

MARKET ANOMALIES ON BETA, BID ASK SPREAD, TRADING VOLUME, TRADING FREQUENCY AND STOCK RETURN

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Abstract: *The purpose of this paper is to investigate the market anomalies in the effect of beta, bid ask spread, trading volume, trading frequency to stock return. This paper is using Ordinary Least Square and Weighted Least Square. The entire independent variables have significant simultaneous effect on the dependent variable in all period. There is day of the week effect in the partial effect of beta, bid ask spread, trading volume and trading frequency to stock return. There is also monthly effect in both simultaneous and partial effect of that relation.*

JEL Classification: E44, G02, G10, G11, G12, G14

Keywords: Beta, Bid Ask Spread, Trading Volume, Trading Frequency, Stock Return, Day of the Week Effect, Monthly Effect

INTRODUCTION

Risk and return are crucial for investors in setting investment strategy in stock market. Capital Asset Pricing Model (CAPM) is a model that return only determined by a systematic risk by using beta coefficient. CAPM was first introduced by Sharpe (1964), which introduced a single index model. The others also supported CAPM like Black, Jensen and Scholes (1972) and Fama and MacBeth (1973).

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Other empirical studies didn't support the CAPM that occurred in Istanbul (Rjoub, Tursoy and Günsel, 2009), Amman (Ramadan, 2012) and Indonesia (Febrian and Herwany, 2010 and Herwany, Omar, Meera and Febrian, 2014). Furthermore, other studies found different results, where liquidity has strong effect on return. Amihud and Mendelson (1986) tested the effect between liquidity and return in the United States. They used bid ask spread and found a cross sectional negative effect between liquidity and return. Studies in the US by Amihud and Mendelson (2006) and in Karachi by Akram (2014) also found similar results, where there was significant negative effect between the bid ask spread and return. However, some studies have found significant positive effect between bid ask spread to return, which occurred in the United States (Amihud and Mendelson (1989) and Egypt (Abdeldayem and Mahmoud (2013).

The other proxy for liquidity in this research is trading volume. Several studies have found positive effect between trading volume and stock returns, like in Karachi (Attari, Rafiq and Clouds, 2012), and in India (Mahajan and Singh, 2009). The different result was found by Chordia, Subrahmanyam and Anshuman (2001) where they found negative effect between trading volume and stock returns in the United States. Besides trading volume, trading frequency can also be used as a proxy for liquidity. Researchers who found a positive effect between trading frequency and stock price volatility occurred in America (Jones, Kaul, and Lipson, 1994) and in Shanghai (Song, Tan and Wu, 2005). Besides all of the factors that have been described previously, market anomalies are also has an important role for investors in making investment decision. These market anomalies are day of the week effect and monthly effect.

The first study of day of the week effect anomaly in security markets appeared in the Journal of Business in 1931, written by Fields (1931). Fields didn't use statistical tests in his research. Many researchers interested by doing investigation in the same field of his research. French (1980) continued this research and was the first author to employ statistical methods to test the existence of the calendar effects. There're many other studies about day of the week effect anomaly, which referred to the negative Monday returns and the positive Friday returns (Berument and Kiyamaz, 2001; Haroon and Shah, 2013).

Market anomalies are also present in certain months, most of the research found the return in January was higher than other months. The first study of monthly effect was Wachtel (1942). He found January effect in his research. Since this discovery, many studies investigated this market anomaly. Other researchers that supported the existence of January effect were Choudhry (2001), Georgantopoulos and Tsamis (2011) and Guler (2013).

So far, no studies have examined more comprehensively about the day of the week effect and the monthly effect on the simultaneous effect and partial effect of beta, bid ask spread, trading volume and trading frequency to stock return in companies listed in the Indonesian Stock Exchange.

