

## EXTREME TRADING VOLUME AND EXPECTED RETURN (Study to Companies Listed in Indonesia Stock Exchange 2008-2012 Period)

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### ABSTRACT

*Trading volume has been known as a reliable measurement for stock liquidity. Nevertheless, there are different opinions regarding trading volume and expected return in stocks investment. Wang and Cheng (2004) found that there are differences in expected return between stocks which experience extreme trading volume in where extreme high volume stocks associated with lower expected return than extreme low volume stocks. In contrary, Gervais et. al (2001) found that extreme high volume stocks associated with higher expected return than extreme low volume stocks. This research aims to determine the difference in expected returns between various portfolios sorted based on extreme trading volume. This research conducted on 80 stocks listed in Indonesia Stock Exchange 2008 to 2012 period. This research is conducted following previous researches such as Amihud and Mendelson (1986), Brennan et. al. (1998), Datar et. al. (1998), Gervais et. al. (2001), Wang and Cheng (2004), and Baker and Stein (2004). This research also interacted the extreme trading volume with security characteristics such as past performance, firm size, and Book-to-Market or BM value.*

*The portfolio formation method in this research is referring to return portfolio approach by Gervais et. al. (2001). Using this method, portfolios formed and determined its average expected returns. After that T-test will be performed to determine the difference in expected returns between each contradicting portfolios like extreme high and extreme low volume, extreme high-winner stocks and extreme low-loser stocks, extreme high-large stocks and extreme low-small stocks, and extreme high-glamour stocks and extreme low-value stocks.*

*The results shows that even though the results of all hypotheses testing mathematically support the hypotheses, but the statistically, as calculated by T-Test, there's no notable different impact of extreme trading volume and security characteristics in Indonesia Stock Exchange. It means that this portfolio strategy does not have significant effect in Indonesia Stock Exchange. This research also found a unique phenomenon in extreme trading volume and expected return study in Indonesia Stock Exchange. Despite the sorting methods, all portfolios showed the same behavior; the average returns chart showed appreciation during 0 week to 1 week of evaluation period but dropped later over the period of 3 weeks before reversal occurred. The phenomena indicated that the market players realized that there are speculations in trading activity which affect the trading volume.*

*Keywords: extreme trading volume, past performance, firm size, BM value.*

### INTRODUCTION

Investment could be defined as a commitment to forego current consumption to increase consumption purposes in the future, said Jones (2004). It means the people who invest rather gave up their satisfaction to consume something in the current time to achieve bigger compensation later on. The compensation in investment called return. Investment return divided into two components, which is yield and capital gain. Investor expects to get return as high as possible. However, another

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aspect that brought together with return in investment concept is the risk. Jones (2004) defines risk as the uncertainty that expected outcomes may not be fulfilled. In general, risk is a probability that there will be a difference between the expected return to the realized one. Investor faced risks when they put their money into investment, so they demands proper return to compensate the risk that has been taken. Basically, investment main purpose is to gain maximal return at reasonable risk.

One of the risks faced by investor is liquidity risk. Liquidity risk is a risk an investor takes when they buys an investment that might not easily sold again. It caused by there are not enough trading activity to that investment, for example, stocks. So when an investor wants to sell his stocks, there is no buyer who wants to buy the stocks. It may cause loss to the investor, especially when he needs funds to buy other potential stocks at the moment. The lack of trading volume also discourage investor from gaining capital gain from trading activity because there are not enough buyer and seller to actually stimulate the price.

Seeing the importance of the liquidity, especially on short term investment like stock, in where investors are aim for capital gain, liquidity measurement is needed to understand more about its relation to expected return. This research aim to determine the difference in expected returns between various portfolios based on trading volume. The subject to this research is companies listed in Indonesia Stock Exchange during 2008 -2012 period. This allows for a direct comparison with previous findings and researches which basically have similarities with this research.

Wang and Cheng (2004) found that this extreme volume–return relation significantly co-varies with security characteristics like past stock performance, firm size, and book-to-market values. In particular, stocks with extreme volumes are related to poorer performance if they are past winners, large firms, and glamour stocks than if they are past losers, small firms, and value stocks, respectively. Brennan et. al. (1998), Datar et. al. (1998) and Chordia et. al. (2001) use dollar volume and share turnover as proxies for liquidity and find negative relation between stock returns and those liquidity measures. These founding are consistent with Amihud and Mendelson (1986) theory called liquidity premium hypothesis.

Baker and Stein (2004), on the other hand, stated that liquidity is also a sentiment indicator of irrational investors to short-sales constraint. If a large volume of winner stocks indicate that irrational investors dominate the market, it made trading volume is a good proxy for liquidity. Irrational investor will pushed stock prices over its fundamental value and usually will dropped back later, resulting in in a negative volume-return relation. Lee and Swaminathan (2000) study shows that past trading volume provides an important link between momentum and strategies. This study tries to determine the stock's characteristic (glamour/value) impact to its subsequent returns. This study also proved that trading volume or changes in volume reflect investor statement fluctuation. The investor irrationality-induced volume-return relation is referred as behavioral hypothesis.

However, there are researches which deliver different result. It said that trading volume has positive relation to stock returns. Gervais et. al. (2001) shows that stock that experiencing high volumes tend to be associated with high returns, and vice versa, which is labeled as the high-volume return premium. Gervais et. al. argue that their findings are consistent with visibility argument by Miller (1977). Miller stated that any shock that attracts the attention of the investor should result in a subsequent price appreciation.

