

# THE ANALYSIS IMPACT OF STOCK SPLIT AND REVERSE STOCK SPLIT ON STOCK RETURN AND VOLUME THE CASE OF JAKARTA STOCK EXCHANGE

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*The research examines the impact of stock split and reverse stock split on stock return and trading volume on Jakarta Stock Exchange between 2001-2005. We analyze abnormal returns and volume during windows period around the split and relate stocks returns to profitability, leverage and volume..*

*We find that there is a significant abnormal return on the date of split on the fifth day before split. On the reverse stock split, there is a significant abnormal return between third days before to first day after split. The results reveal that reverse stock split have more effect to the stock return than stock split. There is a significant volume difference between the days before and after the stock split or reverse stock split. Trading volume and return on asset have significant influence on market adjusted return but debt to equity ratio is not significant.*

*Key word: market return, trading volume, stock split, reverse stock split  
Field Research: FINANCE*

For the past five years, there has been numbers of *corporate actions* affecting stock price that has had happened in Jakarta Stock Exchange (JSX). The conduct of stock split or reverse stock split may merely be cosmetic and is done only when the company wishes to increase or decrease its stock price. But often at times, during days before or after stock split or reverse stock split, there are irregular phenomenon found related to abnormal returns, liquidity, and volatility.

Theoretically, the corporate action is neutral to value. Investors would obtain a given amount of stock certificates based on the split proportion, and the stock's market price would also increase or decrease proportionally to the split factor. Alas, stock split and reverse stock split could send out an effect or signal affecting investor's perception.

For stock split, the underlying perception is that companies conducting stock split would surely have an increasing future earnings or that the company

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would give out an amount of cash dividend in the future. For this matter, stock split would push the stock price up, so that during days near the announcement, abnormal returns are often found. Besides that, there is also a significant difference between the stock trading volume before and after the split.

As the converse of stock split, reverse stock split has empirically been known to give a negative effect on stock price, especially during days near its announcement. Investors often perceived reverse stock split as a signal that the company does not have enough confidence to believe that its stock price would be able to increase solely because of its own venture. As a result, abnormal returns found near the announcement date often are negative. As it is with stock split, on the day after the execution of reverse stock split, there is also a significant volume change compared to the day before.

This articles is organized as follows, Section I describes literature review, Section II explains methodology, Section III contains findings and Section IV concludes.

## **I. Literature Review**

Stocks split divide stock by the smaller nominal value. By stock split, every stock holder will get additional stocks without paying to the issuer company. On the contrary, reverse stock split combine some stocks become to the one that have a larger nominal value. Before the action taken, the company must declare the stock split planning to the stock holder that called announcement date. After the execution date the stocks, the stock is traded with the new price.

Some researches find, stock split will increase the stock price around the announcement date. Company conduct the stock split when the stock price increase but in the other hand, reverse stock split conduct when the stock price decreasing.

Stocks splits have information contain, because the activities give the investor signaling effect to the market. Stock split increases the investor perception about the future earning, and reverse stock split on the other hand. As a corporate action, split will influence the stock price and finally have impact to the stock return.

Johnson (1966) finds increasing stock price after stock split. He compares the stock price 7.5 months before split and 4.5 months after split. Grinblatt, Masulis and Titman (1984) find the abnormal return 3 days after stock split announcement. For the long observation, Fama, Fisher, Jensen and Roll (1969) find stocks returns give 30% abnormal return two years after stock splits.

For the further analysis, some researches observed the variables that influence the stock return. Tjandra (2001) reveals, that PBV have significant effect to the abnormal stock return around the stock split. But, Asquith, Healy and Palepu (1989) find change in EPS doesn't have effect to abnormal return. In brief, table 1 and 2 below give summarize of the previous researches conducted in Indonesia (JSX) and other countries.

