lower post-split price, the investors take advantage of the stock split through increasing their demand for the firms' stock, after the split than before the split. The fact that the investors increase their demand more frequently than before and that the split ratio is the primary component of the stock split benefit, implies that the investors should like splits. By following a split, the managers will expect that the price of a stock should increase rapidly. And, the market reaction can be measured by any positive abnormal returns around the stock split announcements. Brennan and Copeland (1988) provide evidence that is consistent with this research result as they find that the split ratio is positively correlated with the abnormal returns. When the managers announce the split ratio to receive a lower price in the post split, the investors will interpret this as a signal which contains positive information. These results are also consistent with Dennis and Strickland (1998). They state that there are positive abnormal returns around the stock split announcements. The stock splits signal positive information

about the firms' future prospects if the split ratio is a measure of the strength of the signal.

Similar to prior research, this research finds that the differences of abnormal returns following the split, by conditioning the differences of split ratio to a split, increase, and is statistically significant. This suggests that any increase in abnormal returns is potentially a function of split ratio announcements. The result of this research result regarding on the post-split differences in the abnormal return contradicts with what prior researchers expect. This result is inconsistent with the prior researcher argument about the effect of a stock split as signaling hypothesis. The essence of the signaling argument is that managers only split their stock if they are optimistic that the future share price will increase. This research does not find a significant increase in the post split abnormal returns because of the split ratio as a measure of the strength of the signal. This research finds that the increase in the abnormal returns is not an artifact of positive information which is sent out through the split ratio announcements, but it is rather a true increase in demand.

The stockholder's meeting designs the split ratio without any principle. They are only concerned with the stock split types, such as split up and split down. They do not pay attention to the number of the split ratio itself. The stockholders and managers are forced to make illogic decision with the real condition that may happen. The illogic decision occurs as consequences of some clash desires. In one side, the stockholder desires to keep gain realization, while the other side manager desires to

keep sharing dividend. Furthermore, politics also plays an important role in decision making because of unstable climate in this country. That is why the stockholders and managers often decide irrational decision without considering the real condition occurs in the market. The stock split announcements may occur to realize their willingness. Overall, the result of this regression suggests that there are different abnormal returns from the reduction in stock price for firms that split their stock.

4.3.2. Total Outstanding Shares

Total outstanding shares with significant level of 0.000000 shows that the relation between the total outstanding shares variable and abnormal returns variable are strongly significant. This indicates that the difference of the total outstanding shares has a major effect on the magnitude of the markets' reaction to the announcement of the stock split. The result of the regression provides evidence which implies a negative relation between the stock split abnormal returns and the total outstanding shares. The estimated negative coefficient suggests that the bigger the difference of the total outstanding shares, the firms will have the lower announcement returns. This T-test result rejects H_0 . It means that there is the difference of the abnormal returns because of the difference of the total outstanding shares. Managers are motivated to splits their stock to increase the proportion of outstanding shares. By increasing the proportion of outstanding shares, the firms will be able to expand the shareholders. The stock split announcements has a great impact to economic practitioners including prestige investors. It also affects the prestige investors to sell

their shares because the investors have bigger shares after the stock split announcements. This makes the total outstanding shares oversupplied and the return will decrease. This condition is unpredictable, because no one wonders on how the market will react to the stock split announcements. The managers who are unable to avoid extra reactions will break their purposes before. This reality is one of natural conditions that are not expected by the manager in the stock split announcement effects. Furthermore, the bigger the total outstanding shares will indicate the easier the investors to buy the stock. These stock split announcements will change the firms' position into the firms with lower value stock. This condition generates negative market reactions caused by the reduction of the investors' trustworthiness. The effect is that the actual return value will be lower comparing with the expected return, and this makes abnormal returns decrease. This result is not supported by Brennan and Hughes (1991) stating that the number of securities is positively related to the magnitude of stock splits.

This research finds that the abnormal return following a split, by conditioning the improvement of total outstanding shares to a split, decreases, and is statistically significant. At the announcement of a split, the investors interpret the news as positive information, and increase their shares holding in the firm, where the proportion of the increase in the outstanding shares is inversely related to the abnormal return after the split. Research findings which show that the abnormal return after split is inversely related to the increase in total outstanding shares

subsequent to a split may help to explain the contradictory results that prior researchers have found regarding on the abnormal return changes around the stock split. This result is inconsistent with the prior research argument that the effect of a stock split is to increase the proportion of outstanding shares. Increasing the proportion of outstanding shares will drive away the investors due to an increased abnormal return. But, it should be noticed that the abnormal return will increase only if oversupplied that appears in this research does not occurs. This strongly supports the failure of previous research to discern the change of the total outstanding shares effect stem, from the fact that they do not condition the presence of a class of investors who generate oversupplied shares. Overall, the result of this regression suggests that there is a decrease in the abnormal return from the improvement of the total outstanding shares for the firms that splits their stock.

4.3.3. Trading Volume

Trading volume variable positively influences the abnormal return, and the relation between the trading volume and the abnormal return is weakly significant. This is approved by the probability of 0.091101 which shows that the value is lower than 0.1. This result suggests that a trading volume does not fundamentally change the abnormal return. The estimated coefficient suggests that the bigger the difference of trading volume the firms will have higher announcement returns. Although this T-test does not show a strongly significance, it still rejects HO3. Thus, it is found that the difference of the abnormal return is caused by the difference of the trading

volume. The stock split announcements make the total outstanding shares bigger, then this will improve the trading volume among the stockholder. The improved trading based results in greater volume, automatically will improve liquidity. The bigger trading volume represents to higher the investors' enthusiasm to own the stock. The higher investors' enthusiasm will make the bigger probability to produce positive abnormal returns. Furthermore, the more the market participates to trade; this will increase the market liquidity in the stock exchange. Because of the increase of the transaction has happened, the market will automatically react positively to returns improvement. These research findings provide the empirical supporting liquidity hypothesis by Muscarella and Vetsuypens (1996) stating that they find positive abnormal returns because the improvement of trading volume after splits.