Built on those reason, this research tries to determine the difference in expected returns between various portfolios sorted based on extreme trading volume. This research also adds some variables which play important role to explain the dynamics between extreme trading volume and expected return. The variables will helps in understanding on how investor behavior and sentiment changes to certain condition. The variables used to compare investor sentiments to volume-return relationship are past performance, firm size, and book-to-market.

## RESEARCH MODEL

### Extreme Trading Volume and Expected Return

Trading volume is the number of stocks traded by issuers at stock market through broker and trader. Trading volume is an important matter to investor because stock trading volume portrays the conditions of stocks traded at capital market. Trading volume reflects the power of

supply and demand which also reflects the manifestation of investor behavior. Ang (1997) stated that the increasing trading volume implies to the increased market power and vice versa. Active stocks usually have high trading volume and so the subsequent return is also high, as said by Chordia and Swaminathan (2000). Returns of portfolios containing high trading volume stocks is on lead compared to portfolios with low trading volume stocks.

Based on Brennan et. al. (1998), Datar et. al. (1998) and Chordia et. al. (2001) use dollar volume and share turnover as proxies for liquidity and find negative relation between stock returns and those liquidity measures. These findings are consistent with Amihud and Mendelson (1986) theory called liquidity premium hypothesis. Baker and Stein (2004) stated that liquidity is also a sentiment indicator of irrational investors to short-sales constraint. If a large volume of winner stocks indicate that irrational investors dominate the market, it made trading volume is a good proxy for liquidity. Irrational investor will pushed stock prices over its fundamental value and usually will dropped back later, resulting in in a negative volume-return relation. Therefore, there are negative relation between volume and returns. Lee and Swaminathan (2000) study shows that past trading volume provides an important link between momentum and strategies. Along with finding that past trading volume also can be used to predict both magnitude and persistence of price momentum. The investor irrationality-induced volume-return relation is referred as behavioral hypothesis.

Moreover, in the different market, when there are stocks that strongly attracted the market, whether because its extreme high or low volume, as long as it attracts the attention of the market, there are high possibility of these stocks to gain price appreciation, as said by Miller (1977). Consistent with this argument, Gervais et. al. (2001) also found that there are positive relationship between extreme trading volume and stock returns during their research at NYSE.

*H1: There is a difference in expected returns between extreme high volume and extreme low volume portfolios in Indonesia Stock Exchange during 2008-2012 period.*

### **Extreme Trading Volume and Past Performance**

Past performance has been known to have an effect towards trading volume. Glaser and Weber (2005) said, high return makes people overconfident and as a consequence, this investor trade more subsequently. Barber and Odean (2002) analyzed a data set from a U.S discount broker and found that high past portfolio returns induce individual investors to trade more subsequently.

In the other hand, similarly, Statman, Thorley, and Vorkink (2004) find that market wide trading volume in the United States is related to past market returns. Griffin, Nardari, and Stulz (2005) analyze the dynamic relation market-wide trading activity and returns in 46 countries and show that many stock markets exhibit a strong relation between trading and past returns. Baker and Stein (2004) said that stocks that experience extreme volumes are associated with lower expected returns for past winners than for past losers if trading volume is a sentiment indicator.

*H2: There is a difference in expected returns between extreme high volume-winner stocks and extreme low volume-loser stocks portfolios in Indonesia Stock Exchange during 2008-2012 period.*

### **Extreme Trading Volume and Firm Size**

Horne and Wachowichz (1997) describe firm size as total assets of a company and can be seen in the left side of the balance sheet. Theoretically, smaller company attains higher return than bigger company. Small companies withstand economic changes better than bigger company because they focus on increasing the profit. In the other side, bigger company has bigger certainty compared to smaller company in order to reduce future prospect uncertainty. It means smaller company has bigger risk compared to bigger company. On the other hand, as said by Elton and Gruber (1995), bigger companies faced less risk compared to bigger companies. Bigger companies have better access to capital market. In other words, there are negative relationship between firm size and business risk. Investor seeks safety in their investment, and because firm size reflect companies' ability to dodge risk, most investor usually will feel safer to invest in big companies stocks over smaller ones.

Bamber (1986, 1987) found a negative relation between firm size and trading volume. Based on the firm size, investor reaction to extreme trading volume and expected return might be different. This security characteristic will be used to see how firm size influence investor sentiment towards volume-return relationship. Analyses on how the extreme volume-return relationship varies with firm size also help to distinguish between the liquidity premium and the behavioral hypotheses. Large stocks usually associated to be more liquid compared to small stocks, therefore we expect that the extreme volume-return relation is more obvious for small stocks than for large stocks if trading volume proxies for liquidity.

*H3: There is a difference in expected returns between extreme high volume-large stocks and extreme low-small stocks portfolios in Indonesia Stock Exchange during 2008-2012 period.*

### **Extreme Trading Volume and BM Value**

Book to market value is stock's book value divided by its market value. Book value is calculated from the company's balance sheet, while market value is based on the price of the stock. A ratio above 1 indicates a potentially undervalued stock (value stocks), while a ratio below 1 indicates a potentially overvalued stock (glamour stocks).