**Table 1** Previous Studies Regarding *Stock Split* and *Reverse Stock Split*

No.	Author	Year	Events Studied								
			<i>stock split</i>	<i>reverse split</i>	<i>abnormal returns</i>	$\Delta$ <i>earnings to abnormal return</i>	<i>Liquidity</i>	$\Delta$ <i>cash dividend to abnormal ret</i>	<i>volatility</i>	<i>industry market index to abnormal ret.</i>	<i>combination investment performance index to abnormal return</i>
1	Asquith, Healy, Palepu	1989	V	-	V	V	-	V	-	-	-
		Conclusion		positive and significant	Positive (significant for periods of 5 years before to after its announcement)	-	Not significant	-	-	-	
2	Copeland	1979	V	-	-	-	V	-	-	-	
		Conclusion		-	-	Decrease ( <i>stock split</i> )	-	-	-	-	
4	Fama, Fisher, Jensen, Roll	1969	V	-	□	-	-	-	-	-	
		Conclusion		positive and significant	-	-	-	-	-	positive and significant	
5	Grinblatt, Masulis, Titman	1984	V	-	□	-	-	-	-	-	
		Conclusion		positive and significant	-	-	-	-	-	-	
6	Han, K. C.	1995	-	V	V	-	V	-	-	-	
		Conclusion		negative and significant	-	Increase ( <i>reverse split</i> )	-	-	-	-	
7	Hausman, West, Largay (replikasi sebagian penelitian Johnson)	1971	V	-	V	V	-	-	-	-	
		Conclusion		positive and significant	positive and significant	-	-	-	positive and significant	-	
8	Johnson	1966	V	-	V	V	-	V	-	V	
		Conclusion		positive and significant	positive and significant	-	Not significant	-	positive and significant	-	
9	Lakonishok, Lev	1987	V	-	-	V	-	V	-	□	
		Conclusion		-	positive and significant (period of 5 yrs before to 1 year after the announcement)	-	positive and significant	-	-	-	
10	Lamoureux, Poon	1987	V	V	V	-	V	-	-	-	
		Conclusion		significant ( <i>split +, reverse -</i> )	-	Decrease ( <i>stock split</i> ) and increase ( <i>reverse split</i> )	-	-	-	-	
		Conclusion		negative and significant	-	-	-	-	-	-	

**Table 1****Studies Stock Split in Indonesia**

No.	Author	Year	Aggregate Liquidity	Company's Individual Liquidity	Variables affecting <i>Abnormal Returns on Stock Splits</i>			
					$\Delta$ EPS	In Total Asset (size)	PBV ( <i>price-to-book ratio</i> )	DER ( <i>debt to equity ratio</i> )
1	Najmudin	2002	V	-	-	-	-	-
		Conclusion	Increase (significant), for stocks having a high institutional ownership before <i>stock split</i>	-	-	-	-	-
			Decrease (significant), for stocks having a low institutional ownership before <i>stock split</i>	-	-	-	-	-
2	Nuryadin	2004	V	V	-	-	-	-
		Conclusion	No significant changes	Varied between companies	-	-	-	-
3	Tjandra	2001	-	-	V	V	V	V
		Conclusion	-	-	Not significant	Not significant	Significant	Significant

It is confirmed that for studies conducted overseas, there are abnormal stock returns near the days of stock split and reverse stock split. But then when those abnormal returns are being related to several variables, only few of the variables are showing a statistically significant result. For researches conducted in Indonesia, empirically, it is proven that there are changes in liquidity. But for abnormal returns to relate with EPS, Total Asset, Price to Book Value, and Debt to Equity Ratio; none are significant.

## II. Methodology

The research is done to replicate the previous studies conducted by several researchers as mentioned above by using data of companies listed in JSX from the year 2001 to 2002. Specifically, the research has the objective to:

1. Identify whether there is a significant positive / negative abnormal return as a result of the announcement of stock split and reverse stock split.
2. Identify whether there is a significant difference between stock trading volume before and after stock split or reverse stock split.
3. Identify the significant influence of ROA, DER, and Trading Volume Change to market adjusted return.

The research regarding abnormal returns has the time span of days near the announcement date and not the execution date, to take into account the effect of split announcement to abnormal returns. This research is similar with those

done by Lamoureux and Poon (1987), Grinblatt, Masulis, and Titman (1984), Hausman, West, Largay (1971), and Nuryadin (2004). But in this research, we join the analysis stock split and reverse.

One of the reasons to conduct split is to reach a higher stock liquidity. Liquidity becomes important to ensure that the stock is not hibernating and hence is easier to be traded by investors. In determining liquidity, there are several approaches that can be done. The research use trading volume as a proxy of liquidity that had also been done by Copeland (1979), Lamoureux and Poon (1987), and Han (1995).

*Stock return* is generally influenced by several variables. Various researches have also tried to capture these variables, one of them is profitability. This variable has several proxies in the form of ratios. One of the ratios is *Return on Assets* (ROA), which has often been used and found to be significant in Indonesia (Kennedy (2003)) in affecting return generally. ROA is profitability a measurement that comprehends the ability of the company to generate net income from the total asset owned (Keown, Martin, Petty, Scott (2002)). ROA is predicted to be able to significantly influence the *market adjusted return* during the days of the stock split or reverse stock split announcement.