The results from this regression indicate that the increase in the trading volume for stock splits is at least partially the result of an increase in liquidity. Similar to this research, the prior research finds that the lower post-split price attracts the investors who are reluctant to purchase the stock at the higher pre-split price. The investors are willing to trade the stock, the stock becomes more liquid, and they are willing to pay a premium for this liquidity. This research shows that the level of liquidity to a split is positively related to the increase in volume subsequent to a split. This may help to explain the contradictory results that the prior researcher has found the abnormal return changes around the stock split. Contradicted with the prior evidence, this research finds that positive abnormal returns appear because the

investors trade much more than pre split, and because they interpret and process the signal efficiently. The investors who interpret and process the signal efficiently seem to make weak post split volume changes. This is consistent with the fact that there is a liquidity benefit for the stock split and that the magnitude of that benefit is increasing the abnormal return. The inability of earlier research to discern a liquidity benefit results the fact that they are not conditioning investors who are more efficient at interpreting and processing the signal. Moreover, the results of the regression provide evidence which supports the prior research that the relation between the liquidity gains and the change abnormal return implies a positive relation between stock split abnormal returns and trading volume. Overall, this research suggests that although there is a weak evidence of a small increase in the abnormal return, the result does not strongly support a strong stock split liquidity effects.

4.3.4. Bid-Ask Spread

Bid-ask spread are moderately significant to inverse the relationship of abnormal returns. This has proved by the probability of 0.018557. The value is lower than 0.05. Thus, this result rejects HO4. On the other words, this research finds the different abnormal returns because of the different level of bid-ask spread. This negative influence has a meaning that the more bid-ask spread change, the lower the value of abnormal returns. The investors do not assume stock split announcements as positive information because they do not interpret the stock split as a signal to give information about the stock that has lower price. The investors who do not concern

with the positive information will still produce high bid price when trading the stock. This condition shows that the bid price is higher if it is compared with its ask spread, so that this will result the negative abnormal returns. This research finding that bid ask spread of a stock declines after splits is consistent with Copeland (1979) that shows the trading volume decrease after the stock split, while broker commission and bid-ask spread will be bigger after the stock split. Those three conditions show the decline of liquidity after the stock split.

The fact that the change of post-split liquidity in bid-ask spread that are linked to the difference of abnormal returns to a split may explain the mixed results regarding on the post-split volume that this research has found before. While the changes of trading volume shows that the liquidity of a stock improves after a split, bid-ask spread shows that the liquidity of a stock after a split declines. From these mixed results, it can be conclude that there is a different liquidity effect in the markets' reaction to the announcement of a stock split. The difference of the liquidity effect appears because this research is conditioning the investors who do not interpret the stock split as a signal to give information about the stock that has lower price. The result of this research, regarding on the post-split differences in abnormal returns, contradicts with what prior researchers expect. The prior research argument that the effect of liquidity is to drive away investors due to an increased transaction cost. The essence of the increased transaction cost associates managers' willingness to trade their stock with higher price, and investors' willingness to buy the stock with lower

price. This research does not find a significant decrease in the post split abnormal returns because of bid-ask spread as a major element of transaction cost. This research argues the transaction cost is only related to brokers' commission. The brokers provide positive information about the stock split to investors, and earn fees in exchange for their services. But this condition cannot be linked to liquidity changes resulting from the split. Moreover, bid-ask spread variable is significant in explaining the liquidity changes resulting from splits since the investors greatly contribute to a volume of trade.

4.3.5. Volatility

Volatility variable is a variable that negatively influence on abnormal returns with the regression coefficient of -0.457669. So, the bigger the volatility changes, the smaller value of abnormal returns. With the probability of 0.000000, it shows that the relation between volatility variable and abnormal returns variable is strongly significant. This T-test result rejects H_0 . It means that this research documents the difference of the abnormal return because of the different volatility after the stock split announcements. The stock split announcements make higher fluctuation returns. The higher fluctuation returns will be interpreted as an uncertainty on business environments. This higher fluctuation return will reflect investors' untrustworthy to the firms' future and cause negative abnormal returns. Furthermore, because of noisy trading activity, the dislike information will produce negative reaction to the market. This finding is consistent with Ohlson and Penman (1985). They state that the

variance of stock return will highly increase after the stock split around 28% until 35% because the trader does not concern with positive information that enter to the market, such as have low return and institutional factor.

This research shows that the level of volatility to a split, which is negatively related to the abnormal return subsequent to a split, may help to explain the contradictory results that the prior researchers have found regarding on the abnormal return changes around the stock split. The prior research documents a statistically significant negative link between the abnormal return and the volatility of a firms' return. They find the post split that increase in institutional ownership may partly explain the increase in the return volatility following a split. Contradicted with the prior evidence, this research finds the negative abnormal returns appears because the market is less surprised when any firms with lower price announce a stock split. With the lower price after splits, the investors assume that the return will not steady on one level. The market will have various reactions every day. This research conditions the investor to be excited to stock which has stable return. The investors argue that the stock with stable return will show the stability of the stock return value. It means that the stock is still profitable with low risk. This condition generates negative market reactions. Overall, the pattern suggests that when there is strong evidence of a higher increase in volatility, the results do not strongly support the increase of abnormal returns after splits.

This research results regarding the effect of splits on split ratio, total outstanding shares, trading volume, bid-ask spread, and volatility. They are important for several reasons.

First, the abnormal returns' increase for firms with low price to the split announcements, and this increase in abnormal returns are related to the split ratio. This result suggests that there are bigger abnormal returns for firms that split their stock, but the bigger abnormal returns are conditional on the different split ratio. This finding suggests that the level of split ratio has a major effect on the magnitude of the markets' reaction to the announcement of stock splits.

Second, the stock split abnormal returns is negatively related to the total outstanding shares to the split. The decrease of abnormal returns are conditioning on the presence of a class of investors who generate oversupplied shares.