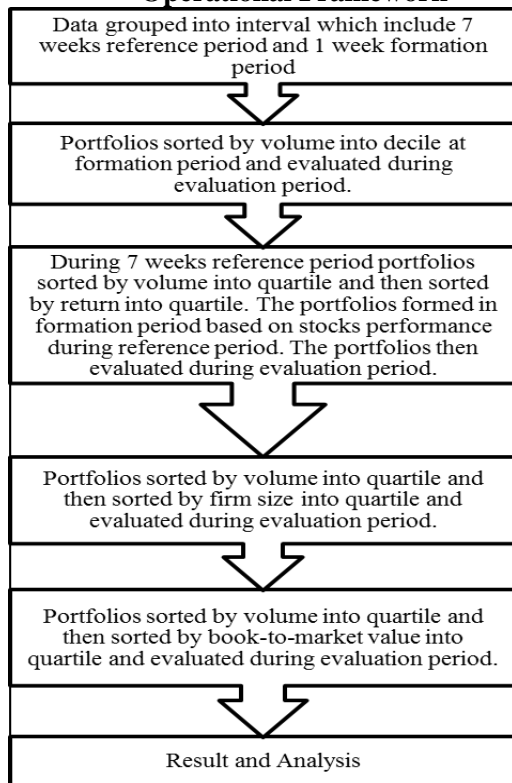
Fitriatri (2002) stated why book-to-market value deemed as a suitable investment analysis; Book value gives measurement that more stable compared to market price. Investors who use estimated discounted cash flow, book value can be used as benchmark to market price. Accounting standard is usually the same for every company. Book-to-market can be compared to each company in the same sector to determine whether a company is undervalued or overvalued. Company with negative earning couldn't be measured by price-earnings ratio, hence can be measured by book-to-market ratio. There are fewer companies with negative book value than negative earnings.

Wang and Cheng (2004) said that a security's BM is shown to be one of the important characteristic associated with the variation in the cross section on expected returns. Fama and French (1993, 1996) state that BM is a proxy for security's loadings on rational risk factors, whereas Lakonishok et. al. (1994) argues that BM effects represent the premium for relative distress, which is caused by investor irrationality. If BM effects caused by investor irrationality and trading volume also proxies the sentiment of irrational investors, this research would expect that the BM effect is associated with trading volume. In particular, low-BM stocks that experience extremely high volumes are associated with lower returns than those experiencing extremely low volumes.

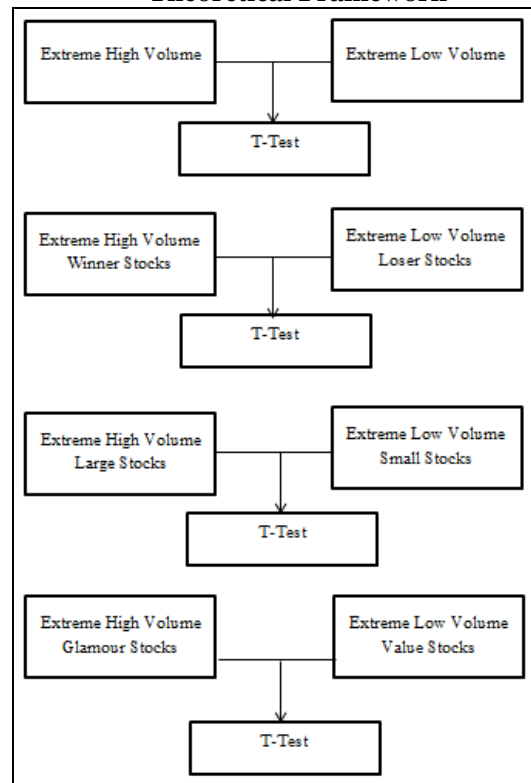
*H4: There is a difference in expected returns between extreme high volume-glamour stocks and extreme low volume-value stocks portfolios in Indonesia Stock Exchange during 2008-2012 period.*

Based on literature review above, the operational and theoretical frameworks which explain this research are designated as follows:

**Figure 1**  
**Operational Framework**



**Figure 2**  
**Theoretical Framework**



**Research Methods**

**Sampling**

Sampling method used in this research are non-random sampling and purposive sampling. Purposive sampling is used to determine sample selection, which means non-probability sample which custom designed to exact criteria depends on the research. Criteria used are as follows:

- a. Stocks traded at Indonesia Stock Exchange at least 6 months prior to the formation period or 1 January 2008.
- b. Stocks that are banks, investment trust, real estate, and investment companies are excluded.
- c. The firm must have available information on trading volume and relevant accounting data during research period.
- d. Samples must be actively traded during research period.

After purposive sampling has done, this research has 80 stocks as samples which meet the requirements above.

**Stock Formation**

Stock formation period in this research is one week. Portfolios are formed using a reference return portfolio approach similar to that of Gervais et. al. (2001). The weekly sample is constructed as follows. The time interval between January 2008 and December 2012 is divided into 29 non-overlapping intervals. Each trading interval consists of a 7-week reference period and a 1-week formation period with 1 week lag between reference period to formation period. The lag is allowed to avoid possible bid-ask spread and lead-lag effects. In this research, due to the time constraint, there will be only 26 intervals calculated.



After portfolio formed, it will be evaluated during evaluation period over 1, 3, 5, 10, and 20 weeks. There will be 1 week lag between formation period and the evaluation period to avoid bid-ask spread lag.

**T-Test**

T-test performed in this research used to compare returns of each evaluation periods are paired T-Test with 2-tails, 25 degree of freedom, and 95% confidence level. Thus the following requirements are as follows:

- If p value > 0.05, then it means average return of both samples is identic or there is no difference at all.
- If p value < 0.05, then it means average return of both samples is not identic or they are higher or lower.