LITERATURE REVIEW

Sharpe (1964) was the first researcher that found Capital Asset Pricing Model, which introduced a single index model, namely beta. Systematic risk, as measured by beta, captures that aspect of investment risk which cannot be eliminated by diversification. Black, Jensen and Scholes (1972) formed portfolios of all the stocks of the New York Stock Exchange over the period 1931-1965, and reported a linear relationship between the average excess portfolio return and beta, and for high beta portfolios (low beta portfolios) the intercept tends to be negative (positive). Fama and MacBeth (1973) evaluated stocks traded on NYSE with similar period as that of Black, Jensen and Scholes' study. The evidence supported the CAPM after analyzing the American stock market before 1969 (January 1935-December 1968). They supported CAPM because higher returns were associated with higher betas. They found linearity between the expected return and beta of a portfolio, and the expected return being determined purely by a portfolio's beta and not by the residual variance or non-systematic risk of the portfolio.

Other empirical studies didn't support the CAPM. Rjoub, Gursoy and Gonsel (2009) tested the APT by using data from the Istanbul Stock Exchange for the period January 2001 to September 2005. The results showed that there was significant effect between unexpected inflation, interest rate, risk premium and the money supply on stock returns. Ramadan (2012) also investigated the APT on the Amman Stock Exchange for the period 2001-2011. By using Ordinary Least Squares, this study showed the presence of APT on the Amman Stock Exchange. The interest rate, money supply, risk premium and industrial productivity could explain 84% change in stock return. Febrian and Herwany (2010) investigated the ability of CAPM and APT models in explaining the excess returns of a portfolio of shares traded on the Indonesian Stock Exchange. This study used three different time periods, (1) the pre-crisis period (1992-1997), the crisis period (1997-2001) and the post-crisis period (2001-2007). They found if beta was not the only variable that can explain the excess return of a portfolio. APT model proved capable in explaining the excess return of a portfolio within the observation period, where the average excess return was found consistently negative. Herwany, Omar, Meera and Hidalgo (2014) did not find CAPM in explaining changes in portfolio yield. The period of the study was conducted from January 1996 to July 2010. The market capitalization was a variable that could explain changes in portfolio yield. APT models indicated if macroeconomic and market risk premium was significant variables that affected portfolio return against to change, but the production index was not significant. The study also found some multifactor models that significantly affected the return of the portfolio, such as the factor rating and liquidity were the benchmark in Indonesia. Trading volume and trading frequency has significant effect to the overall model testing.

Other studies found liquidity is an important factor in asset pricing and has strong effect on return. Amihud and Mendelson (1986) tested the effect between liquidity and return in the United States by using bid ask spread and found a cross sectional

negative effect between liquidity and return. They tested the effect between liquidity and return by using a measuring instrument illiquidity, bid ask spread. They used monthly data security in period 1961-1980 in the CRSP database and relative bid ask spread NYSE stock of Fitch's Stock Quotations on the NYSE. They tested the effect of cross-sectional between the average excess return, spread and relative risk (beta). The results showed that there was a positive effect between the excess return to the relative risk (beta).

Amihud and Mendelson (2006), which examined the effect of illiquidity and return using data from the NYSE-AMEX stock during the period 1960-1980. The results of this study showed a negative effect between liquidity and returns both on stocks and bonds. Akram (2014) also tested the effect of liquidity and return by using bid ask spread as a measure of liquidity. The data used was data of 10 companies listed on the Karachi Stock Exchange for the period 2005-2012. Data processing was performed by using a two-stage regression. By using the first regression, the results were not significant. However, by using the second regression, there was a significant negative effect between the bid ask spread and stock returns.

However, some studies have found significant positive effect of bid ask spread to returns. Amihud and Mendelson (1989) used beta, residual risk, company size and liquidity. They found beta and bid ask spread has significant effect to the expected return, while the residual risk and the size of the company did not have significant effect to expected return. The data used were obtained from the University of Chicago for monthly returns and Fitch's Stock Quotations NYSE for calculating bid ask spread over the period 1960-1979. Furthermore, Abdel Dayem and Mahmoud (2013) investigated 167 shares on the Egyptian Exchange (EGX) during January 2006 to December 2011. They used bid ask spread as a proxy information asymmetry, and found positive effect between bid ask spread and stock returns in the Egyptian stock market. They found a positive effect between multiple trading motives and asymmetric information. The size of the company has a positive effect on stock returns.