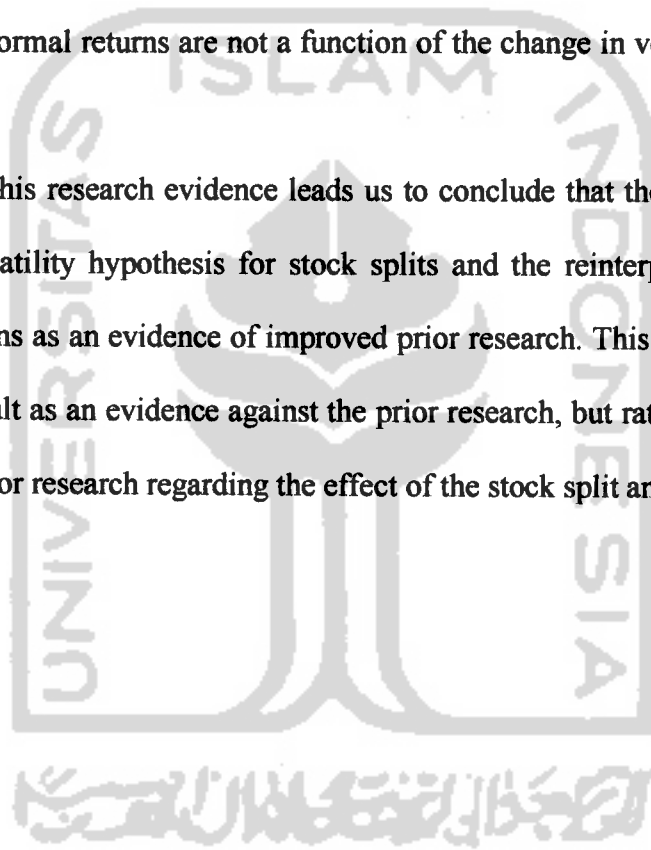
Third, the abnormal return increase for firms with higher trading volume to the split announcements. The abnormal return result indicates that the market prices gain in liquidity. This research suggests that there is a weak evidence of a small increase in the abnormal return. The abnormal returns' which has a small increase is conditioning investors who are more efficient at interpreting and processing the signal.

Fourth, the stock split of the abnormal return is negatively related to bid-ask spread to the split. In addition, the changes in the abnormal return are not related to

bid-ask spread as a major element of transaction cost. The abnormal returns' results show the decline of liquidity after the stock split.

Fifth, the abnormal return decreases for firms with higher fluctuation price to the split announcements, and the decrease in abnormal returns are related to the investors who are excited to the stock that has stable return. These findings suggest that the gain abnormal returns are not a function of the change in volatility following a stock split.

Overall, this research evidence leads us to conclude that there is merit to the liquidity and volatility hypothesis for stock splits and the reinterpretation of stock split excess returns as an evidence of improved prior research. This research does not interpret this result as an evidence against the prior research, but rather new evidence to support the prior research regarding the effect of the stock split announcements.



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

This research examines whether the abnormal return can be explained by signaling, liquidity, or volatility changes around the stock splits announcements. The objects of the research are corporations listed in Jakarta Stock Exchange (JSX) that announce the stock splits from 1999 until 2004 but do not have any other events following the stock splits announcements, such as right issue, stock dividend, bonus stock and financial report announcement date.

The research documents several conclusions as follows:

1. Simultaneously, the abnormal return around the stock split can be explained by signaling, liquidity, and volatility changes because those entire variables have significant correlation with the abnormal return.
2. Partially, the split ratio and trading volume variables influence positively significant to the abnormal return, while the total outstanding shares, bid-ask spread, and volatility variables influence negatively significant to the abnormal return for firms to split their stock.

Test of signaling level concludes that the level of signaling before and after the stock split is different. There is a significant abnormal returns' increase because of the different split ratio after the stock split. Thus, the result of this research is

consistent with Dennis and Strickland (1998) that document the positive abnormal returns for splitting companies. The findings support the first hypothesis that the different abnormal returns are caused by the difference of split ratio after the stock split. Therefore, this research finding supports the signaling hypothesis.

The test of liquidity level by using total outstanding shares concludes that the level of liquidity before and after the stock split is different. There is a significant abnormal returns' decrease because of the difference of the total outstanding shares after the stock split. The finding supports the second hypothesis that there is a difference in the abnormal returns' because of the difference of the total outstanding shares after the stock split. Therefore, this researches finding does not support the liquidity hypothesis.

The test of liquidity level by using trading volume concludes the same result that the level of liquidity before and after the stock split is different. There is a significant abnormal returns' increase because of the difference of the trading volume after stock splits. The finding supports the third hypothesis that the stock split increases the abnormal returns' after the stock split. Therefore, this research finding supports the liquidity hypothesis.

The test of liquidity level by using bid-ask spread concludes that the level of liquidity before and after the stock split is different. There is a significant abnormal returns' decrease because of the difference of bid-ask spread after the stock split. The finding supports the fourth hypothesis that there is a difference of abnormal returns

because of the difference of bid-ask spread after the stock split. Therefore, this research finding does not support the liquidity hypothesis.

The level of volatility of returns in the market before and after the stock split is different. There is a significant abnormal returns' decrease caused by the difference of volatility after the stock split. The result of this finding is consistent with Ohlson and Penman (1985) that document the decrease of the level of returns volatility in the market. This finding supports the fourth hypothesis that there is a difference of the abnormal return because of the difference of volatility after the firms split their stock. Therefore, this research finding does not support the volatility hypothesis.

This research finding suggests that stock splits are merely an accounting change with changes in firms' value. There are changes on the stock return and returns volatility after the firms split their stock. This research also finds evidence to support liquidity hypothesis and volatility hypothesis as incentive for firms to split their stock. Therefore, this research suggests that the stock split is a company policy that has information content.

Because the stock split has any information content, the market reacts to the stock split announcements. It also indicates that the stock market in Jakarta Stock Exchange is not efficient in strong form, because the market of all information, either public or private, is fully reflected in security prices and whether any type of investors can make an excess profit (Elton & Gruber, 95:406).

5.2. Recommendations

The result of the research raises additional issues for future research of particular interests. They are:

1. Future research could add more objects to conclude more accurate result.
2. Research could also focus on certain sectors in Jakarta Stock Exchange (JSX) or by comparing the sectors in Jakarta Stock Exchange (JSX) for the same period to conclude specific conclusions.
3. Future research could use splitting and non splitting companies as objects, and then make a comparison between them.
4. Research about signaling hypothesis could use factors such as EPS, PBV, or PER besides split ratio as proxy of company's performance.
5. Future research could use objects from Surabaya Stock Exchange or other stock markets. Compare one stock market to another in Indonesia or abroad.