There will be 4 part of the T-Test which will be performed on each hypotheses testing. Generally, there will be T-test to differentiate returns for high volume portfolios at formation period and evaluation period, T-test to differentiate returns for low volume portfolios at formation period and evaluation period, T-test to differentiate returns between high and low volume portfolios at formation period and evaluation period, and the last one is T-test to differentiate returns of high and low volume portfolios at each evaluation period.

**Hypotheses Testing**

For H1 testing the stock in each interval will be sorted based on its trading volume and divided into decile based on the volume. A stock is classified as extremely high volume if its volume is on top 10% of the formation period and classified as extremely low volume if its volume is in the bottom 10% of the formation period.

For H2 testing the stock divided into quartile based on its volume. A stock is classified as extremely high-volume if its volume is in the top 25% of the reference period and classified as extremely low-volume if its volume is in the bottom 25% of the reference period. Then both class sorted again by its return and each divided into quartile. A stock is classified as winner if its return is among the top 25% of the high-volume class and classified as loser if its return is among the bottom 25% of the low-volume class. So there are extreme high volume-winner stocks and extreme low volume-loser stocks in a reference period. A final portfolio will formed at the formation period at the end of reference periods which consist of stocks which remain at the top 25% and bottom 25% during prior 7 weeks reference periods.

For H3 testing first all stocks sorted into high and low volume groups based on the volume. A stock is classified as extreme high volume if its volume is in the top 25% and classified as extreme low volume if its volume is in the bottom 25%. In each size sorted group, stocks are further split into the large or small stocks by sorting it based on its market capitalization as the measurement of size. A stock is classified as large stock if its size is among the top 25% and classified as small stock if its size is among the bottom 25%.

For H4 testing first sort all stocks into high and low volume groups based on the volume. A stock is classified as extreme high volume stock if its volume is in the top 25% and classified as extreme low volume stock if its volume is in the bottom 25% so each class has 20 stocks. In each size sorted group, stocks are further split into the glamour or value stocks by sorting it based on its BM value. A stock is classified as glamour stock if its BM value is among the bottom 25% of the high volume group and classified as value stock if its size is among the top 25% of the low volume group.

To determine average returns to the long position of high-volume stocks ( $\hat{R}^h$ ) and low-volume stocks ( $\hat{R}^l$ ) over all trading intervals, this research uses formulas as follows:

$$\hat{R}^h = \frac{\sum_{i=1}^k \sum_{j=1}^{N_i^h} R_{ij}^h}{\sum_{i=1}^k N_i^h}$$

and

$$\hat{R}^l = \frac{\sum_{i=1}^k \sum_{j=1}^{N_i^l} R_{ij}^l}{\sum_{i=1}^k N_i^l}$$

Whereas:

$\hat{R}^h$  = return to high-volume stock

$\hat{R}^l$  = return to low-volume stock

$i$  = trading interval

$N_i^h$  = number of high-volume stock

$N_i^l$  = number of low-volume stock

$k$  = number of trading intervals

Each paired portfolios then evaluated at a period of 1, 3, 5, 10, and 20 week after the formation period for all trading interval. The choice of various holding periods provides a robustness test for this research's results.

After all average returns in each trading interval calculated, T-test will be performed to determine the difference between extreme high volume and extreme low volume portfolios through the evaluation periods. H1 will be accepted if p value is  $< 0.050$ .

## RESULT AND ANALYSIS

Sampling method used in this research is purposive sampling method. The sample is very specific which means the samples reflect the unit of economic activity and not represent general population. Object of research in this study are 80 stocks listed in Indonesia Stock Exchange (IDX).

There are several notable event happened on IDX during research period. One of them is the financial crisis happened in United States which affect all capital market around the world. The crisis impacted to decline of share price indexes for all of the world's major stock markets including the IDX Composite Index. Upon sharp decline on Indonesia Composite Index at October 8<sup>th</sup>, IDX took swift and effective action by halting all trading activity at the Stock Exchange from the 8<sup>th</sup> until the 10<sup>th</sup> of October 2008. Throughout the suspension of trading activities, the IDX updated investors and other parties regarding the satate of market. As a result the IDX was able to secure the market, providing investors with sufficient time to make rational secisions. The year of 2009 was a challenging year in where financial communities including IDX trying to gain public's trust and confidence. As a result, Jakarta Composite Index (JCI) constantly grew, especially since the second quartile of 2009, along with the increase in market capitalization even though the average daily transaction value in the first quartile of 2009 was under IDR 2 trillion.

IDX market indicators at the end of 2010 showed significant improvement, particularly in term of the Jakarta Composite Index (JCI) growth, which more than doubled in the last five years. At 2011, IDX strived to be one of best performing stock exchanges in 2011 among major exchanges in Asia Pacific region, along with Stock Exchanges in the Philippines and India. With these achievements, IDX is confidence to continue its role to deliver its commitment as both a center of excellence and center of competence, and also as a point of reference for best business practices in Indonesia. Through business development strategies, IDX always strives to enhance its competitiveness and deliver the best value to the shareholders and to the Indonesian community as the stakeholders of IDX.

### Descriptive Statistics

Descriptive statistics aims to provide a picture of description of the statistical data to be viewed from a minimum, maximum, median, and mean from each variable. Descriptive statistics conducted on samples of this study as follows:

**Table 1**  
**Sample Statistics**

Year	Number of Stocks	Market Capitalization (IDR billions)	Return (%)	BM Value
2008	80	15,957.25	-0.0142	0.925
2009	80	7,808.31	0.0145	1.960
2010	80	16,116.55	0.0100	1.000
2011	80	22,493.53	0.0014	1.288
2012	80	23,120.28	0.0031	0.778

Source: IDX Statistic 2012

The samples of this research consist of 80 stocks which remain the same throughout the research period. The average monthly return between 2008 and 2012 are -0.0142% and 0.0031%, respectively, with the highest return was obtained at 2009 with 0.0145%. The BM value showed 0.925, 1.960, 1.000, 1.288, and 0.778 over 2008 to 2012 period, respectively.

