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Testing Fama and French Three Factor Models in Indonesia Stock Exchange

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Abstract: This study aims to examine the effect of Fama and French three factor model and the CAPM to stock return in Indonesia. The sample used in this study is a company registered in LQ-45 period August 2013 to January 2014. The number of samples used, there are 43 companies. Besides, it also deepened by examining the major sector groups, groups of the manufacturing sector and the service sector groups. Period used is January 2010 to December 2013. The research model is linear regression. The results obtained from this study indicate all good sample LQ-45, the main sector groups, group manufacturing sector and the service sector groups could receive CAPM Model in predicting stock return. As for Fama and French three factor models, only the services sector that could accept to explain the changes that occur in the stock return. While, the LQ-45 and the main sector groups, book to market equity factors showed no significant results. While the group's manufacturing sector, firm size factor showed no significant results while the book to market equity factors indicate the direction of a significant negative effect.

Key words: Excess market return, firm size, book to market equity, Fama and French three factor model, Capital Assets Pricing Model, LQ-45, Bursa Efek Indonesia

INTRODUCTION

At the time of the global economic crisis in 2008, many countries are experiencing negative economic growth. The average growth of the world economy is only 2.7% (in 2008) and decreased to -0.4% (in 2009). While, Indonesia has one of the survivors of the global crisis. With the economic growth of 6% (in 2008) and only decreased to 4.6% (2009). Despite a decline Composite Index (JCI) from 2830.26 (09/01/2007) dropped to 1141.40 (24/11/2008). However, this decline rapidly recovering. In just a short time, there has been a recovery. Currently, JCI has bolted into 5089 (25/07/2014). This shows the capital market in Indonesia is still quite attractive to investors, both Foreign investors and domestic investors.

Consideration of the investment election by Indonesian investors more on the return. The higher the return, the more desirable. Most Indonesian investors still consider the risks of investing. Still fresh in the memories of their dupe of funds "bulging" Antaboga. Until now, it is not clear that the fate of Antaboga investors. In investing, there are three classes of investors (Elton *et al*., 2003). Investor risk aversion, i.e., investors who always avoid risk. These types of investors are always looking for safe investments. The second type of risk neutrality is that investors are a little more courage to face the risk of investment. However, this type of investors still remain more cautious in the face of great risk. While the third type of investor is risk seeking, i.e., investors who are happy with the risk. Investors are pleased with this type of gambling that is fair.

Investors always expect the highest return with the lowest possible risk. But this is impossible. Markowitz (1952) provides a solution to get maximum returns with limited risk. The theory offered is to diversify assets known as portfolio theory. This theory states the risk can be reduced by diversification of assets that have a negative correlation. Instead risks are not systematically considered to be irrelevant because this risk can still be eliminated by diversification. Factors affecting the amount of return is market risk. This theory is known as the Capital Asset Pricing Model (CAPM) (Black *et al*., 1972).

CAPM emphasize the factors that affect stock return is market risk. But Ross (1976) do not agree if only market risks that affect the stock return. There are factors that affect stock return in addition to market risk. This study became known as the Arbitrage Pricing Model. Research Ross (1976) supported by Fama and French (1993). In his research found besides influenced by the market, stock returns are also influenced by firm size and book to market equity. This study also known as the Fama and French three factors models. In research Fama and French (1993) found the size and book to market equity more could explain the change stock return compared with CAPM uses only one factor alone. This study was widely supported by other studies as Liew and Vassalou (2000), Davis *et al*. (2000), Charitou and Constantinidi (2003), Ajili (2003), Taneja (2010) and Al-Mwalla (2012), etc.

Research conducted in Indonesia have been done by Murtini and Saputra (2008) with the CAPM better results in measuring stock return on the capital market in Indonesia compared to the Fama and French three-factor models. Murtini and Saputra (2008) research results is supported by research conducted by Sudiyatno and Irsad (2011). However in research Hardianto and Suherman (2009) and Ferdian *et al.* (2011) shows the capital market in Indonesia supports the Fama and French three factors models.

With the difference in the results obtained by researchers in Indonesia, it is necessary to research back to test the efficacy of Fama and French three factors in determining stock return models in the Indonesian Capital Market.

Study literature: Modern portfolio theory starts from the research conducted by Markowitz (1952). Assuming investors tend to avoid risk (risk aversion). Markowitz offers investors to diversify their assets in the form of a portfolio in order to obtain optimal stock return.

