

Testing Fama and French Three Factors Model Within the Context of Indonesia Stock Exchange

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Abstract: Research aims to examine the influence of Fama and French's Three Factors Model and CAPM on stock return Indonesia. Sample includes 43 companies listed in LQ-45 from August 2013 to January 2014. The company groups from main sector, manufacture sector and service sector are also examined for additional data. The observation period is from January 2010 to December 2013. Research method is multiple linear regression. Result of research indicates that all samples which are LQ-45 companies, main sector group, manufacture sector group and service sector group can accept CAPM in predicting stock return. Based on Fama and French's Three Factors Model, only service sector group is acceptable to explain the change in stock return. LQ-45 companies and main sector group have insignificant factor of book to market equity. In manufacture sector group, factor of firm size is not significant but factor of the significant negative influence.

Key words: Excess market return, firm size, book to market equity, Fama and French's Three Factors Model, capital assets pricing model, LQ-45, Indonesia Stock Exchange

INTRODUCTION

Many countries suffered negative economic growth during global economic crisis in 2008. Worldwide economic growth only reached 2.7% in 2008, an average of and it decreased to -0.4% in 2009. Indonesia is one of the countries which is not much affected by global financial crisis. Indonesian economic growth was 6% in 2008 and it only reduced to 4.6% in 2009. The Jakarta Stock Price index (IHSG) may reduce from 2830.26 (1/9/2007) to 1141.40 (11/24/2008). But this reduction is quickly recovered. Short-term recovery seems achievable because IHSG has taken off into 5089 (7/25/2014). Indonesia capital market becomes so attractive for both domestic and foreign investors.

Investment euphoria is manifested into stocks and this form of investment was so popular in the last decade. Earlier, stock trading was dominated by foreign investors. Now a days, local investors have participated into >50% trading in capital market. Local investors have various options of investment instruments. Previous instruments are mostly conventional such as saving, deposit, gold, property and plantation. Recently, investors start to seek financial instruments in capital market as it is more promising.

Indonesian investors only concern with return when they are choosing investment instruments. Higher return is more attractive. Indonesia investors do not familiar with

risk consideration for investment. It is proven by the fact of fraud by reksadana antaboga which inflicts losses to many of its investors and leaves them with uncertainty. There are three types of investor (Elton *et al.*, 2003). Risk Aversion Investor is always avoiding the risk. This type of investor seeks for secure investment. The second type is risk neutrality investor who is more likely to take investment risk. However, this type still keeps aware in dealing the bigger risk. The third type is risk seeking investor who is always glad with the risk. This type of investor finds pleasure with fair gambling. Do Indonesia investors are risk seeking type with pleasure to find high risk investment?

Term high risk, high return is a popular investment adage, meaning that high risk always offers high return. In financial theory, although, there are three different investors, they are always rational. Indeed, rational investors shall always avoid the risk (risk aversion). Investors also expect highest return with lowest risk. However, this kind of situation is impossible. Markowitz (1952) suggests a solution to obtain maximum return with limited risk. Which involves assets diversification or known as portfolio theory. This theory states that risk can be reduced by diversifying negatively correlated assets. There are two types of risk challenged by investors which are systematic risk and unsystematic risk. Systematic risk is known as marker or beta risk. This risk has greater impact on all companies or markets. Second risk is

unsystematic risk which affects only one or few companies. Systematic risk is a risk relevant to portfolio analysis because it can not be easily reduced by diversification. On the other hand, unsystematic risk is not relevant because it can be easily eliminated by diversification. A factor influencing return is market risk and the theory explaining this factor is called Capital Asset Pricing Model (CAPM) (Black *et al.*, 1972).

CAPM emphasizes that market risk is the only factor influencing stock return. Ross (1976) disagreed with this statement and said that some factors other than market risk are also influencing stock return. Hence, Ross proposed a model called Arbitrage Pricing Model. Ross (1976) was supported by Fama and French (1993) who asserted that other than market risk, stock return is also influenced by firm size and book to market equity. Through their research, Fama and French also proposed a model called Fama and French's Three Factors Model. They found that firm size and book to market equity are more possible to explain the change of stock return than CAPM which uses only one factor. This finding is also widely supported by other researches such as Liew and Vassalou (2000), Davis *et al.* (2000), Charitou and Constantinidi (2003), Ajili (2003), Taneja (2010), Al-Mwalla (2012) and other researches.

Within Indonesia context, Martini and Dede (2008) find that CAPM is better than Fama and French's Three Factors Model in measuring stock return in capital market. This finding is supported by Sudiyatno and Irsad (2011). However, Ferdian *et al.* (2011) have reported that Indonesia capital market espouses Fama and French's Three Factors Model.