**Table 2**  
**Price and Volume Statistics**

Year	Weekly Sample	
	High Volume	Low Volume
Mean Price (IDR)	3,712.82	4,165.67
Medium Price (IDR)	3,275.00	240.00
Mean Volume (000)	29,707,995.69	8,745,500.00
Medium Volume (000)	594,075.37	350,000.00

Source: IDX Statistics (compiled)

The result shows that there's no discernible difference in the level of price between the two groups. There are huge difference between the medium price of the high volume and the mean volume because the stock sorted by volume. Average volume between high- and low-volume stocks is quite apparent as the average high-volume stocks are 3.5 times larger than low-volume stocks. The average numbers of shares traded are 29.7 million and 8.7 million for high- and low-volume stocks, respectively.

**Table 3**  
**Number of Stocks with High and Low Volume**

	Weekly Sample			
	Small Stocks		Large Stocks	
	High Volume	Low Volume	High Volume	Low Volume
Mean	21,107,496	218,832	34,992,564	1,565,719
Median	4,307,500	122,000	13,441,500	1,330,000
Maximum	2,223,420,500	863,000	2,569,928,500	4,321,500
Minimum	863,000	0	4,323,500	0

Source: IDX Statistics (compiled)

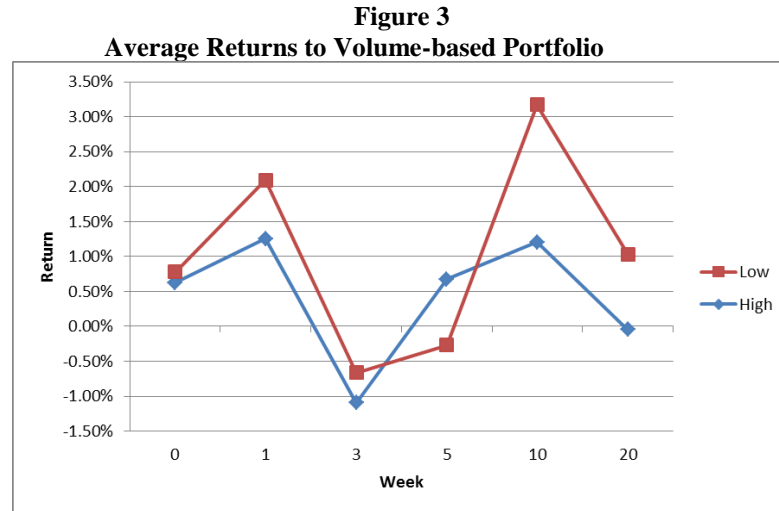
Table 3 above showed that the average number of stocks with high or low volume over the sample period. For the small stocks, high volume stocks obtain mean at 21,107,496 stocks, median at 4,307,500 stocks, maximum value at 2,223,420,500 stocks and minimum value at 863,000 stocks. Meanwhile, the low volume stocks obtain mean at 218,832 stocks, median at 122,000 stocks, maximum value at 863,000 stocks, and minimum value at 0 stocks. Fr the large stocks, high volume stocks obtain mean at 34.992,564 stocks, median at 13,441,500 stocks, maximum value at 2,569,928,500 stocks, and minimum value at 4,323,500 stocks. Meanwhile the low volume stocks obtain mean at 1,565,719 stocks, median at 1,330,000 stocks, maximum value at 4,321,500 stocks, and minimum value at 0 stocks.



Data Analysis

The Difference in Expected Returns between Extreme High Volume and Extreme Low Volume Portfolios

Figure 3 below plots the relations between extreme volumes and subsequent returns over a period of 1, 3, 5, 10, and 20 weeks. It shows that even went through the same ups and downs, low volume portfolio did slightly better than high volume portfolio marked by its higher returns over the evaluation period.



Source: IDX Statistic (computed)

**Table 4**  
**Average Cumulative Return to The Volume-Based Portfolios**

	Evaluation Period					
	1	3	5	10	20	
High Volume	0.013 (0.723)	-0.011 (0.375)	0.007 (0.981)	0.012 (0.748)	0.000 (0.773)	
Low Volume	0.008 (0.435)	0.004 (0.741)	-0.009 (0.224)	0.020 (0.020)	0.011 (0.368)	
H-L	0.004 (0.969)	-0.015 (0.288)	0.016 (0.553)	-0.008 (0.480)	-0.011 (0.392)	
H&L T-Test	(0.525)	(0.082)	(0.081)	(0.354)	(0.357)	

Source: IDX Statistic (computed)