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APPENDICES



Appendix 1. Object Distribution and Announcement Date

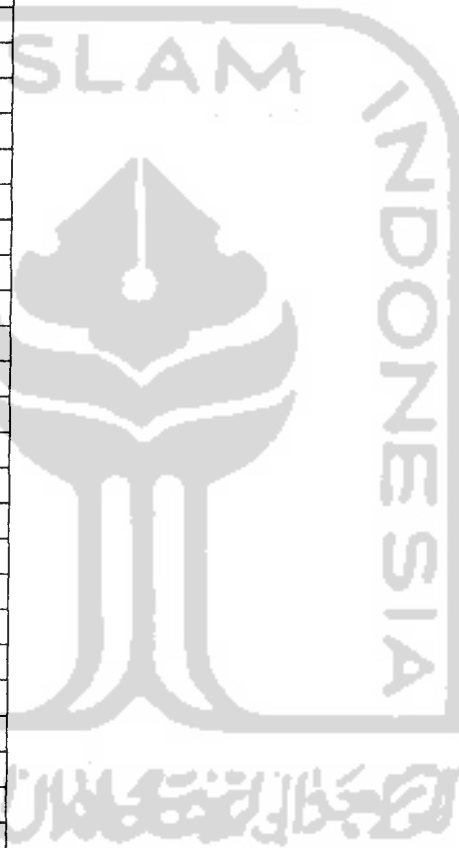
No	Emiten Name	Emiten Code	Stock Split Date
1	Bank CIC International	BCIC	4/1/1999
2	Bank Global International	BGIN	8/16/1999
3	Bank NISP	NISP	11/4/1999
4	BBI Dharmala Finance	BBLD	7/26/1999
5	Bhakti Investama	BHIT	9/8/1999
6	Budi Acid Jaya	BUDI	9/28/1999
7	Dankos Laboratoris	DNKS	9/20/1999
8	Daya Sakti Unggul	DSUC	10/18/1999
9	Ekadarma Tape Ind.	EKAD	9/3/1999
10	Enseval Putra Megatrading	EPMT	9/13/1999
11	Hotel Sahid Jaya	SHID	6/4/1999
12	Igarjaya	IGAR	8/16/1999
13	Kalbe Farma	KLBF	9/27/1999
14	Kurnia Kapuas Utama	KKGI	9/29/1999
15	Lautan Luas	LTLS	11/8/1999
16	Metrodata Elektronik	MTDL	12/9/1999
17	Soedarpo Corporation	SDPC	2/3/1999
18	Bank PAN Ind	PNBN	10/4/1999
19	Suba Indah	SUBA	6/9/1999
20	Sunson Textile Manufaktur	SSTM	9/27/1999
21	Surya Dumai Industri	SUDI	10/21/1999
22	AGIS	TMPI	2/18/1999
23	Asiana Multi Kreasi	ASIA	12/18/1999
24	Asiaplast Industri	APLI	8/16/2000
25	Astra Graphia	ASGR	3/7/2000
26	Asuransi Harta Aman	AHAP	10/2/2000
27	Bhahtera Admina Samudra	BASS	10/9/2000
28	Bentoel International	RMBA	4/25/2000
29	Bhakti Investama	BHIT	2/8/2000
30	Evershine Textile Industri	ESTI	12/11/2000
31	Fast Food Indonesia	FAST	12/5/2000
32	Indofood Sukses Makmur	INDF	9/29/2000
33	Intraco Penta	INTA	11/6/2000
34	Maskapai Reasuransi Ind.	MREI	8/8/2000
35	Medco Energi International	MEDC	6/2/2000
36	Mitra Rajasa	MIRA	8/14/2000
37	Siwani Trimitra	MITI	10/9/2000
38	Sona Topas Tourism Inds.	SONA	4/7/2000
39	Tirta Mahakam Plywood	TIRT	5/15/2000
40	Trias Sentosa	TRST	10/9/2000

41	Trimegah Securitas	TRIM	4/24/2000
42	Unilever Indonesia	UNVR	11/6/2000
43	United Tractor	UNTR	9/5/2000
44	Bank Central Asia	BBCA	5/15/2000
45	Bentoel International Investama	RMBA	1/31/2001
46	Charoen Pokphand Ind.	CPIN	1/15/2001
47	HM Sampoerna	HMSP	9/24/2001
48	Millenium Pharmacon Int.	SDPC	9/3/2001
49	Ramayana Lestari Sentosa	RALS	2/15/2001
50	Sarasa Nugroho	SRSN	8/6/2001
51	Siantar TOP	STTP	12/20/2001
52	Suba Indah	SUBA	1/8/2001
53	Summitplast Interbenua	SMPL	7/31/2001
54	Surya Intrindo Makmur	SIMM	8/30/2001
55	Tunas Baru Lampung	TBLA	10/29/2001
56	Tunas Ridean	TURI	7/6/2001
57	Ultra Jaya Milk	ULTJ	1/16/2001
58	Andhi Chandra Automotive P Tbk	ACAP	1/3/2002
59	Voksel Electric Tbk	VOKS	3/14/2002
60	Jaka Artha Graha Tbk	JAKA	5/14/2002
61	Asuransi Dayin Mitra Tbk	ASDM	5/27/2002
62	Fortune Mate Indonesia Tbk	FMII	6/28/2002
63	Hexindo Adiperkasa Tbk	HEXA	7/26/2002
64	Mustika Ratu Tbk	MRAT	8/1/2002
65	Panin Sekuritas Tbk.	PANS	9/16/2002
66	Pan Brothers Tex Tbk	PBRX	1/9/2003
67	Panin Insurance Tbk	PNIN	5/28/2003
68	Clipan Finance Indonesia Tbk	CFIN	26/06/2003
69	Selamat Sempurna Tbk	SMSM	7/4/2003
70	Unilever Indonesia Tbk	UNVR	9/1/2003
71	Pool Asuransi Indonesia Tbk	POOL	12/4/2003
72	Enseval Putra Megatrading Tbk	EPMT	12/8/2003
73	Kalbe Farma	KLBF	12/30/2003
74	Dankos Laboratories Tbk	DNKS	2/4/2004
75	Ekadharma Tape Ind Tbk	EKAD	2/9/2004
76	Jakarta Int L Hotel & Dev. Tbk	JIHD	5/6/2004
77	Inco Tbk	INCO	8/2/2004
78	Rig Tenders Tbk	RIGS	8/3/2004
79	Ramayana Lestari Sentosa Tbk	RALS	10/18/2004
80	Davomas Abadi Tbk	DAVO	12/15/2004
81	Indosat Tbk	ISAT	15/03/2004