Research on the relationship between stock return with risk, continues. CAPM is the development of research conducted by Markowitz (1952). Black *et al.* (1972) developed a model of stock return correlation with the risk represented by the beta (market risk). In the study Markowitz, the risk is described as the standard deviation. Risk reduction can be done with the diversification of assets (portfolio). New risk reduction will be effective if the correlation of assets is negative. Getting closer to the negative one of the more effective risk reduction. However, the risk reduction is not possible to zero. Only systematic risk only relevant as a risk. Research Black *et al.* (1972) found a significant positive relationship between systematic risk or beta with stock return.

Law of one price (the law of one price) of Ross (1976) stated there was no possibility misprice. Shares the same company will not be sold at different prices in two different places. If there misprice, automatically will happen arbitrage. This theory is known as the Arbitrage Pricing Theory (APT). According to research by Ross (1976), stock return is not only influenced by market risk only. But there are still other factors. Other factors are related to macro-economic factors and the company.

Fama and French (1993) conducted a study improvement of Ross (1976) and Black *et al.* (1972). By taking samples at the New York Stock Exchange (NYSE), AMEX and Nasdaq for the period 1963-1991, the results showed that the systematic risk factor CAPM has not been able to explain the change in the stock return. The addition of other risk factors, namely firm size and book to market equity, better able to explain the change in the stock return. This model is known as the Fama and French three factor model.

Firm size factor was first investigated by Banz (1981). By taking samples at NYSE period 1936-1975, the results obtained firm size plays a role in explaining changes in stock return. This result is also supported by research conducted by Blume and Stambaugh (1983) which examines the period 1963-1980 NYSE and AMEX. While research on the book to market equity was first performed by Rosenberg *et al.* (1985). Samples taken are NYSE period 1973-1984. The results obtained indicate a book to market equity effect. This research was supported by research conducted by Davis *et al.* (2000), Chan *et al.* (1991) and Capaul *et al.* (1993). All of these studies support the research conducted by Fama and French on three factors models.

Research conducted by Fama and French carried on US Capital Markets. This result is also supported by research back Davis *et al.* (2000) who studied in Moddy Industrial Stock period 1929-1997. The results obtained showed three factors corresponding models to measure changes in stock return. Liew and Vassalou (2000) examined three factors models in 10 countries including Australia, Canada, France, Germany, Italy, Japan, Netherlands, Switzerland, UK and USA 1978-1996 period is taken. The results also support the three factors models. Similar results were also obtained by Charitou and Constantinidi (2003) who studied in the UK Capital Markets for the period 1992-2001 and Ajili (2003) who took the sample in France for the period 1976-2001. The results also support the three factors models. Only research Griffin and Lemmon (2002) who studied at the NYSE, Nasdaq and Amex for the period 1965-1996. The results obtained showed three factors the model can not explain very well the changes in stock return.

Chan *et al.* (1991) conducted a study on the Japanese Capital Market. The time period used is 1971-1988. The results indicate the presence of firm size effect and a significant positive correlation of book to market equity. However, research conducted by Djajadikerta and Nartea (2009) who studied in New Zealand Capital Markets the period 1994-2002 showed firm size could explain the changes in the stock return. But, the book to market equity is not. So, it does not support the three factors models. Similar results occurred in research conducted by Drew *et al.* (2003) and Wang and Xu (2004) who studied the Chinese Capital Market. The results also showed only firm size are significant effect on changes in stock return. While the book to market equity is not able to explain it. According to the observations of Wang and Xu (2004), companies in China 2/3 owned by the state. Besides ownership by an insurance company or pension fund is <10%. Private investment company only has <30%. The rest is >60% owned by individual investors. Individual

investors tend to be speculators from the investors. They lack the fundamentals of the company. Besides, the understanding of individual investors on the financial statements is also very limited. This could explain why the book to market equity does not play a role in China's Capital Market.

Research conducted in the capital market in India also showed different results. Taneja (2010) studied in the Indian Capital Market and Senthilkumar 2004-2009 (2009) who studied also in India with the period 2002-2008. Their results showed three factors the model can be applied to the Indian Capital Market. Only Senthil and Kumar (2009) find a negative and significant relationship of firm size. While the book to market equity remains significantly positive.

Research Fama and French three factors models in emerging markets is also carried by Al-Mwalla (2012). Samples taken is Amman Stock Market in the period 1999 to 2010. The results turned out to be a good firm size and book to market equity has a very convincing role in explaining changes in stock return. This means that three factors can be applied to both models there. However, contrary to research conducted by Rehman *et al*. (2013) on the Karachi Stock Exchange of Pakistan with the period from 2003-2007, showed different results. Rehman *et al*. (2013) found three factor model can not be explained by both phenomena stock return in Pakistan. Precisely CAPM can explain better than the three factor models.