Besides that, leverage as a proxy of risk can influence the stock return. This research use debt to equity ratio (DER) as a leverage measurement. DER is directly linked to the risk of having to invest to a company (Schroeder, Clark, Cathey (2001)). The higher DER, then the market perception on the risk of investing would also increase. But this measure of risk is of course relative to the investor's preference and the industrial characteristic of the company. On the research conducted by Tjandra (2001), the variable of *debt to total equity* (DER) gave a significant influence to stock returns conducting split in the year 1999-2000. DER is anticipated to be able to significantly influence *market adjusted return* on the day of the announcement of *stock split* or *reverse stock split*.

The trading volume (*adjusted*) on the day of split would have a different movement than the day before. The study of Brazilian market, found that return is dependent to trading volume. Based on the previous study, the movement of trading volume on the day of the split is anticipated to be able to also significantly influence market adjusted return during the announcement date of stock split or reverse stock split.

The samples of this research are companies listed in Jakarta Stock Exchange and conducted *stock split* or *reverse stock split* during January 2001 to December 2005. The determination of this period is done by considering the fact that the periods before had only few of stock split and reverse stock split done. We would also like to avoid the year 1998 whereas the political condition and security in that period is unstable and is affecting the individual stock price, hence it is less accurate to predict the expected return.

The sampling is purposive sampling, using the following criteria:

1. Companies which stocks were rarely traded during the research period are excluded from the sample. The stock had no activity for at least one week in a row (five days of trading day) hence degrading the accuracy of the research.
2. Sample does not include companies having other corporate actions during the period of stock split or reverse stock split, hence would affect the stock price.
3. To investigate the significance of ROA, DER, and trading volume to return; data of ROA and DER of each sample has to be available for at least nine quarters in a row, starting from five quarters before to four quarters after the announcement of stock split or reverse stock split.
4. To investigate the significance of ROA, DER, and trading volume to market adjusted return; sample had to have done the IPO for at least three years before the split, to be able to study the data for the years after the IPO.
5. Sample having done split for more than one time, had to have time span of at least one year to the following split, this is done to analyze the impact of one split action in a one year period.

The sample selection by considering such criteria leaves out final samples of the stock split research of 24 actions which includes two companies conducting it twice. While for the research of reverse stock split leaves out 14 samples which includes also two companies having done it twice. Table 3 summarize the calculation on the numbers of samples explained above:

**Table 3**  
**Calculation of the Amount of Samples: *Stock Split* Split Reverse**

Companies conducting <i>Stock Split</i>	57	21
Companies conducting other <i>Corporate Actions</i>	(11)	(1)
Companies with low liquidity	(19)	(5)
Companies having an incomplete data	(1)	(0)
Number of samples used for the research of abnormal returns	<b>24*</b>	<b>15</b>
* 2 (two) companies conduct the stock split 2 (two) times		

### **Abnormal Returns**

Abnormal returns would be tested at dates near the announcement of stock split or reverse stock split for companies conducting stock split or reverse stock split during the period of 2001 to 2005. The research uses an index-model. Lamoreux and Poon (1987) and Asquith, Healy and Palepu (1989) use the model to compute abnormal return..

The length of estimation period is 100 trading days, with  $t_{-100}$  as the starting point of estimation. The day of the announcement is named as period zero. The period of event is defined at 10 days before until 5 days after the announcement of stock split or reverse stock split. Hence,  $t_{-10}$  is the ending point of estimation and the starting point to calculate abnormal return; while  $t_{+5}$  is the ending point to calculate abnormal return.

Period of estimation is best to include an adequate lengthy period so that the normal return of the model could be estimated with a better accuracy. The length of the period should also take into account the availability of daily stock price data. The time span of  $t_{-100}$  to  $t_{-10}$  is considered to be adequate enough. The period of event is started from  $t_{-10}$  to anticipate the information leakage before the announcement date. The period of event would also include the day of the announcement and 5 (five) days after.