Appendix 2. Abnormal Returns around Announcement Date

No	Emiten Code	AR
1	BCIC	0.0195
2	BGIN	0.0219
3	NISP	0.0040
4	BBLD	0.0060
5	BHIT	0.0106
6	BUDI	0.0414
7	DNKS	0.0020
8	DSUC	-0.0495
9	EKAD	-0.0213
10	EPMT	0.0076
11	SHID	0.0719
12	IGAR	-0.0073
13	KLBF	0.0023
14	KKGI	-0.0089
15	LTLS	-0.0059
16	MTDL	0.0083
17	SDPC	-0.0002
18	PNBN	0.0257
19	SUBA	0.0326
20	SSTM	0.0157
21	SUDI	-0.0067
22	TMPI	-0.0680
23	ASIA	-0.0252
24	APLI	-0.0906
25	ASGR	-0.0895
26	AHAP	0.0084
27	BASS	-0.0479
28	RMBA	-0.0170
29	BHIT	-0.0433
30	ESTI	0.0011
31	FAST	-0.0815
32	INDF	-0.0745
33	INTA	-0.0032
34	MREI	0.0340
35	MEDC	0.0025
36	MIRA	-0.0376
37	MITI	-0.0355
38	SONA	-0.0436
39	TIRT	0.0891
40	TRST	0.0026

41	TRIM	0.0183
42	UNVR	-0.0063
43	UNTR	0.0003
44	BBCA	-0.0391
45	RMBA	-0.0110
46	CPIN	-0.0767
47	HMSP	-0.0660
48	SDPC	-0.0765
49	RALS	-0.0771
50	SRSN	-0.0757
51	STTP	-0.0652
52	SUBA	-0.0466
53	SMPL	-0.0510
54	SIMM	-0.0761
55	TBLA	-0.0476
56	TURI	-0.0788
57	ULTJ	-0.0634
58	ACAP	-0.0757
59	VOKS	-0.0125
60	JAKA	-0.0750
61	ASDM	-0.0270
62	FMII	-0.0624
63	HEXA	-0.0472
64	MRAT	-0.0749
65	PANS	-0.0494
66	PBRX	0.0006
67	PNIN	-0.0424
68	CFIN	-0.0474
69	SMSM	-0.0803
70	UNVR	-0.0791
71	POOL	-0.0530
72	EPMT	-0.0430
73	KLBF	-0.0479
74	DNKS	-0.0442
75	EKAD	-0.0718
76	JIHD	-0.0604
77	INCO	-0.0620
78	RIGS	0.0258
79	RALS	-0.0771
80	DAVO	-0.0786
81	INDOSAT	-0.0660



Appendix 3. Split Ratio Calculation

No	Emiten Code	Split Ratio	LN(Split Ratio)
1	BCIC	1.25	0.223143551
2	BGIN	1.25	0.223143551
3	NISP	2	0.693147181
4	BBLD	2	0.693147181
5	BHIT	2	0.693147181
6	BUDI	5	1.609437912
7	DNKS	1.25	0.223143551
8	DSUC	1.5	0.405465108
9	EKAD	2	0.693147181
10	EPMT	2	0.693147181
11	SHID	10	2.302585093
12	IGAR	1.25	0.223143551
13	KLBF	1.25	0.223143551
14	KKGI	1.5	0.405465108
15	LTLS	2	0.693147181
16	MTDL	1.25	0.223143552
17	SDPC	2	0.693147181
18	PNBN	2	0.693147181
19	SUBA	2	0.693147181
20	SSTM	2	0.693147181
21	SUDI	1.25	0.223143551
22	TMPI	2.5	0.916290732
23	ASIA	2.5	0.916290732
24	APLI	1.25	0.223143551
25	ASGR	1.25	0.223143551
26	AHAP	2	0.693147181
27	BASS	1.25	0.223143551
28	RMBA	1.25	0.223143551
29	BHIT	1.5	0.405465108
30	ESTI	1.25	0.223143551
31	FAST	10	2.302585093
32	INDF	1.25	0.223143551
33	INTA	2	0.693147181
34	MREI	5	1.609437912
35	MEDC	1.25	0.223143551
36	MIRA	2	0.693147181
37	MITI	2	0.693147181
38	SONA	2	0.693147181
39	TIRT	10	2.302585093
40	TRST	1.25	0.223143551

41	TRIM	1.25	0.223143551
42	UNVR	1.25	0.223143551
43	UNTR	1.25	0.223143551
44	BBCA	2	0.693147181
45	RMBA	1.5	0.405465108
46	CPIN	1.5	0.405465108
47	HMSP	5	1.609437912
48	SDPC	5	1.609437912
49	RALS	2	0.693147181
50	SRSN	1.25	0.223143551
51	STTP	2	0.693147181
52	SUBA	2	0.693147181
53	SMPL	2	0.693147181
54	SIMM	2	0.693147181
55	TBLA	1.25	0.223143551
56	TURI	2	0.693147181
57	ULTJ	3.5	1.252762968
58	ACAP	5	1.609437912
59	VOKS	2	0.693147181
60	JAKA	10	2.302585093
61	ASDM	2	0.693147181
62	FMII	5	1.609437912
63	HEXA	2	0.693147181
64	MRAT	4	1.386294361
65	PANS	2	0.693147181
66	PBRX	5	1.609437912
67	PNIN	2	0.693147181
68	CFIN	2	0.693147181
69	SMSM	5	1.609437912
70	UNVR	5	1.609437912
71	POOL	2	0.693147181
72	EPMT	5	1.609437912
73	KLBF	2	0.693147181
74	DNKS	2	0.693147181
75	EKAD	2	0.693147181
76	JIHD	2	0.693147181
77	INCO	4	1.386294361
78	RIGS	10	2.302585093
79	RALS	5	1.609437912
80	DAVO	2	0.693147181
81	INDOSAT	5	1.609437912