Research on the Colombo Stock Exchange conducted by Shafana *et al*. (2013) also describes three factors model is not fully effective in explaining changes in stock return. The results obtained show the book to market equity has a significant connection, only the sign is negative. While firm size although, a positive effect but showed no significant relationship. The results were not much different obtained by Eraslan (2013) who conducted research on the Istanbul Stock Exchange period 2003-2010. The results obtained in this study is the firm size has no significant effect on small businesses. But, significant in medium and large companies. But, the book to market equity can be explained by either a change in the stock return. This means that the application of the three factors model is not entirely possible in emerging markets. Only studies conducted by Drew and Veeraraghavan (2009) who conducted research on the Kuala Lumpur Stock Exchange that gets a reality three factor models work very well there.

Research conducted at the Indonesian Stock Exchange also showed different results. Hardianto and Suherman (2009) which examines the company in Indonesia Stock Exchange 2000-2004 period shows the results support the Fama and French three factors models. Meanwhile, Ferdian *et al*. (2011) who took the sample to companies incorporated in Jakarta Islamic Index for the period 2007-2009. The results obtained support the three-factor models. This means that the three factor model of the phenomenon can be explained by either changes in stock return on shariah market in Indonesia compared with CAPM. Only the influence of book to market equity although significant but has a negative sign. Otherwise the results found by Murtini and Saputra (2008) who studied in a group of companies LQ-45 between 2000 and 2007 as well as Sudiyatno and Irsad (2011) who studied also at the LQ-45 period 2007-2009. The results are the same, namely the CAPM more able to explain the phenomenon of change in stock return in Indonesia of the three factors models.

From these results indicate inconsistencies results of research conducted on emerging markets. Especially for research conducted in Indonesia differences that occur very contrasting research. Besides, the research conducted for the Fama and French in Indonesia is still very limited. For this study will try to perform back testing Fama and French three factors models in Indonesian Stock Exchange. Samples to be used is a registered d LQ-45 with the observation in January 2010 until December 2013.

Hypothesis: Based on the explanation above, it can be built hypothesis for this study as follows:

- H_1: there is a positive effect of the excess return on stock market returns
- H_2: there is a positive effect of firm size on stock return
- H_3: there is a positive effect of book to market equity ratio of the stock return

MATERIALS AND METHODS

Samples: The purpose of this research is to study the behavior of stock returns back caused by changes in firm size and book to market equity. Samples were taken from the companies listed in LQ-45 period August 2013 to January 2014. The companies listed on the LQ-45 is regarded as the best 45 companies and could represent all the companies that exist because of all the sectors represented on the list. Besides, according to the nature of the companies listed on the LQ-45 is the companies choice of liquid where the market capitalization for the entire company LQ-45 reaches 74.53% of the market capitalization of all companies listed on the Indonesia Stock Exchange (Chandra, 2013). Samples were taken by using purposive sampling. The company must be

registered in the Indonesia Stock Exchange, since January 2010 to December 2013. The company also may not have negative equity and profit.

From the results of data collection LQ-45 were acquired 43 companies are worth because there are two companies that are not viable. The 1 companies experiencing losses (EARTH) last 2 years and 1 other company newly listed October 6, 2010. In addition to analysis of 43 companies of the LQ-45 is in this study also try a more in-depth research. The study grouping into large sector groups. Large sectors of the group consists of the main sectors (industries producing raw materials) there are 7 companies, there are 12 companies manufacturing sector and the service sector there are 24 companies.

Data analysis techniques: To perform the test Fama and French three factors model, the research is still using models that have been developed as follows:

$$Ri\text{-}RF = a+b1(RM\text{-}RF)+b2\ (SMB)+b3(HML)+e(5)$$

Where:

Ri = i stock return
RF = Risk-free interest rate (SBI monthly)
RM = Market return of return JCI described
SMB = Small minus big
HML = High minus low
a = Constant
b1 = Regression coefficients or beta of the market risk premium
b2 = Regression coefficient i of SMB shares
b3 = Regression coefficient stock i of HML
e = Error term

RESULTS

Descriptive results obtained from this study can be described in Table 1. Year 2011 was a dismal year for the stock market in Indonesia compared with 2010. This is illustrated by the reduction of excess market return (R_M-R_F) by 109% in 2011 compared to 2010. This situation is also reflected in the stock return (R_i-R_F) stock of the company on the LQ-45. The decline in the company LQ-45 in 2011 was 102.22% compared to 2010. If further search on issuers LQ-45, this decline is the impact of the decline in the primary sector groups. The main sector groups has decreased to 208.13% in 2011 compared to 2010. Although, the two groups in other sectors also declined but the decline was the same as the decline in the market excess return. Groups of the manufacturing sector decreased by 96.71% while the service sector also decreased by 90.51%.