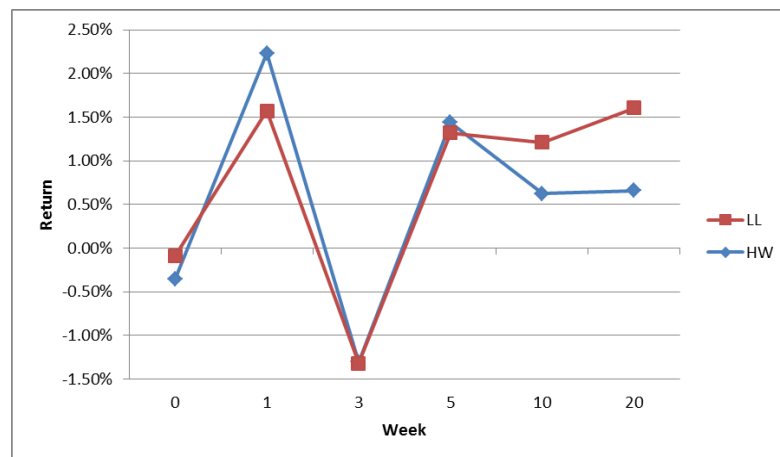
For the extreme high volume portfolios, the average return decrease from 0.013% over a period of 1 week to 0.000% over a period of 20 weeks. On the other hand extreme low volume portfolios achieve accumulative return of 0.008% over a period of 1 week and 0.011% over a period of 20 weeks. H-L denotes the difference between extreme high volume portfolios and extreme low volume portfolios. The differences are increasing over the holding periods 1 to 20 weeks which are 0.004% to 0.011%, respectively.

The numbers in parentheses are T-statistics. With the exception of 10<sup>th</sup> weeks of low volume portfolios, the majority results of the T-test are all more than 0.050 which means there's no difference in expected returns between extreme high volume portfolios and low volume portfolios.

**The Difference in Expected Returns between Extreme High Volume-Winner Stocks and Extreme Low Volume-Loser Stocks**

Figure 4 below depicts the relation between volume and past sorted portfolios over a period of 1, 3, 5, 10, and 20 weeks. Both portfolios showed the same reaction over a period of 1 week to 5 weeks, but after that extreme low volume-loser stocks portfolio showed a better performance than extreme high volume-winner stocks portfolios.

**Figure 4**  
**Average Return to Volume-Past-Sorted Portfolio**



Source: IDX Statistic (computed)

**Table 5**  
**Average Cumulative Return to The Volume-Past-Sorted Portfolios**

	Evaluation Period				
	1	3	5	10	20
High-Winner	0.022 (0.057)	-0.013 (0.483)	0.014 (0.179)	0.006 (0.336)	0.007 (0.426)
Low-Loser	-0.007 (0.456)	0.000 (0.812)	-0.001 (0.683)	0.006 (0.791)	0.009 (0.687)
HW-LL	0.029 (0.027)	-0.013 (0.548)	0.016 (0.112)	0.000 (0.657)	-0.003 (0.833)
HW&LL T-Test	(0.001)	(0.035)	(0.099)	(0.965)	(0.825)

Source: IDX Statistic (computed)

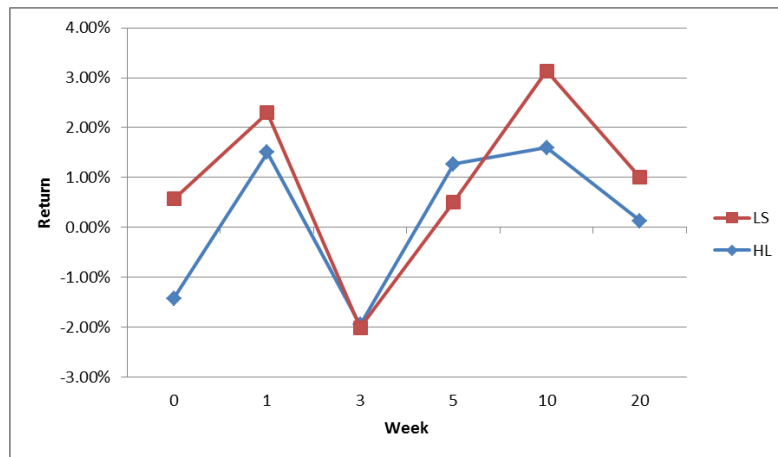
The average returns of extreme high volume-winner stocks portfolios are constantly decreasing with 0.022% over a period of 1 week to 0.007% over a period of 20 weeks. On the other hand, extreme low volume-loser stocks portfolios are achieve improvement in accumulative returns with -0.007% over a period of 1 week to 0.009% over a period of 20 weeks. HW-LL denotes the difference in mean returns between extreme high volume-winners stocks and extreme low volume-loser stocks. The differences are 0.029%, -0.013%, 0.016, 0.000, and -0.0029% over a period of 1, 3, 5, 10, and 20 week respectively. It shows that the difference between both portfolios got smaller in every evaluation period.

The numbers in parentheses are T-statistics. With the exception of 1<sup>st</sup> week of HW-LL and 1<sup>st</sup> and 5<sup>th</sup> weeks of HW&LL, the majority results of the T-test are all more than 0.050 which means there's no difference in expected returns between extreme high volume-winner stocks portfolios and extreme low volume-loser stocks portfolios.

**The Difference in Expected Returns between Extreme High Volume-Large Stocks and Extreme Low Volume-Small Stocks Portfolios**

Figure 5 depicts the returns of volume and size-sorted portfolios. Extreme low volume-small stocks portfolios in general showed a better performance compared to extreme high volume-large stocks portfolios. It proved by its position which overtook high-large portfolios 4 times out of 6 since the formation period. The highest achievement achieved by extreme low volume-small stocks portfolios is during a period of 10 weeks of the evaluation periods.