Appendix 4. Total Outstanding Shares Calculation

No	Emiten Code	Total Outstanding Shares-Pre	Total Outstanding Shares-Post	Diff Total Outstanding Shares	LOG(TOS)
1	BCIC	1140800000	1426000000	285200000	8.455149521
2	BGIN	2394000000	2992500000	598500000	8.777064155
3	NISP	543729365	1087458730	543729365	8.735382788
4	BBLD	90000000	180000000	90000000	7.954242509
5	BHIT	428000000	856000000	428000000	8.631443769
6	BUDI	787500000	1575000000	787500000	8.896250562
7	DNKS	510300000	637875000	127575000	8.105765577
8	DSUC	300000000	450000000	150000000	8.176091259
9	EKAD	11180400	22360800	11180400	7.048457342
10	EPMT	228000000	456000000	228000000	8.357934847
11	SHID	326400000	652800000	326400000	8.51375015
12	IGAR	997500000	1246875000	249375000	8.396852913
13	KLBF	1728000000	2160000000	432000000	8.635483747
14	KKGI	150000000	225000000	75000000	7.875061263
15	LTLS	390000000	780000000	390000000	8.591064607
16	MTDL	349222186	436527733	87305547	7.941041838
17	SDPC	13650000	27300000	13650000	7.135132651
18	PNBN	2942753764	5885507528	2942753764	9.468753924
19	SUBA	22500000	45000000	22500000	7.352182518
20	SSTM	418353500	836707000	418353500	8.621543407
21	SUDI	2000000000	2500000000	500000000	8.698970004
22	TMPI	293454000	733635000	440181000	8.643631293
23	ASIA	322671432	806678580	484007148	8.684851776
24	APLI	1040000000	1300000000	260000000	8.414973348
25	ASGR	1176187500	11761875000	10585687500	10.02471907
26	AHAP	6000000	12000000	6000000	6.77815125
27	BASS	1306230800	1632788500	326557700	8.513959929
28	RMBA	1615950000	2019937500	403987500	8.606367928
29	BHIT	1284000000	1926000000	642000000	8.807535028
30	ESTI	1612166976	2015208720	403041744	8.605350029
31	FAST	401625000	4016250000	3614625000	9.558063248
32	INDF	7324800000	9156000000	1831200000	9.26273578
33	INTA	87000000	174000000	87000000	7.939519253
34	MREI	54600000	81900000	27300000	7.436162647
35	MEDC	2665961160	3332451450	666490290	8.823793827
36	MIRA	114000000	228000000	114000000	8.056904851
37	MITI	120000000	240000000	120000000	8.079181246
38	SONA	165600000	331200000	165600000	8.219060332
39	TIRT	468000000	585000000	117000000	8.068185862
40	TRST	1728000000	2160000000	432000000	8.635483747

41	TRIM	1800000000	2250000000	450000000	8.653212514
42	UNVR	686700000	858375000	171675000	8.234707056
43	UNTR	1159200000	1449000000	289800000	8.462098381
44	BBCA	2914546140	5829092280	2914546140	9.464570935
45	RMBA	3591000000	5386500000	1795500000	9.254185409
46	CPIN	857669175	1286503763	428834587.5	8.632289806
47	HMSP	3712000000	18560000000	14848000000	10.17166796
48	SDPC	7967416692	39837083460	31869666768	10.50337752
49	RALS	700000000	1400000000	700000000	8.84509804
50	SRSN	1980000000	2475000000	495000000	8.694605199
51	STTP	1048000000	2096000000	1048000000	9.020361283
52	SUBA	720000000	1440000000	720000000	8.857332496
53	SMPL	8640000000	17280000000	8640000000	9.936513742
54	SIMM	3340000000	6680000000	3340000000	9.523746467
55	TBLA	1025301000	1281626250	256325250	8.40879139
56	TURI	5468227000	10936454000	5468227000	9.737846535
57	ULTJ	530588000	1857058000	1326470000	9.122697432
58	ACAP	643200000	3216000000	2572800000	9.410406027
59	VOKS	63000000	126000000	63000000	7.799340549
60	JAKA	2340000000	23400000000	21060000000	10.32345837
61	ASDM	96000000	192000000	96000000	7.982271233
62	FMII	1280000000	6400000000	5120000000	9.709269961
63	HEXA	84000000	168000000	84000000	7.924279286
64	MRAT	321000000	1284000000	963000000	8.983626287
65	PANS	160000000	320000000	160000000	8.204119983
66	PBRX	307200000	1536000000	1228800000	9.089481203
67	PNIN	1186757411	2373514822	1186757411	9.074361952
68	CFIN	463606040	927212080	463606040	8.666149085
69	SMSM	1038935040	5194675200	4155740160	9.618648385
70	UNVR	6867000000	68670000000	61803000000	10.79100956
71	POOL	25000000	50000000	25000000	7.397940009
72	EPMT	1824000000	9120000000	7296000000	9.863084825
73	KLBF	965019600	1930039200	965019600	8.984536134
74	DNKS	893025000	1786050000	893025000	8.950863617
75	EKAD	178886400	894432000	715545600	8.854637316
76	JIHD	965019600	1930039200	965019600	8.984536134
77	INCO	745225404	2980901616	2235676212	9.349408906
78	RIGS	548217000	5482170000	4933953000	9.693195008
79	RALS	5600000000	28000000000	22400000000	10.35024802
80	DAVO	4961484528	24807422640	19845938112	10.29767163
81	INDOSAT	1035500000	5177500000	4142000000	10.21927009

Appendix 5. Trading Volume Calculation

No	Emiten Code	TV-Pre	TV-Post	Diff TV
1	BCIC	0.06065	0.34824	0.287589
2	BGIN	0.00447	0.001003	-0.00347
3	NISP	0.012506	0.00377	-0.00874
4	BBLD	0.034778	0.120833	0.086056
5	BHIT	0.019393	0.005689	-0.0137
6	BUDI	0.002298	0.00894	0.006641
7	DNKS	0.065256	0.034913	-0.03034
8	DSUC	0.024233	0.267311	0.243078
9	EKAD	0.010733	0.004472	-0.00626
10	EPMT	3.658947	0.366382	-3.29257
11	SHID	0.008578	0.014752	0.006173
12	IGAR	0.00817	0.226238	0.218067
13	KLBF	0.007141	0.317	0.309859
14	KKGI	0.231933	0.026978	-0.20496
15	LTLS	0.107949	0.299526	0.191577
16	MTDL	0.015978	0.687746	0.671767
17	SDPC	0	0	0
18	PNBN	0.090426	0.106329	0.015903
19	SUBA	0.005778	0.033333	0.027556
20	SSTM	0.039393	0.027991	-0.0114
21	SUDI	0	0.01844	0.01844
22	TMPI	4.845257	0.555044	-4.29021
23	ASIA	0.306287	0.039235	-0.26705
24	APLI	0.213529	2.983038	2.76951
25	ASGR	0.011979	0.16017	0.148191
26	AHAP	0.006667	0	-0.00667
27	BASS	0.054447	0.414524	0.360077
28	RMBA	0.001442	0.158673	0.157231
29	BHIT	0.627469	0.525343	-0.10213
30	ESTI	0.004671	0.016847	0.012176
31	FAST	0.005204	4.73E-06	-0.0052
32	INDF	0.018123	0.547207	0.529084
33	INTA	0.007931	0.009138	0.001207
34	MREI	0.027473	6.460195	6.432723
35	MEDC	0.00548	0.031778	0.026298
36	MIRA	0.115702	2.834649	2.718947
37	MITI	2.65725	0.206125	-2.45113
38	SONA	0.043357	0.039312	-0.00405
39	TIRT	0.001303	4.090496	4.089192
40	TRST	0.224248	0.136917	-0.08733