Table 1: Descriptive analysis of stock return (R_i-R_F), market excess return, SMB and HML

	Years			
Variables (R_i-R_F)	2010	2011	2012	2013
Main	0.03000	-0.03244	-0.00774	-0.00420
Manufacturing	0.07681	0.00253	0.00147	-0.00317
Service	0.06111	0.00580	0.02101	-0.00960
Total (LQ-45)	0.06043	-0.00134	0.01088	-0.00693
R_M-R_F	0.02643	-0.00238	0.00625	-0.00598
SMB	0.07715	0.03502	0.01744	0.00775
HML	-0.04879	-0.03246	-0.00994	-0.01588

Data processed

The decline in stock return in 2011 compared to 2010 in the main sector groups are almost equal, both in agriculture and in the mining sector. However, companies that experienced the sharpest decline occurred in the agricultural sector of the PP London Sumatra Tbk. (LSIP) amounted to 361.95%. Other companies in the agricultural sector also experienced a sharp decline is Astra Agro Lestari Tbk. (AALI) which decreased to 320.75%. While other companies declined still below 100%.

Groups of the manufacturing sector has decreased stock return in 2011 than in 2010 to 96.71%. The decline was triggered by the decline in the industrial sector and the chemical basis decreased by 115.38%. While the various sectors of industry and consumer goods industries, respectively only decreased by 80.76 and 73.58%. The decline in basic industry and chemical triggered by a decline in the company Malindo Feedmill Tbk. (MAIN) and Charoen Pokphand Indonesia Tbk. (CPIN). MAIN has decreased to 130.41% and CPIN decreased by 112.51%. While other companies despite the drop but the decline is still below 100%.

Group services sector also decreased by 90.51% in 2011 compared with 2010. The decrease was more contributed by infrastructure, utilities and transportation as well as the financial sector. The decline in infrastructure, utilities and transportation of 119.84%. Financial sector decreased by 119.79%. While property and real estate sectors as well as trade, services and investment also decreased, although the decline was not too large (<100%). The sharpest decline in infrastructure, utilities and transport occurs in Perusahaan Gas Negara Tbk. (PGAS) that is equal to 270.89%. While the decline in the financial sector a lot donated by a decline in Bank Danamon Tbk. (BDMN) in the amount of 223,176%.

Market conditions in 2012 started to improve. It is characterized by an increase in the market excess return of 362.61% compared with 2011. This increase is also reflected in the increase in stock return shares in LQ-45. The increase in stock return LQ-45 stock companies

reached 911.94% compared to 2011. The increase in stock return stock in Indonesian Capital Market is mostly contributed by the service sector groups. Stock returns on the group's service sector rose in 2012 to 262.24% compared to 2011. The only major sector group increased by 76.14%. It otherwise experienced by the manufacturing sector. The manufacturing sector has decreased stock stock returns in 2012 amounted to 41.90% compared to the year 2011.

The decline in stock return experienced by the manufacturing sector group in 2012, more driven by the decline experienced by the various sectors of industry and consumer goods industry sector. As for the chemical industry excess return basis and its stock has increased. The greatest contribution reduction experienced by various industry sectors, more is given by Astra International Tbk. (ASII) that is = 454.89%. While the contribution of the sector the largest decline occurred in the consumer goods industry companies Kalbe Farma Tbk. (KLBF) that is = 1954%.

Group services sector increased in 2012 amounted to 262.24% compared to 2011. The increase is mostly driven by increases in infrastructure, utilities and transportation and financial sectors. The increase in stock return stock in 2012 for infrastructure, utilities and transport amounted to 453.42% while the stock return for a share of the financial sector increased by 271.05%. Other sectors belonging to the group is the services sector and the real estate property sector and trade, services and investment. These two sectors also increased stock return shares in 2012 amounted to 33.7% for property and real estate sector as well as an increase of 23:10% for trade, services and investment. Both of these sectors has increased which is not too large compared with the other two sectors in the services sector group.