We estimate the expected return based on the index-model during the period of estimation:

$$AR_{it} = R_{it} - (\alpha + \beta R_{Mt}) \quad (1)$$

where:

- $\alpha$  = average rate of return of stock at the period whereas the market return equals zero
- $\beta$  = stock sensitivity parameter to market return
- $R_{Mt}$  = market rate of return on the period of event

The test of significance of abnormal return is done with the hypothesis of:

$$H_0 : AR_{it} = 0$$

$$H_1 : AR_{it} \neq 0$$

## Trading Volume

The indicator used to compare the liquidity before and after the execution of stock split or reverse stock split is the trading volume (adjusted). In comparing the samples of trading volume, test of equality would be used. Both of these procedures would be conducted twice, once to sample companies having done stock split and once to sample companies having done reverse stock split..

The test of equality of mean in the data processing is basically using t test. For each stock compared, there would be drawn a time span of 60 days before the execution ( $t_{-60}$ ) and 60 days after the execution ( $t_{+60}$ ), with  $t_0$  as the execution day of stock split or reverse stock split.

The day of execution ( $t_0$ ) is not included in the data compared to avoid the overreaction effect on the day of split execution. The research conducted by Nuryadin (2004) and Lamoureux and Poon (1987) had done a similar methodology to study the volume change of individual companies on the day of the split.

*Hypotheses: there is a change in trading volume between ones before and ones after the execution of stock split and reverse stock split*

Later on, to observe the movement of aggregate volume on the day of the split, a paired t-test would be used since the data is paired and dependent. The tested hypotheses are whether the mean of the volume change equals to zero or not. The indicator of liquidity compared is the adjusted volume on the day before ( $t_{-1}$ ) and at the announcement ( $t_0$ ). Hypotheses constructed for stock split, where  $\mu_2$  as the volume after the split and  $\mu_1$  as the volume before the split, is as follows:

$$H_1: \mu_2 - \mu_1 < 0 \text{ for stock split}$$

$$H_1: \mu_2 - \mu_1 > 0 \text{ for reverse stock split}$$

## Test of Abnormal Returns Using the Regression Model

The stock regression model to analyze the significance of dependent variable to market adjusted return is along these lines:

$$R_t = \alpha_1 + \alpha_2 D + \beta_1 ROA_t + \beta_2 DER_t + \beta_3 Vol \quad (2)$$

where: R = market adjusted return on the announcement date of stock split or reverse stock split on year t  
D = dummy variable, qualitative independent variable  
= 1 if executes stock split  
= 0 if executes reverse stock split  
ROA<sub>t</sub> = company's return on asset on year t  
DER<sub>t</sub> = company's debt to equity ratio on year t  
Vol = volume change on the execution date of stock split or reverse stock split

The analysis would be carried on with the test of interaction factors (Agung (1999)) to the responding variable of market adjusted return. The interaction factor built in the model is the interaction between the ROA variable with the dummy variable, the DER variable with the dummy variable, and the volume variable with the dummy variable. Based on the model (3) below, then is generated two models differentiating stock split from reverse stock split:

$$R_t = \alpha_1 + \alpha_2 D + \beta_1 ROA_t + \beta_2 DER_t + \beta_3 Vol + \beta_4 ROA_t * D + \beta_5 DER_t * D + \beta_6 Vol * D \quad (3)$$

It is decided that for companies conducting stock split, the dummy variable would be given a value of 1, hence the model would be as follows:

$$R_t = \alpha_1 + \alpha_2 D + \beta_1 ROA_{it} + \beta_2 DER_t + \beta_3 Vol + \beta_4 ROA_t * D + \beta_5 DER_t * D + \beta_6 Vol * D \\ = (\alpha_1 + \alpha_2) + (\beta_1 + \beta_4) ROA_t + (\beta_2 + \beta_5) DER_t + (\beta_3 + \beta_6) Vol \quad (4)$$

### III. Finding Abnormal Returns

The index-model approach is stated in Bodie, Kane Marcus (2005) and is used on the previous studies by Lamoureux and Poon (1987); and Asquith, Healy and Palepu (1989). For sample companies conducting stock split, a positive and significant abnormal return is found at the date of the announcement and at the fifth day before that, with the  $\alpha$  of 10%. This means that the hypotheses stating  $H_0 : AR_{it} = 0$  can not be accepted. Most of the research had done before have a similar result, few of which are research conducted by Lamoureux and Poon (1987), Grinblatt, Masulis, and Titman (1984), Hausman, West, Largay (1971), and Nuryadin (2004).