Trading volume can also be used as a proxy for liquidity. Attari, Rafiq and Clouds (2012) examined the effect of trading volume and stock return as well as the effect of changes in the trading volume on stock return in Pakistan. The data used was data Karachi Stock Exchange (KSE-100 Index) during the period January 2000-April 2012. By using unit root tests and GARCH models, they found a significant positive effect between volume and stock return and changes in trading volume on stock return. Similar results came from Mahajan and Singh (2009), which also examined the effect of trading volume and stock return volatility by using daily data stock Sensitive Index (Sensex) during the period October 1996-March 2006. By using GARCH models, they found a significant positive effect between trading volume and stock return volatility.

The different results were found by Chordia, Subrahmanyam and Anshuman (2001) where they found negative effect between trading volume and stock returns in the United States. They also examined the effect of liquidity to expected stock return.

They used trading volume and share turnover in measuring the liquidity. They found significant negative effect between liquidity and expected return stock for NYSE and AMEX stock during the period January 1966-December 1995. The same effect also occurred in the NASDAQ stock during the period 1984-1995. The stocks which have low trading volumes have high expected returns.

Besides trading volume, trading frequency can also be used as a proxy for liquidity. Research by Febrian and Herwany (2008) found the trading frequency was the best variable that can be used as a measure of liquidity. Jones, Kaul, and Lipson (1994) examined the effect of the trading frequency and trading size to the volatility of stock returns by using data from the NASDAQ stock during the period 1986-1991. They found the stock return volatility was influenced more strongly by the trading frequency rather than trading size. Trading frequency has significant positive effect on stock return volatility. Song, Chan and Wu (2005) examined the effect of trading size and trading frequency on stock price volatility using data from Shanghai Stock Exchange 566 shares during the period February 2001-June 2002. Similarly, Song (2005) found if trading frequency describes a more powerful influence on the effect of trading volume and share price volatility than trading size.

Besides all of the factors that have been described previously, market anomalies are also has an important role in making investment decision. Monday effect is one of the well known market anomalies in financial studies. It states that the average return on Monday is significantly negative and lower than the returns on all other weekdays (Lee, Kim and Kim, 2012). The first study of day of the week effect anomaly in security markets appeared in the *Journal of Business* in 1931, written by Fields (1931). Fields didn't use statistical tests, but many researchers interested in the same field of research. Fields (1931) examined the pattern of the Dow Jones Industrial Average (DJIA) for the period 1915-1930. He compared the closing price of the DJIA for Saturday with the mean of the closing prices on Friday and Monday. For the 717 weekends he studied, the Saturday prices were more than \$ 10 higher than the Friday-Monday mean.

French (1980) continued this direction of research and was the first author to employ statistical methods in order to test for the existence of the calendar effects. He used the S&P 500 index to study daily returns and obtained similar results. He studied the period 1953-1977 and found that the mean Monday returns were negative for the full period and also for every five year sub-period. The mean returns were positive for all other days of the week, with Wednesdays and Fridays having the highest returns.

There're many other studies about day of the week effect anomaly. Berument and Kiyamaz (2001) tested the presence of the day of the week effect on stock market volatility by using the S&P 500 market index during the period of January 1973 and October 1997. They found the highest and lowest returns on Wednesday and Monday, the highest and the lowest volatility on Friday and Wednesday. Haroon and Shah (2013) investigated day of the week effect in Karachi Stock Exchange of Pakistan by

employing OLS regression during the period January 2004 to December 2011. They found negative Monday and positive Friday effects in sub period II.

Market anomalies also occur in January month, whereby stock prices tend to fall towards the end of December and then recuperate quickly in the first month of the New Year, January (Ahsan and Sarkar, 2013). January Effect is the most studied pattern of monthly effect. It is established that in January, the stock return is higher than that of other months of the year. It may be caused normally by a significant low return in December (Nageswari, Selvam, Vanitha and Babu, 2013). The first study of monthly effect was Wachtel (1942). Wachtel (1942) was the first to examine January effect in the Dow Jones Industrial Average (DJIA) Index from 1927 to 1942. He found that the returns in January were higher than other months. Since this discovery, many studies that investigated this market anomaly.