Capital market conditions in Indonesia again decreased in 2013 compared to 2012. The decrease was seen from the decline in the market excess returns of up to 195.68%. This decrease was also seen in the stock return stock companies LQ-45 which has decreased to 163.69%. The decline that occurred in 2013 is more driven by the decline in the services sector groups and groups of the manufacturing sector. Opposite situation occurs in the primary sector which experienced an increase in the year 2013.

The increase in stock return stock that experienced by the primary sector in 2013, driven by increases in the agricultural sector. The increase in stock return on the agricultural sector's share reached 492.31% in 2013 compared to 2012. The increase in stock return stock on the agricultural sector is mostly contributed by Astra Agro Lestari Tbk. (AALI) and PP London Sumatra Tbk. (LSIP). The increase in 2013 is a reversal of the decline that occurred in 2011. The mining sector is also included in the group of primary sector has decreased. Although on average, the mining sector has decreased but the particular company Vale Indonesia Tbk. (INCO) which is part of the mining sector actually increased.

Groups of the manufacturing sector has decreased stock returns in 2013 amounted to 315.65% compared to 2012. The decline in stock return this stock a lot donated by the base and chemical industry sectors. While the various sectors of the industry and the consumer goods industry has just raised.

Fluctuations in the market excess return, since 2010 until 2013 was also followed by fluctuations in firm size factor (SMB). Just in 2012 alone the rise in the market excess return is not followed by a variable-size companies.

This suggests that the market movement is always followed by firm size. While the book to market equity factor (HML) always follow the fluctuations in the market. Increase or decrease in the market always followed the same trend.

Testing multiple linear regression model: Testing multiple linear regression models made here are eight models. In this study, calculated the four models to Fama and French three-factor model and the four models for the CAPM. Each model calculates the total of all enterprise model for LQ-45 as well as to break down into groups of primary sector, the manufacturing sector groups and group services sector. The multiple linear regression model to test the effect of Fama and French three-factor model consisting of excess market returns, firm size (SMB) and book to market equity (HML) of the stock return. The result of the calculation of the linear regression model can be seen in Table 2.

Table 2: Results of hypothesis testing

		Sector groups			
Variables	Factors	Main	Manufacturing	Service	Total
FF 3 factors					
Market	Koefisien	0.199	0.266	0.348	0.296
	Sig.	0.000	0.000	0.000	0.000
SMB	Koefisien	0.212	0.027	0.222	0.151
	Sig.	0.004	0.626	0.000	0.000
HML	Koefisien	0.131	-0.181	0.172	0.043
	Sig.	0.070	0.001	0.000	0.129
F-Ratio	Koefisien	9.913	23.411	84.191	93.521
	Sig.	0.000	0.000	0.000	0.000
Adj. R^2		0.084	0.107	0.181	0.121
CAPM					
Market	Koefisien	0.245	0.267	0.348	0.296
	Sig.	0.000	0.000	0.000	0.000
F-Ratio	Koefisien	20.813	43.110	209.515	241.240
	Sig.	0.000	0.000	0.000	0.000
R^2		0.107	0.071	0.157	0.107

LQ-45: Models and hypotheses to be discussed here is to answer the problems that occur in companies LQ-45 overall. Here is a hypothesis and multiple linear regression models were developed to address the main issues of the study.

Hypothesis:

- H_1: there is a positive effect of the excess return on stock market returns
- H_2: there is a positive effect of firm size on stock return
- H_3: there is a positive effect of book to market equity ratio of the stock return

Model of Fama and French three models:

$$YSR = -0001(0.811) + 1109(0.000) + 0336(0.000)XMR\ XSMB + 0.072(0.129)XHML$$

CAPM Model:

$$YSR = 0.013(0.000) + 1.225(0.000)XMR$$

Of the two models developed the model and the CAPM Fama and French generally showed good results. F-ratio obtained for the model fama and french received significant 93,521 with 0.000<0.05. With this result, the null hypothesis is rejected. That is Fama and French three factor models can be explained by both a phenomenon that occurs in the stock return. The same thing happened on the CAPM Model where F-ratio is obtained with a significant 241, 240, 0.000<0.05, so the null hypothesis was rejected. This means CAPM Model can well explain the phenomena that occur on the stock return. By observing the coefficient of determination for Fama and French three factor model and the CAPM, the result of each 0121 and 0107. This means that the three factors of Fama and French i.e., excess market return, firm size (SMB) and book to market equity (HML) could explain the changes of the stock return of 12.1%. While the remainder is = 87.9% must be explained by other factors in addition to excess market return, firm size (SMB) and book to market equity (HML) in LQ-45. For the CAPM Model, showing excess market returns could explain the changes of the stock return of 10.7%. While the remainder is = 89.3% must be explained by other factors in addition to the excess market return on the company LQ-45.