41	TRIM	0.012461	0.30232	0.289859
42	UNVR	0.000102	0.003134	0.003032
43	UNTR	0.024344	0.202112	0.177767
44	BBCA	0.025493	0.069462	0.043969
45	RMBA	0.12995	0.248789	0.118839
46	CPIN	0.004792	0.003008	-0.00178
47	HMSP	0.03107	0.042284	0.011214
48	SDPC	2.13E-05	0	-2.1E-05
49	RALS	0.1427	0.02285	-0.11985
50	SRSN	0.196929	0.480901	0.283972
51	STTP	0.000611	0.000988	0.000377
52	SUBA	0.223694	0.028535	-0.19516
53	SMPL	0.003486	0.038767	0.035281
54	SIMM	0.001542	0.029214	0.027672
55	TBLA	0.000644	0.001217	0.000573
56	TURI	0.011583	0.023675	0.012092
57	ULTJ	0.178444	0.244037	0.065593
58	ACAP	5.821906	0.038573	-5.78333
59	VOKS	0.025079	0.030635	0.005556
60	JAKA	8.97E-05	0.087071	0.086982
61	ASDM	0.017708	0.23276	0.215052
62	FMII	0.002586	0.015061	0.012475
63	HEXA	0.08881	0.008869	-0.07994
64	MRAT	0.001495	0.002796	0.001301
65	PANS	0.00425	0.015031	0.010781
66	PBRX	3.26E-05	0.000651	0.000618
67	PNIN	0.466498	0.28443	-0.18207
68	CFIN	0.433752	0.590135	0.156383
69	SMSM	0.009712	0.026104	0.016392
70	UNVR	0.002566	0.009901	0.007335
71	POOL	0	0	0
72	EPMT	0.191848	0.121217	-0.07063
73	KLBF	0.554383	0.759658	0.205276
74	DNKS	0.252837	0.062383	-0.19045
75	EKAD	0.064846	0.000738	-0.06411
76	JJHD	0.71841	0.236467	-0.48194
77	INCO	0.039371	0.02878	-0.01059
78	RIGS	0.001131	0.000212	-0.00092
79	RALS	0.022689	0.005271	-0.01742
80	DAVO	0.001338	0.000577	-0.00076
81	ISAT	0.048288	0.047279	-0.00101

INDONESIA

Appendix 6. Bid-Ask Spread Calculation

No	Emiten Code	Bid-Ask Spread-Pre	Bid-Ask Spread-Post	Diff Bid-Ask Spread
1	BCIC	0	0.4	0.4
2	BGIN	0.159074879	0.11047619	-0.048598688
3	NISP	1.221601831	0.05171717	-1.169884659
4	BBLD	0.274266229	0.09458677	-0.179679457
5	BHIT	0.03288297	0.06157796	0.02869499
6	BUDI	1.223087193	0.0603938	-1.162693392
7	DNKS	0.801895735	0.03082332	-0.771072416
8	DSUC	1.20661157	0.03515522	-1.17145635
9	EKAD	0.639189189	0.56940558	-0.069783613
10	EPMT	0.808519316	0.01539031	-0.793129009
11	SHID	0.024242424	0.43714565	0.412903226
12	IGAR	1.225916064	0.08	-1.145916064
13	KLBF	0.806667638	0.00326751	-0.803400128
14	KKGI	0.038570618	0.01905842	-0.019512195
15	LTLS	0.013618556	0.02657317	0.012954614
16	MTDL	1.2	0.03135531	-1.168644689
17	SDPC	2	2	0
18	PNBN	1.2	0.01410455	-1.185895453
19	SUBA	0.206060606	0.0214931	-0.18456751
20	SSTM	0.029878106	0.05007161	0.020193505
21	SUDI	2	0.03691172	-1.963088278
22	TMPI	0.015367824	0.04022748	0.024859652
23	ASIA	0.045126677	0.05294525	0.007818576
24	APLI	0.002299595	0.0040404	0.001740809
25	ASGR	0.009693888	0.0262581	0.016564208
26	AHAP	2	1.77777778	-0.222222222
27	BASS	0.00631392	0.00158103	-0.004732892
28	RMBA	0.005840513	-0.00025518	-0.006095696
29	BHIT	0.011548833	0.02337363	0.011824802
30	ESTI	0.029412096	0.06	0.030587904
31	FAST	0	0	0
32	INDF	0.002637778	0.00750414	0.004866358
33	INTA	0.020279741	0.01783063	-0.002449107
34	MREI	0.05723436	-0.00164609	-0.058880451
35	MEDC	0.015903351	0.04289905	0.026995703
36	MIRA	0.035867938	0.0119596	-0.023908339
37	MITI	0.021630134	0.01067426	-0.010955877
38	SONA	0.029878106	0.11902439	0.089146284
39	TIRT	0.031168831	0.0152903	-0.015878532
40	TRST	0.015276214	0.07293066	0.057654449