Choudhry (2001) investigated seasonal anomalies in the mean stock returns of Germany, the UK, and the US during pre-World War I period using the data from January 1870 to December 1913 in Germany and the UK and from January 1871 to December 1913 for the US. The empirical research was conducted using a non linear GARCH-t model. Choudhry (2001) found the January effect and the month of the year effect on the UK and US returns. There was month of the year anomaly, but there was no January effect in German returns. Georgantopoulos and Tsamis (2011) used a data set from FYROM Stock Exchange to investigate the presence of calendar effects during period 2002-2008. They found day of the week effect and January effect examined by both mean (OLS) and variance (GARCH) regressions. Guler (2001) investigated the existence of January effect in the Brazil, Shanghai, India, Argentina and Turkey indices with power ratio method. Results indicated existence of the January effect in China, Argentina and Turkey returns.

RESEARCH MODEL

This paper uses daily data from ICaMEL (Indonesian Capital Market Electronic Library) in period 2007-2014 by using 3 sub periods, (1) all period, (2) daily period and (3) monthly period. This paper is using purposive sampling. There are 270 firms that continuously listing for period 2007-2014 in Indonesian Stock Exchange. This paper is using Ordinary Least Square and Weighted Least Square to estimate the research model. Weighted Least Square is used if there's heterocedasticity problem by using Ordinary Least Square. Dependent variable in this paper is return of stock, calculated as:

$$R_{i(t)} = \frac{P_{i(t)} - P_{i(t-1)}}{P_{i(t-1)}}$$

Where $R_{i(t)}$ is return on stock i at time t ; $P_{i(t)}$ is price on stock i at time t ; $P_{i(t-1)}$ is price on stock i at time $t-1$. Independent variable in this paper is beta, bid ask spread, trading volume and trading frequency. The estimation of beta is using this following model:

$$R_{i(t)} = \alpha + \beta R_m + \varepsilon$$

Where:

$R_{i(t)}$ = return of stock i at time t

β = beta

R_m = return of market

ε = error

Bid ask spread is the difference between the amount should be paid by the buyer and the amount should be received by the seller at the same time and assets on the market (Damodaran, 2005). Both trading volume and trading frequency are already available in trading activity database from ICaMEL. The relationship between beta, bid ask spread, trading volume and trading frequency to stock return is investigated by employing the following model:

$$R_{i(t)} = \gamma_0 + \gamma_1 * \beta + \gamma_2(\text{BAS}) + \gamma_3(\text{TV}) + \gamma_4(\text{TF}) + \varepsilon$$

Where:

$R_{i(t)}$ = return of stock i at time t

β = beta

BAS = bid ask spread

TV = trading volume

TF = trading frequency

ε = error

RESULTS

Table 1 presents the results of the effect of beta, bid ask spread, trading volume, trading frequency to stock return both in all period and in daily period. Based on the table 1, by using all period, the entire independent variables have significant simultaneous effect on the dependent variable. Partially, beta, trading volume and trading frequency have significant effect to stock return.

By using daily period, it can be explained that the entire independent variables have significant simultaneous effect on the dependent variable. It can be seen from each P-value of F-test from each period is $\leq 0,05$. These finding indicates that there is no day of the week effect in the simultaneous effect of beta, bid ask spread, trading volume and trading frequency to stock return in daily period.

By using daily period, beta and bid ask spread have significant partial effect to stock return on Monday, Tuesday, Wednesday and Thursday. But on Friday, beta, bid ask spread and trading frequency have significant partial effect to stock return. However, beta is consistently has significant partial effect in both period. These finding

indicates that there is day of the week effect in the partial effect of beta, bid ask spread, trading volume and trading frequency to stock return. Table 2 presents the results of the effect of beta, bid ask spread, trading volume, trading frequency to stock return both in monthly period. Based on the table, it can be explained that in the monthly period, the entire independent variables have significant simultaneous effect on the dependent variable only in January, February, April, May, July, August and October. It can be seen from each P-value of F-test from each month is $\leq \alpha 0,05$. These finding indicates that there is monthly effect in the simultaneous effect of beta, bid ask spread, trading volume and trading frequency to stock return.