Test results of multiple linear regression for the CAPM and Fama and French three factor model, the visible factor market excess returns get significant results (Sig. 0.000<0.05), so the null hypothesis is rejected. This means CAPM Model can answer the phenomenon of changes in stock return. Firm size (SMB) on the model Fama and French three factor models also showed significant results (Sig. 0.000<0.05), so the null hypothesis was rejected. Only book to market equity factor (HML) which shows the results were not significant (Sig. 0129>0.05), so the null hypothesis is accepted. So for Fama and French three factor model, the only factor market excess return and firm size are significant effect on stock return while the book to market equity, although the direction of the effect is positive but not significant.

Sector group: Models and hypotheses to be discussed here is to answer the problems that occur in the primary sector group companies. Here is a hypothesis and multiple linear regression models were developed to address the research.

Hypothesis:

- H_1: there is a positive effect of the excess return on stock market returns
- H_2: there is a positive effect of firm size on stock return
- H_3: there is a positive effect of book to market equity ratio of the stock return

Model of Fama and French three models:

$$YSR = -0016\ (0.021) + 0588\ (0.000) + 0372\ (0.004)\ XMR\ XSMB + 0.172\ (0.070)\ XHML$$

CAPM Model:

$$YSR = -0003(0607) + 0.721(0000)XMR$$

Models derived from primary sector group is similar to the results of the companies LQ-45. Of the two models developed the model and the CAPM Fama and French generally showed good results. F-ratio obtained for the model 9913 Fama and French gets significantly 0.000<0.05. With this result, the null hypothesis is rejected. That is Fama and French three factor models can be explained by both a phenomenon that occurs in the stock return. The same thing happened on the CAPM Model where F-ratio is obtained with a significant 20, 813, 0.000<0.05, so the null hypothesis was rejected. This means CAPM Model can well explain the phenomena that occur on the stock return. By observing the coefficient of determination for Fama and French three factor model and the CAPM, the result of each 0084 and 0060. This means that the three factors of Fama and French ie excess market return, firm size (SMB) and book to market equity (HML) could explain the changes of the stock returns of 8.4%. While

the remainder is = 91.6% must be explained by other factors in addition to excess market return, firm size (SMB) and book to market equity (HML) in the main sectors of the group companies. For the CAPM Model, showing excess market returns could explain the changes of the stock return of 6%. While the remaining 94% must be explained by other factors in addition to the excess market return on the company main sector groups.

Test results of multiple linear regression on the primary sector groups for the CAPM and Fama and French three factor model, the visible factor market excess returns get significant results (Sig. 0.000<0.05), so the null hypothesis is rejected. This means CAPM Model can answer the phenomenon of changes in stock return. Firm size (SMB) on the model Fama and French three factor models also showed significant results (Sig. 0.004<0.05), so the null hypothesis was rejected. Only book to market equity factor (HML) which shows the results were not significant (Sig. 0.070>0.05), so the null hypothesis is accepted. So for Fama and French three factor model, the only factor market excess return and firm size are significant effect on stock return. While the book to market equity although, the direction would be significant if the alpha is used is 10%.

Manufacturing sector group: Models and hypotheses to be discussed here is to answer the problems that occurred in the manufacturing sector group companies. Here is a hypothesis and multiple linear regression models were developed to address the research.

Hypothesis:

- H_1: there is a positive effect of the excess return on stock market returns
- H_2: there is a positive effect of firm size on stock return
- H_3: there is a positive effect of book to market equity ratio of the stock return

Model of Fama and French three models:

$$YSR = -0001(0.900) + 1227(0.000) + 0074(0.626)XSMB\ XMR - 0.372(0.001)XHML$$

CAPM Model:

$$YSR = 0.017(0.022) + 1.229(0.000)XMR$$

Models obtained from different groups of the manufacturing sector with the results of firms or groups LQ-45 main sectors. Of the two models developed the model and the CAPM Fama and French generally, showed good results. F-ratio obtained for the model Fama and French received significant 23 411 with 0.000<0.05. With this result, the null hypothesis is rejected. That is Fama and French three factor models can be explained by both a phenomenon that occurs in the stock return. The same thing happened on the CAPM Model where F-ratio is obtained with a significant 43, 110, 0.000<0.05, so the null hypothesis was rejected. This means CAPM Model can well explain the phenomena that occur on the stock return. By observing the coefficient of determination for Fama and French three factor model and the CAPM, the result of each 0107 and 0071. This means that the three factors of fama and french, i.e., excess market return, firm size (SMB) and book to market equity (HML) could explain the changes of the stock return of 10.7%. While the remainder is equal to 80.3% must be explained by other factors in addition to excess market return, firm size (SMB) and book to market equity (HML) in the group company manufacturing sector. For the CAPM Model, showing excess market returns could explain the changes of the stock return of 7.1%. While the remainder is = 92.9% must be explained by other factors in addition to the excess market return on the company's manufacturing sector group.