**Figure 5**  
**Average Return to Volume-Size-Sorted Portfolio**



Source: IDX Statistic (computed)

**Table 6**  
**Average Cumulative Return to the Volume-Size-based Portfolios**

	Evaluation Period				
	1	3	5	10	20
High-Large	0.015 (0.017)	-0.020 (0.718)	0.013 (0.024)	0.016 (0.038)	0.001 (0.262)
Low-Small	0.008 (0.197)	-0.001 (0.107)	-0.008 (0.017)	0.015 (0.622)	0.009 (0.406)
HL-LS	0.007 (0.004)	-0.019 (0.218)	0.020 (0.000)	0.001 (0.020)	-0.007 (0.024)
HL&LS T-Test	(0.452)	(0.019)	(0.024)	(0.939)	(0.488)

Source: IDX Statistic (computed)

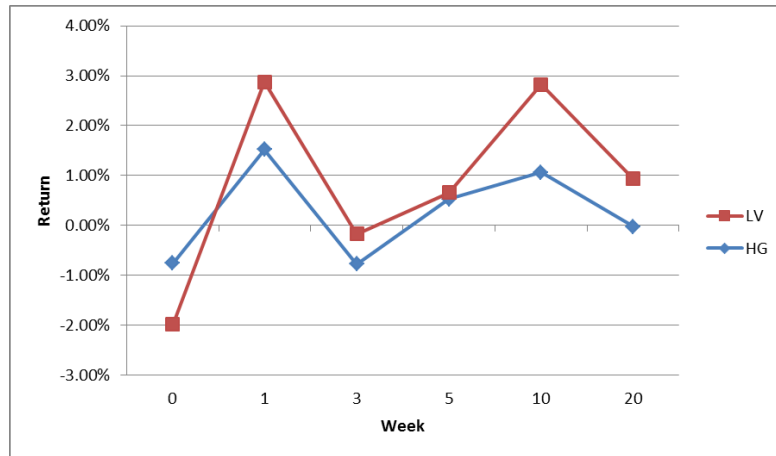
The result shows that the return of extreme high volume-large stocks tends to decrease through the evaluation period from 0.015% over a period of 1 week to 0.001% over a period of 20 weeks. On the other hand, extreme low-small stocks tend to achieve improvement through the evaluation period with 0.008% over a period of 1 week to 0.009% over a period of 20 weeks. HL-LS denote the mean returns difference between extreme high volume-large stocks and extreme low volume-small stocks. The result shows that the difference been decreasing through the formation period which means gap are getting smaller.

The numbers in parentheses are T-statistics. With exceptions of HL-LS which showed significance, the majority results of the T-test are all more than 0.050 which means that there's no difference in expected returns between extreme high volume-large stocks portfolios and extreme low volume-small stocks portfolios.

**The Difference in Expected Returns between Extreme High Volume-Glamour Stocks and Extreme Low Volume-Value Stocks Portfolios**

Figure 6 showed the returns of volume and BM value-sorted portfolios. From the graph above it clearly seen that extreme low volume-value stocks portfolios has better performance compared to extreme high volume-glamour stocks portfolios. Extreme low volume-value stocks portfolios consistently gain higher returns than extreme high volume-glamour stocks portfolios during evaluation period of 1, 3, 5, 10, and 20 despite had started lower at the formation period (0 week).

**Figure 6**  
**Average Return to Volume-Size-Sorted Portfolio**



Source: IDX Statistic (computed)

**Table 7**  
**Average Cumulative Return to the Volume-BM value-based Portfolios**

	Evaluation Period				
	1	3	5	10	20
High-Glamour	0.015 (0.163)	-0.008 (0.991)	0.005 (0.227)	0.011 (0.222)	0.000 (0.641)
Low-Value	0.014 (0.009)	0.006 (0.039)	0.001 (0.146)	0.018 (0.007)	0.010 (0.053)
HG-LV	0.002 (0.850)	-0.014 (0.177)	0.004 (0.947)	-0.007 (0.357)	-0.002 (0.716)
HG&LV T-Test	(0.888)	(0.138)	(0.627)	(0.563)	(0.330)

Source: IDX Statistic (computed)

The result shows that extreme high volume-glamour stock's returns are decreasing from 0.015% over a period of 1 week to -0.000% over a period of 20 weeks. On the other hand, extreme low volume-value stocks portfolios achieve increasing subsequent returns at 0.014%, and 0.010% over a holding period of 1 and 20 weeks, respectively. HG-LV denotes the difference in mean returns between high-volume-glamour stocks and low volume-value stocks in which are decreasing from 0.002% over a period of 1 week to -0.002% over a period of 20 weeks.

The numbers in parentheses are T-statistics. With the exception of 1<sup>st</sup>, 3<sup>rd</sup>, and 10<sup>th</sup> weeks of low volume-value stocks, the majority results of the T-test are all more than 0.050 which means there's no difference in expected returns between extreme high volume-glamour stocks portfolios and extreme low volume-value stocks portfolios.

**Interpretation and Result Discussion**

The first hypothesis testing showed that the return of high-volume portfolios constantly decreasing from 0.013% over a period of 1 week to -0.000% over a period of 20 weeks and on the other hand low-volume portfolios achieve average cumulative returns of 0.008% over period of 1

week to 0.011% over a period of 20 weeks. Even though mathematically the result showed that extreme high volume stocks tends to receive lower subsequent returns than extreme low volume portfolios, but statistically, as resulted by T-Test, there's no difference in expected returns between extreme high volume stocks and extreme low volume stocks portfolios. It caused by the amount of difference in expected returns of both portfolios are considered as too small that counted as insignificant changes. So the T-Test showed identic results to both portfolio returns.