For samples of companies conducting reverse stock split, right at the day of the announcement a negative and significant abnormal return is present at  $\alpha = 5\%$ , besides that at the third day before the announcement ( $\alpha = 5\%$ ), second day before ( $\alpha = 10\%$ ), and a day after ( $\alpha = 5\%$ ), a negative and significant abnormal return is also found. This findings are also in line with the previous research done by Woolridge and Chambers (1983), Lamoureux and Poon (1987) and Han (1995). An exception happens at a day before the announcement whereas the abnormal return is found to be positive and significant at the confidence level of 90%. This

may happen due to the market reactions regarding reverse stock split are sometimes inconsistent and are affected by the signaling effect and optimal price range. This may also happen since the companies within the sample are highly varied.

<b>Tabel 4</b>										
<b>Abnormal Return near the Announcement Date</b>										
<b>Stock Split</b>					<b>Reverse Stock Split</b>					
<b>Day</b>	<b>AR</b>	<b>t-stat</b>	<b>p-value</b>	<b>Sig</b>	<b>Day</b>	<b>AR</b>	<b>t-stat</b>	<b>p-value</b>	<b>Sig</b>	
H-10	-0.0009	-0.182	0.857	-	H-10	-0.034	-1.621	0.127	-	
H-9	-0.0028	-0.453	0.655	-	H-9	0.034	1.238	0.236	-	
H-8	0.0022	0.290	0.774	-	H-8	0.013	0.273	0.789	-	
H-7	-0.0047	-0.693	0.496	-	H-7	0.000	-0.011	0.991	-	
H-6	0.0040	0.511	0.614	-	H-6	0.027	1.757	0.101	-	
H-5	0.0128	1.841	0.079	*	H-5	-0.047	-0.663	0.518	-	
H-4	-0.0042	-0.741	0.466	-	H-4	0.002	0.050	0.961	-	
H-3	0.0017	0.273	0.788	-	H-3	-0.039	-2.375	0.032	**	
H-2	-0.0050	-1.281	0.213	-	H-2	-0.046	-1.950	0.071	*	
H-1	0.0006	0.082	0.936	-	H-1	0.077	2.034	0.061	*	
H-0	0.0157	2.073	0.050	*	H-0	-0.087	-2.438	0.029	**	
H+1	0.0051	0.646	0.525	-	H+1	-0.021	-2.560	0.023	**	
H+2	-0.0207	-0.970	0.342	-	H+2	0.012	0.463	0.651	-	
H+3	-0.0024	-0.361	0.721	-	H+3	0.612	0.990	0.339	-	
H+4	-0.0217	-0.979	0.338	-	H+4	-1.195	-1.195	0.252	-	
H+5	-0.0337	-1.037	0.311	-	H+5	0.786	0.786	0.445	-	
* Significant 10%										
** Significant 5%										

## Trading Volume

The number of companies conducting stock split and had an increase in volume is as much as 10 (ten) companies, while ones had a decrease in volume is as much as 14 (fourteen) companies. From those 10 (ten) companies had an increase in volume, 3 (three) of them had a non significant increase, 4 (four) are significant at  $\alpha = 1\%$ , and the rest is significant at  $\alpha = 5\%$ . From those 14 (fourteen) companies having had a decrease in trading volume, 8 (eight) of them had a non significant decrease, 5 (five) of them are significant at  $\alpha = 1\%$ , and the rest is significant at  $\alpha = 5\%$ . These are shown on table 5.

In summary, there are 41.67% of samples having had an increase in volume after stock split, 70% of which are statistically significant. While there are as much as 58.33% of samples had a decrease in volume after the conduct of stock split, 42.86% of which are statistically significant. The result is in line with the research conducted by Lamoureux and Poon (1987); and Nuryadin (2004) for companies conducting stock split at JSX during the year 2000 to 2004, whereas 32.29% samples had a significant increase in volume and 38.71% samples had a significant decrease.

The number of companies conducting reverse stock split and had a decrease in volume is as much as 9 (nine) companies, while ones had a decrease in volume is 6 (six) companies. From those 9 (nine) companies experiencing an increase, 2 (two) of which had a non significant increase, 6 (six) are significant at  $\alpha$

= 1%, and the rest are significant at  $\alpha = 5\%$ . From those 6 (six) companies experiencing a decrease in volume, 2 (two) of which had a non significant decrease, 2 (two) are significant at  $\alpha = 1\%$ , and the rest are significant at  $\alpha = 5\%$ . These findings are shown on the table.