Test results of multiple linear regression on the manufacturing sector group for the CAPM and Fama and French three factor model, the visible factor market excess returns get significant results (Sig. 0.000<0.05), so the null hypothesis is rejected. This means CAPM Model can answer the phenomenon of changes in stock return. Firm size (SMB) on the model Fama and French three factor models showed no significant results (Sig. 0626>0.05), so the null hypothesis is also accepted. While the book to market equity factor (HML) although showing the results of significance 0.001<0.05 but the direction of the effect produced is negative. Direction of the effect is not consistent with the hypothesis, so the null hypothesis is accepted. So for Fama and French three factor model, the only factor of excess market returns are significant effect on stock return. While, the book to market equity can be significant to the direction of the negative influences.

Group services sector: Models and hypotheses services group can produce answers to the problem in this study. Here is a hypothesis and multiple linear regression models were developed to address the research.

Hypothesis:

- H_1: there is a positive effect of the excess return on stock market returns
- H_2: there is a positive effect of firm size on stock return

- H_3: there is a positive effect of book to market equity ratio of the stock return

Model of Fama and French three models:

$$YSR = 0004(0.368) + 1202(0.000) + 0457(0.000)XMR\ XSMB + 0.265XHML$$

CAPM Model:

$$YSR = 0.016(0.000) + 1.370(0.000)XMR$$

The model obtained from the service sector group is a better result than the other groups. Of the two models developed the model and the CAPM Fama and French generally showed good results. F-ratio obtained for the model Fama and French received significant 84, 191 with 0.000<0.05. With this result, the null hypothesis is rejected. That is Fama and French three factor models can be explained by both a phenomenon that occurs in the stock return. The same thing happened on the CAPM Model where F-ratio is obtained with a significant 209, 515, 0.000<0.05, so the null hypothesis was rejected. This means CAPM Model can well explain the phenomena that occur on the stock return. While the coefficient of determination for Fama and French three factor model and the CAPM, the result of each 0181 and 0157. This means that the three factors of Fama and French, i.e., excess market return, firm size (SMB) and book to market equity (HML) could explain the changes of the stock return of 18.1%. While the remainder is = 81.9% must be explained by other factors in addition to excess market return, firm size (SMB) and book to market equity (HML) in the service sector group companies. For the CAPM Model, showing excess market returns could explain the changes of the stock return of 15.7%. While the remainder is = 84.3% must be explained by other factors in addition to the excess market return on the company services sector group.

Test results of multiple linear regression in the service sector group for the CAPM and Fama and French three factor model, the visible factor market excess returns get significant results (Sig. 0.000<0.05), so the null hypothesis is rejected. This means CAPM Model can answer the phenomenon of changes in stock return. Firm size (SMB) on the model Fama and French three factor models also showed significant results (Sig. 0.000<0.05), so the null hypothesis was rejected. Book to market equity factor (HML) also showed significant results (Sig. 0.000>0.05), so the null hypothesis was rejected. So for Fama and French three factor model of the service sector groups, all factors both factors excess market return and firm size and book to market equity yield significant results.

DISCUSSION

From the results obtained in the CAPM Model, found that both the CAPM Model of the companies LQ-45, the major sector groups, groups of the manufacturing sector and the service sector groups, indicating that the CAPM Model can well explain the phenomena that occur on the stock return. This is according to research conducted by Ross (1976), Rehman *et al.* (2013). While research in Indonesia which is equal to this research is the study Murtini and Saputra (2008) and Sudiyatno and Irsad (2011). However, these results do not correspond with the results of research conducted by Ferdian *et al.* (2011). Research conducted by Ferdian *et al.* (2011) conducted on companies sharia in Indonesia. This shows that the Indonesian investors are not too considering the market risk inherent in the companies shariah in Indonesia. Meanwhile, investors are still very concerned with market risk for companies incorporated in the LQ-45 are considered top tier company. These results are supported by research conducted Murtini and Saputra (2008) and Sudiyatno and Irsad (2011).