By using monthly period on January, beta, bid ask spread and trading frequency have partial significant effect to stock return. On February, beta and trading frequency have partial significant effect to stock return. On March, trading volume has partial

Table 1
The Effect of Beta, Bid Ask Spread, Trading Volume, Trading Frequency to Stock Return for All Period and Daily Period

<i>Period</i>	<i>P-Value F-Test</i>	γ_0	γ_1	γ_2	γ_3	γ_4
All Period by using Ordinary Least Square	0.0000	-2.836027	.1981735*	-.0087298	-.1637659**	-.1802139*
Monday by using Weighted Least Square	0.0000	-.0753499	.0675071***	.0000114***	1.39e-07	-.0000503
Tuesday by using Weighted Least Square	0.0000	.0006482	.0061933***	7.68e-07***	-2.66e-11	-8.59e-08
Wednesday by using Weighted Least Square	0.0000	.0026299	.0036206***	2.25e-06**	-1.65e-12	-2.80e-06
Thursday by using Weighted Least Square	0.0000	-.0003777	.0043995*	6.65e-06*	6.88e-12	-2.16e-06
Friday by using Weighted Least Square	0.0000	.0044979	.0058808***	8.50e-07 ***	-2.23e-11	-4.97e-06***

Source: IDX. The data reprocessed by the researcher, 2015

Note: * = Statistically significant at the 10% level, ** = Statistically significant at the 5% level, *** = Statistically significant at the 1% level

Table 2
The Effect of Beta, Bid Ask Spread, Trading Volume, Trading Frequency to Stock
Return for Monthly Period

<i>Period</i>	<i>P-Value F-Test</i>	γ_0	γ_1	γ_2	γ_3	γ_4
January by using Weighted Least Square	0.0000	.0054863	.0105874***	2.59e-06***	-3.85e-08	-.0000201***
February by using Weighted Least Square	0.0001	-5.352561	.2148908***	.0632099	.0982669	-.2214467***
March by using Ordinary Least Square	0.2607	.3127484	.0250927	2.34e-06	-2.73e-09*	.0001254
April by using Weighted Least Square	0.0000	.0067684	.0020026***	1.24e-06***	5.26e-11	-9.88e-06**
May by using Weighted Least Square	0.0000	-.0691423	.1860304***	6.29e-06*	-1.22e-10	-.0000724***
June by using Weighted Least Square	0.3369	.0015954	-.0001776	1.47e-06	-1.00e-11	-8.31e-07
July by using Weighted Least Square	0.0002	.0104047	.0044358***	-2.61e-07	1.25e-09	-.0001753**
August by using Weighted Least Square	0.0001	.0015923	-.0041335***	4.45e-08	-1.03e-12	4.48e-07
September by using Weighted Least Square	0.2683	-.0000371	.000026	1.68e-07	-2.08e-13	8.67e-08
October by using Weighted Least Square	0.0075	-5.060881	.0778102	-.0106042	-.0260938	-.1442618
November by using Weighted Least Square	0.3914	.000019	.0000371	-1.22e-08	-1.02e-12	-6.12e-08
Desember by using Weighted Least Square	0.4551	-.0007597	.0101598	-1.60e-06	1.96e-11	1.21e-06

Source: IDX. The data reprocessed by the researcher, 2015

Note: * = Statistically significant at the 10% level, ** = Statistically significant at the 5% level,
 *** = Statistically significant at the 1% level

significant effect to stock return. On April, beta, bid ask spread and trading frequency have significant partial effect to stock return. On May, beta, bid ask spread and trading frequency have significant partial effect to stock return. On July, beta and trading frequency have partial significant effect to stock return. On August, only beta that has partial significant effect to stock return. In contrary, there is no partial significant effect from all of the independent variables to dependent variable on June, September, October, November and December. These finding indicates that there is monthly effect in the partial effect of beta, bid ask spread, trading volume and trading frequency to stock return in monthly period.

CONCLUSION

We have presented evidence if the entire independent variables have simultaneous significant effect on the dependent variable in all period. Partially, beta, trading volume and trading frequency have significant effect to stock return.

There is no day of the week effect in the simultaneous effect of beta, bid ask spread, trading volume and trading frequency to stock return in daily period. But there is day of the week effect in the partial effect of beta, bid ask spread, trading volume and trading frequency to stock return in daily period. Furthermore, beta is consistently has partial significant effect in daily period.

We also have presented evidence if there is monthly effect in the simultaneous and partial effect of beta, bid ask spread, trading volume and trading frequency to stock return in monthly period.

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