<b>Tabel 5 Comparison of trading volume before and after Stock Split</b>				<b>Comparison of trading volume before and after Reverse Stock Split</b>			
Emiten	t-stat	Volume	Sig	Emiten	t-stat	Volume	Sig
BBCA.1	7.141	Increase	**	APIC	2.114	Increase	*
BBCA.2	-4.280	Decrease	**	BBNI	-4.320	Decrease	**
CFIN	4.022	Increase	**	BDMN.1	-.2.560	Decrease	*
CPIN	2.435	Increase	*	BDMN.2	2.667	Increase	**
DAVO	-3.530	Decrease	**	BNBR	5.751	Increase	**
DNKS	-1.660	Decrease	ns	BNGA	-0.150	Decrease	ns
EPMT	-1.500	Decrease	ns	BNII	-0.660	Decrease	ns
FMII	2.554	Increase	*	BNLI	0.178	Increase	ns
HMSP	-0.7200	Decrease	ns	IIKP	1.407	Increase	ns
INCO	0.439	Increase	ns	LPBN	3.631	Increase	**
ISAT	2.867	Increase	**	LPLI	-2.020	Decrease	*
JIHD	-1.390	Decrease	ns	SIPD	2.795	Increase	**
KLBF	-2.140	Decrease	*	SUBA	-3.040	Decrease	**
PNBN	-0.290	Decrease	ns	UNIT 1	2.834	Increase	**
PNIN	1.511	Increase	ns	UNIT 2	2.902	Increase	**
RALS 1	-0.250	Decrease	ns				
RALS 2	-2.980	Decrease	**				
SIMM	-0.440	Decrease	ns				
SMPL	-3.710	Decrease	**				
TLKM	0.268	Increase	ns				
TURI	-5.360	Decrease	**				
ULTJ	-1.430	Decrease	ns				
UNSP	4.836	Increase	**				
UNVR	2.081	Increase	*				
* significant 10%				** significant 5%			
ns not significant							

In summary, 60% of samples had an increase in volume after conducting the *stock split*, 77.78% of which are statistically significant. While there are 40% of samples had a decrease in volume after reverse stock split, and 66.67% of which are statistically significant. It was also shown on the previous research conducted by Lamoureux and Poon (1987) with a varied result of 30.61% samples with a significant increase in volume and 4.08% had a significant decrease in volume.

The shift in daily trading volume on ex-day of stock split had a significant decrease at  $\alpha = 5\%$  (t-stat of -2.158). It means that the hypothesis stating that there is a change of volume between the days before and after the stock split can be accepted. The finding is in line with the previous research by Lamoureux and Poon (1987) and Copeland (1979).

The shift of daily trading volume on ex-day of reverse stock split (t-stat of 0.226) had a non significant increase. The *P-value* shown is 0.825, which is higher than 0.05. This is not in line with the previous research conducted by Lamoureux and Poon (1987). This may happen due to the mixing of companies in the samples having had a various characteristic.

**Tabel 6**  
**Comparison Trading Volume**

	<b>Difference mean between H – H1</b>		
	t	Df	Sg
Stock Split	-2.158	23	0.042
Reverse Stock Split	0.226	14	0.825

**Regression**

Those three models are statistically significant, but variables that are consistently significant throughout the three models are dummy variable and volume. While other variables are not consistently significant throughout the three models stated. Those models also had no indication of multicollinearity and heteroscedasticity.

**Table 7**  
**Result of Regression  $R_t = \alpha_1 + \alpha_2 D + \beta_1 ROA_t + \beta_2 DER_t + \beta_3 Vol$**

Period		$\alpha_1$	$\alpha_2$	$\beta_1$	$\beta_2$	$\beta_3$
<b>t<sub>2</sub></b>		-0.071145*	0.072449*	0.292925	-2.63E-08	-0.00000773 <sup>+</sup>
Adjusted R square	25.00%					
Prob (F-Stat)	0.009646					
<b>t<sub>1</sub></b>		-0.053188*	-0.078612*	-0.112456	-3.03E-08	-0.0000084*
Adjusted R square	22.93%					
Prob (F-Stat)	0.015915					
<b>t<sub>0</sub></b>		-0.032497	0.070848+	-0.141525	-0.00000231*	-0.00000914*
Adjusted R square	30.77%					
Prob (F-Stat)	0.003027					

\* significant at  $\alpha = 5\%$

+ significant at  $\alpha = 10\%$

Table 8 is the result of the regression of model (III-4) generated from the output of Eviews 4. The table is divided by periods of research, starting from two year before split (t<sub>2</sub>), 1 year before split (t<sub>1</sub>), and at the year of the announcement (t<sub>0</sub>).