41	TRIM	0.007839225	0.02025316	0.012413939
42	UNVR	0.034684583	0.00789436	-0.026790219
43	UNTR	0.013266125	0.01051112	-0.002755005
44	BBCA	-0.014728305	-0.02755984	-0.012831538
45	RMBA	-0.028332313	-0.0295153	-0.001182987
46	CPIN	-0.029520018	-0.06979362	-0.040273603
47	HMSP	0.004180085	0.0067698	0.002589715
48	SDPC	0.477419355	1.01014284	0.532723489
49	RALS	0.011009329	0.01106422	5.48929E-05
50	SRSN	0.018335754	0.03519966	0.01686391
51	STTP	-0.445795265	-0.08976587	0.356029395
52	SUBA	0.010542743	0.03088418	0.020341441
53	SMPL	0.003053435	0.01274876	0.009695322
54	SIMM	0.01218316	0.01051541	-0.00166775
55	TBLA	0.031357928	0.08422939	0.052871462
56	TURI	0.020535688	0.00917314	-0.011362545
57	ULTJ	-0.020285328	-0.02519316	-0.004907835
58	ACAP	0.27337274	0.05578602	-0.217586723
59	VOKS	0.066075194	0.06319066	-0.002884532
60	JAKA	-1.597385621	0.13542959	1.732815212
61	ASDM	0.122943223	0.05808463	-0.064858597
62	FMIJ	0.02421538	0.03376018	0.009544796
63	HEXA	0.051748709	0.05683633	0.005087626
64	MRAT	0.089980459	0.09078174	0.000801279
65	PANS	0.077464775	0.06895279	-0.008511982
66	PBRX	1.290679908	1.22857143	-0.06210848
67	PNIN	0.017734335	0.02489122	0.007156883
68	CFIN	0.024459394	0.03317607	0.008716676
69	SMSM	0.13084279	0.01495647	-0.115886316
70	UNVR	0.005452932	0.00620295	0.000750014
71	POOL	0	0	0
72	EPMT	0.014803682	0.01301058	-0.001793098
73	KLBF	0.024822403	0.05596192	0.03113952
74	DNKS	0.024822403	0.05596192	0.03113952
75	EKAD	0.044909628	0.09566649	0.050756865
76	JIHD	0.041916568	0.03826972	-0.00364685
77	INCO	0.004612326	0.00695084	0.002338518
78	RIGS	0.031372142	0.05286146	0.02148932
79	RALS	0.005750783	0.02109545	0.015344666
80	DAVO	0.080405152	0.0290899	-0.051315252
81	INDOSAT	0.003344602	0.00637108	0.003026475

Appendix 7. Volatility Calculation

No	Emiten Code	VOL-Pre	VOL- Post	Diff VOL
1	BCIC	0.001388778	0	-0.001388778
2	BGIN	0.009622515	0.007256526	-0.002365989
3	NISP	8.33136E-05	0.000661703	0.000578389
4	BBLD	0.018841729	0.008676498	-0.010165231
5	BHIT	0.000842366	0.001191633	0.000349266
6	BUDI	0.009451682	0.005432583	-0.004019099
7	DNKS	0.000452865	0.00205824	0.001605375
8	DSUC	0	0.007586191	0.007586191
9	EKAD	0	0.013850637	0.013850637
10	EPMT	0.002125054	0.00331149	0.001186437
11	SHID	0.004284867	0.064436474	0.060151607
12	IGAR	0.005330733	0.021828825	0.016498092
13	KLBF	0.00013115	0.004144401	0.00401325
14	KKGI	0.001423183	0.000453533	-0.000969651
15	LTLS	0.000284389	0.00044678	0.000162391
16	MTDL	0.000944567	0.000660115	-0.000284452
17	SDPC	0	0	0
18	PNBN	0.000475898	0.001480117	0.001004219
19	SUBA	0.004081796	0.023971878	0.019890082
20	SSTM	0.000304949	0.001110535	0.000805586
21	SUDI	0	0.000570332	0.000570332
22	TMPI	0.000344392	0.049927001	0.049582608
23	ASIA	0.002370605	0.000692479	-0.001678126
24	APLI	0.006984327	0.00676769	-0.000216636
25	ASGR	0.000223891	0.14984075	0.149616859
26	AHAP	0.002612441	0	-0.002612441
27	BASS	0.003272086	0.000559213	-0.002712873
28	RMBA	0.000542257	0.00034503	-0.000197227
29	BHIT	0.012173204	0.000430249	-0.011742954
30	ESTI	0.00473758	0.000682888	-0.004054692
31	FAST	0	0.162	0.162
32	INDF	0.000413913	0.119705634	0.119291722
33	INTA	0.000189113	0.000217622	2.85084E-05
34	MREI	0.010339298	0.024389966	0.014050668
35	MEDC	0.001658269	0.00044572	-0.001212549
36	MIRA	0.001770952	0.046233335	0.044462384
37	MITI	0.002528845	0.000849653	-0.001679192
38	SONA	0.000962254	0.040859263	0.039897009
39	TIRT	0.002469086	0.019652843	0.017183756
40	TRST	0.000859279	0.00178319	0.000923911

41	TRIM	0.00047521	0.000320582	-0.000154628
42	UNVR	0.000298694	6.35462E-06	-0.00029234
43	UNTR	0.00043421	0.00073442	0.00030021
44	BBCA	4.32768E-05	0.001685495	0.001642218
45	RMBA	0.001018734	0.001071126	5.23921E-05
46	CPIN	0	0.000453533	0.000453533
47	HMSF	0.001038922	0.127492655	0.126453733
48	SDPC	0.000208117	0.128	0.127791883
49	RALS	0.00035416	0.121027379	0.12067322
50	SRSN	0.002176374	0.004593352	0.002416978
51	STTP	0.001028718	0.002414172	0.001385453
52	SUBA	0.004023282	0.000617383	-0.003405899
53	SMPL	0.000406833	0.001198422	0.000791589
54	SIMM	0.000121607	0.000581533	0.000459926
55	TBLA	0.004466151	0.00257043	-0.001895721
56	TURI	0.000973092	0.001848736	0.000875644
57	ULTJ	0.000335426	0.001931583	0.001596157
58	ACAP	3.6523E-05	0.138198635	0.138162112
59	VOKS	0.00332246	0.050627507	0.047305047
60	JAKA	3.37325E-05	0.165790772	0.16575704
61	ASDM	0.006419572	0.053579521	0.047159949
62	FMII	0.000419783	0.135932351	0.135512568
63	HEXA	0.004876128	0.042522358	0.03764623
64	MRAT	0.000601692	0.112762891	0.112161199
65	PANS	0.000537613	0.044266309	0.043728696
66	PBRX	0.21378125	0.125050103	-0.088731147
67	PNIN	0.001030206	0.043272042	0.042241836
68	CFIN	0.000419783	0.054686672	0.054266889
69	SMSM	4.2008E-05	0.137784559	0.137742551
70	UNVR	5.83017E-05	0.160193225	0.160134924
71	POOL	0	0.05	0.05
72	EPMT	0.003057018	0.132061987	0.12900497
73	KLBF	0.000410821	0.060524156	0.060113336
74	DNKS	0.000369327	0.048319448	0.047950122
75	EKAD	0.000967459	0.131580247	0.130612788
76	JJHD	0.001268166	0.04516292	0.043894754
77	INCO	0.000319535	0.108054945	0.10773541
78	RIGS	0.002732333	0.00608283	0.003350497
79	RALS	0.00035416	0.121027379	0.12067322
80	DAVO	0.000166174	0.122380165	0.122213991
81	INDOSAT	7.17828E-05	0.140327811	0.140256028