If seen from the results of Fama and French three factor model, the results obtained are very diverse both in the LQ-45, the major sector groups, groups of the manufacturing sector and the service sector groups. The role of market excess return to the explanation of the change of the stock return is recognized by all good sample LQ-45, the major sector groups, groups of the manufacturing sector and the service sector groups. These results are consistent with research Fama and French (1993), Davis *et al.* (2000), Charitou and Constantinidi (2003), Ajili (2003), Taneja (2010) and Al-Mwalla (2012). While research in Indonesia which is the same as the results of research conducted by Murtini and Saputra (2008), Hardianto and Suherman (2009), Ferdian *et al.* (2011) and Sudiyatno and Irsad (2011). For research conducted in Indonesia, all agree that the excess market returns have a clear contribution to describe the phenomenon of stock return.

The second factor of Fama and French three factor model of that firm size (SMB). The results of this study indicate that both companies LQ-45 as well as companies from the main group and services acknowledge the role of firm size in explaining the changes that occur on the stock return. Only the manufacturing sector groups who can not acknowledge the contribution of firm size to the changes of the stock return. Research conducted by Banz (1981), Blume and Stambaugh (1983), Chan *et al.* (1991), Fama and French (1993), Liew and Vassalou (2000), Davis *et al.* (2000), Charitou and Constantinidi (2003), Ajili (2003), Taneja (2010), Drew *et al.* (2003), Wang and Xu (2004),

Djajadikerta and Nartea (2009) and Al-Mwalla (2012), supporting the role of firm size to changes in stock return. While research in Indonesia which supports the role of firm size is the research conducted by Hardianto and Suherman (2009) and Ferdian *et al.* (2011). While research on manufaktiur sector group that does not acknowledge the role of firm size is supported by research conducted by Shafana *et al.* (2013) who conducted research on the Colombo Stock Exchange and Eraslan who conducted research on small firms in the Istanbul Stock Exchange. While the Indonesian research also does not support the role of firm size is the research conducted by Sudiyatno and Irsad (2011) who examined the LQ-45 for the 2007-2009 period. This means that only a group of investors in the manufacturing sector alone and conditions of crisis (2008-2009) which is not too concerned with firm size.

Book-to-market equity (HML) is a third factor of Fama and French three factor models do not get a good response from investors in the company LQ-45. But if you do a search further, investors are more concerned with factors book to market equity in all sectors of the existing group. However, only the manufacturing sector group of investors who gave negative responses to these factors. While the primary sector and a group of investors group services sector gave a positive response. Results of research on the company LQ-45 that do not respond to the book to market equity research supported by Griffin and Lemmon (2002), Drew *et al.* (2003), Wang and Xu (2004), Djajadikerta and Nartea (2009) and Rehman *et al.* (2013). While the Indonesian research supporting this research is Martini and Saputra (2008) and Sudiyatno and Irsad (2011).

If seen from the results in the main sector groups and group care services sector with a book to market equity factors, many studies that support these results. Research support was Rosenberg *et al.* (1985), Fama and French (1993), Capaul *et al.* (1993), Davis (1994), Liew and Vassalou (2000), Davis *et al.* (2000), Drew and Veeraraghavan (2009), Charitou and Constantinidi (2003), Ajili (2003), Senthil Kumar (2009), Taneja (2010), Al-Mwalla (2012) and Eraslan (2013). While the Indonesian research supporting this research only study conducted by Hardianto and Suherman (2009) who studied at the Jakarta Stock Exchange in 2000-2004. Groups of the manufacturing sector is a sector group that is unique because of the results of this study also provide a good response but the direction of the effect is negative. These results are supported by research conducted by Shafana *et al.* (2013) and Ferdian *et al.* (2011).

The findings in this study have implications vary. In general to purchase company stock LQ-45 does not need to consider the book to market equity. However, it should pay attention to the size of the company and excess stock market return to get a better return. However if viewed more deeply, it turns out only major sector groups who have the same behavior. As for the group's manufacturing sector, firm size is not a determinant in the selection of stocks, just book to market equity and market excess return is more involved. Only the service sector group companies who need to consider three factors in Fama and French three factor models.

CONCLUSION

Although, this research has seen the company LQ-45 and do more in-depth research by looking at the existing sector groups in the Indonesia Stock Exchange. However, the sector still has a group of varied sectors. For example, the service sector still has a group of real estate and real estate, trade, services and investment, infrastructure, utilities and transportation as well as the financial sector. Each of these sectors have different characteristics. Therefore, it would be advisable to subsequent researchers to be able to examine more deeply the consistency of these results in the sectors that exist in Indonesia Stock Exchange.

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