**Table 8**  
**Result of Regression**

$$R_t = \alpha_1 + \alpha_2 D + \beta_1 ROA_{it} + \beta_2 DER_{it} + \beta_3 Vol + \beta_4 ROA_{it} * D + \beta_5 DER_{it} * D + \beta_6 Vol * D$$

Period		$\alpha_1$	$\alpha_2$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$
<b>t<sub>2</sub></b>		-0.016157	0.032702	1.977829*	-0.00023*	-0.0000101*	-2.05176*	0.000223*	0.01462
Adj. R <sup>2</sup>	52.61%								
Prob (F-Stat)	0.000092								
<b>t<sub>1</sub></b>		-0.02283	0.036798	-0.094607	-0.000168	-0.00000963*	0.065633	0.000163	0.014835
Adj. R <sup>2</sup>	20.10%								
Prob (F-Stat)	0.059167								
<b>T<sub>0</sub></b>		-0.023605	0.051257	0.599286	-0.000286*	-0.00000985*	-0.705641	0.000206	0.000246
Adj. R <sup>2</sup>	25.51%								
Prob (F-Stat)	0.025103								

\* significant at  $\alpha = 5\%$

These three models are statistically significant and had no indication of multicollinearity and heteroscedasticity. Based on the result, the only significant variable for those three models is the volume. This is in line with the research conducted by De Medeiros and Doornik (2005). Models using interaction variables explain the difference between the influences of stock split and reverse stock split by the value of its intercept and the value of slope. But the regression shows a significance result only for the model of t-2.

## V. Conclusions

There is a positive and significant abnormal return on the fifth day before the announcement of stock split and at the day of the announcement as the impact of the announcement of stock split. For reverse stock split, there is a negative and significant abnormal return on the third and second day before the announcement of reverse stock split. A negative and significant abnormal return also happened on the day of the announcement until a day after.

There is a significant volume difference between the day before and after the stock split or reverse stock split. But the direction of change (increase or decrease) varied between companies.

In aggregate, there is a significant trading volume difference between a day before stock split and the day of execution, with a negative direction of change (a decrease in volume). There is no significant trading volume difference between a day before reverse stock split and the day of execution. The significance occurs only when the samples are sorted based on industry (banking only).

In the regression model without interaction factor, the variable consistently affecting market adjusted return is volume. ROA is significant at  $t_0$ . Generally, the model is significant and had no indication of multicollinearity or heteroscedasticity.

In the regression model with interaction variables, volume consistently affecting market adjusted return. ROA is only significant at  $t_2$ . DER is significant at the model of  $t_0$ . Interaction variable is significant only at the model of  $t_2$ . The model is generally significant and had no indication of multicollinearity or heteroscedasticity.

On the research of abnormal returns, the approach of index-model and ARIMA is used. ARIMA approach on the research has several points could be applied on the next research, such as prolonging the estimation period to more than 90 days. By doing so, the stock modeling could be more representative.

In this research, the regression model used three independent variables of ROA, DER and Vol. The next research could identify other variables that may have explained the model better. The period of research could also be prolonged to include more samples so that the research could have a thorough population of the event.

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<b>Tabel 4 Abnormal Return near the Announcement Date</b>				
<b>Reverse Stock Split</b>				
<b>Day</b>	<b>AR</b>	<b>t-stat</b>	<b>p-value</b>	<b>Sig</b>
H-10	-0.034	-1.621	0.127	-
H-9	0.034	1.238	0.236	-
H-8	0.013	0.273	0.789	-
H-7	0.000	-0.011	0.991	-
H-6	0.027	1.757	0.101	-
H-5	-0.047	-0.663	0.518	-
H-4	0.002	0.050	0.961	-
H-3	-0.039	-2.375	0.032	**
H-2	-0.046	-1.950	0.071	*
H-1	0.077	2.034	0.061	*
H-0	-0.087	-2.438	0.029	**
H+1	-0.021	-2.560	0.023	**
H+2	0.012	0.463	0.651	-
H+3	0.612	0.990	0.339	-
H+4	-1.195	-1.195	0.252	-
H+5	0.786	0.786	0.445	-
* Significant 10%    ** Significant 5%				