The second hypothesis testing showed that the returns of extreme high volume-winners stocks portfolios are decreasing from 0.022% over a period of 1 week to 0.007% over a period of 20 weeks. On the other hand the returns of extreme low volume-loser stocks portfolios are increasing from -0.007% over a period of 1 week to 0.009% over a period of 20 weeks. Even though mathematically the result showed that extreme high volume-winners stocks tends to receive lower subsequent returns than extreme low volume-loser stocks portfolios, but statistically, as resulted by T-Test, there's no difference in expected returns between extreme high volume-winner stocks and extreme low volume-loser stocks portfolios. It caused by the amount of difference in expected returns of both portfolios are considered as too small that counted as insignificant changes. So the T-Test showed identic results to both portfolio returns.

The third hypothesis testing showed that the extreme high volume-large stocks portfolios experience decrease in return from 0.015% over a period of 1 week to 0.001% 20 weeks later. On the other hand, extreme low volume-small stocks portfolios showed an increase from 0.008% to 0.009% over a period of 1 and 20 weeks, respectively. Even though mathematically the result showed that extreme high volume-large stocks tends to receive lower subsequent returns than extreme low volume-small stocks portfolios, but statistically, as resulted by T-Test, there's no difference in expected returns between extreme high volume-large stocks and extreme low volume-small stocks portfolios. It caused by the amount of difference in expected returns of both portfolios are considered as too small that counted as insignificant changes. So the T-Test showed identic results to both portfolio returns.

The fourth hypothesis testing showed that that over the evaluation period, extreme high volume-glamour stocks portfolios showed a decrease in result at 0.015% over a period of 1 week to -0.000% over a period of 20 weeks. Meanwhile, extreme low volume-value stocks portfolios had increased from 0.014% over a period of 1 week to 0.010% over a period of 20 weeks. Even though mathematically the result showed that extreme high volume-glamour stocks tends to receive lower subsequent returns than extreme low volume-value stocks portfolios, but statistically, as resulted by T-Test, there's no difference in expected returns between extreme high volume-glamour stocks and extreme low volume-value stocks portfolios. It caused by the amount of difference in expected returns of both portfolios are considered as too small that counted as insignificant changes. So the T-Test showed identic results to both portfolio returns.

## **Conclusions**

The results shows that even though the results of all hypotheses testing mathematically support the hypotheses, but the statistically, as calculated by T-Test, there's no notable different impact of extreme trading volume and security characteristics in Indonesia Stock Exchange. It means that this portfolio strategy does not have significant effect in Indonesia Stock Exchange. This research also found a unique phenomenon in extreme trading volume and expected return study in Indonesia Stock Exchange. Despite the different sorting methods, all portfolios showed the same behavior; the average returns chart showed appreciation during 0 week to 1 week of evaluation period but dropped later over the period of 3 weeks before reversal occurred. The phenomenon indicated that the market players realized that there are speculations in trading activity which affect the trading volume.

Although extreme trading volume is a reliable measurement of liquidity, the results that stocks that experiencing extremely high volumes are associated with lower expected returns than those which experiencing extremely low volumes mathematically consistent with Amihud and Mendelson (1986), Wang and Cheng (2004), Brennan et. al. (1998), Datar et. al. (1998) and Chordia et. al. (2001). It it possible that an increase in stock's trading volume indicates that its liquidity is expected to improve, and thus investor command a lower return of the stock, and vice versa. As also proved in Wang and Cheng (2004), liquidity premium hypothesis doesn't seem to



fully account the results of this research as in there's no explanation why extreme volume-returns co-vary with security characteristics. A more suitable explanation was served by Baker and Stein (2004) that trading volume is also a sentiment indicator of irrational investors in Indonesia Stock Market. There are limitations of this research; First, small number of sample. The lack of numbers of samples used in this research mainly caused by the lack of data availability in where there are many stocks that doesn't document their trading data properly. The number of samples on this research is 80 stocks, relatively small compared to all listed companies in Indonesia Stock Exchange which is 459 as documented in 2012. Second, this research only includes two interactions at one time, like trading volume with past performance, trading volume with firm size, and trade volume with BM value. If more than two factors combined like a portfolio with triple- or quadruple- sorting, it might create different results. Third, the time period of the research is relatively small, which is 5 years. The results may show differences if a larger time frame is used. Fourth, no further follow up. After it found that Gervais et. al. portfolio formation doesn't seem to suitable to performed in Indonesia Stock Exchange, there's no further research to determine the best portfolio strategy to be used in Indonesia Stock Exchange like asset allocation, for example. Fifth, the coverage of this research is only in Indonesia, so the result is most likely only to fit in Indonesia and maybe will be different if applied in other country with different conditions. Further research to compare this strategy to asset allocation in portfolio strategy is needed to give new insight to Indonesia Stock Exchange characteristic.

This research suggests that extreme trading volumes are not significantly associated with expected returns. There are associations as proved mathematically but statistically there are no notable differences. This founding and Gervais et. al. (2001) suggests that the relation of extreme trading volume and expected return need not be the same for all markets. Therefore, additional evidence obtained from independent samples is beneficial for academics to better understand the relation between trading activity and asset returns, and thus asset price behavior. Our findings also imply that a trading strategy conditional on extreme volumes and/or past performance, and/or firm size, and/or BM value is not significantly profitable in Indonesia Stock Market. Therefore, this research evidence on the interaction between extreme volumes and security characteristics has implications for investors' practical trading strategies in the market.

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