These different results of Indonesia researches shall be mediated by a review to test the efficacy of Fama and French's Three Factors Model in determining stock return within Indonesia capital market.

Review of literatures: Modern portfolio theory began from Markowitz (1952) who assumed that investors tend to avoid risk (risk aversion). Markowitz, suggested that investors shall diversify their assets into portfolio to obtain optimum stock return. Indeed, optimum stock return means relatively higher profit with relatively lower risk. If high risk assets are unified into a portfolio, it is expected that the risk is lower than having asset in separated way.

Research about the relation between stock return and risk is continued. CAPM was developed by Markowitz (1952). Black *et al.* (1972) constructed a model describing the relation between stock return and risk which is represented by beta (market risk). In Markowitz, risk is shown by deviation standard. Risk may be reduced

through assets diversification (portfolio). Risk reduction is only effective if the correlation of assets is negative. A closer to negative means that risk reduction is more effective. However, risk reduction can not be zero. In other words, although fixed portfolio assets are increased, the risk adhered to these assets can not be removed. Such irremovable risk is called market risk or systematic risk in CAPM. The removable risk by diversification is called unsystematic risk. The sum of both risks is total risk. Unsystematic risk can not be reduced through diversification and therefore, this risk is not relevant to risk equation. Systematic risk is the only relevant risk. Black *et al.* (1972) suggested a significant and positive relation between systematic risk or beta and stock return.

The law of one price proposed by Ross (1976) states that misprice is not possible. Similar stocks from a company can not be sold in different prices at two different places. If misprice occurs, arbitrage is possible. This theory is called Arbitrage Pricing Theory (APT). According to Ross, stock return is not influenced only by market risk but also by other factors. These factors may include macroeconomic and company.

Fama and French (1993) improved the result of Ross (1976) and Black *et al.* (1972). By taking samples from New York Stock Exchange (NYSE), AMEX and Nasdaq in period from 1963-1991, they find that factor of systematic risk in CAPM is still unable to explain the change in stock return. The other risk factors such as firm size and book to market equity are more possible to explain the change in stock return. This model is called Fama and French's Three Factors Model.

Firm size was observed for the first time by Banz (1981). By taking samples from NYSE in period from 1936-1975, it was shown that firm size can explain the change of stock return. This finding was supported by Blume and Stambaugh (1983) who also examined NYSE and AMEX in period from 1963-1980. Research about book to market equity was firstly conducted by Rosenberg *et al.* (1985) by taking the samples from NYSE in period from 1973-1984. The result indicated that book to market equity influences stock return. This result was supported by Davis (1994), Chan *et al.* (1991) and Capaul *et al.* (1993). All these researches are supporting Fama and French's Three Factors Model.

Fama and French observed America capital market. Davis, Fama and French repeated the research for Moddy Industrial Stock in period from 1929-1997. The result showed that Three Factors Model is suitable to measure stock return change. Liew and Vassalou (2000) attest Three Factors Model within 10 countries, including Australia, Canada, France, Germany, Italia, Japan, Holland,

Switzerland, England and USA. The observed period was from 1978-1996. Their result also supported three factors model. Similar result was also reported by Charitou and Constantinidi (2003) who examined England capital market in period from 1992-2001 and also by Ajili (2003) by samples of France in period from 1965-1996. The obtained result is that three factors model cannot explain the change of stock return.

Chan *et al.* (1991) did research for Japan capital market. The observed period was from 1971-1988. The result indicated firm size effect and a significant positive relation between firm size and book to market equity. However, Djajadikerta and Nartea (2009) who observe New Zealand capital market in period from 1994-2002 have found that firm size is the only factor, rather than book to market equity which is able to explain the change of stock return. Thus, this finding was not supporting three factors model. Similar result was also proposed by Drew *et al.* (2003) and Wang and Xu (2004) who observed China capital market. Their results indicated that only firm size has significant influence to stock return change while book to market equity fails to give explanation. As observed by Wang and Xu (2004), 2/3 companies in China are owned by the state. Stock ownership by insurance companies or retirement trusts is only <10%. Private investment companies have only less 30% their stock circulated. The remaining 60% operational stocks are governed by individual investors. However, individual investors are more towards speculators than investors. They do not care of fundamentals of companies. The understanding of individual investors on financial statement is also low. That is why, book to market equity does not play an important role in China capital market.

Indian capital market has been examined but it come out with various results. Taneja (2010) has observed India capital market from 2004-2009 and SenthilKumar (2009) also examined similar place from 2002-2008. Both results are basically similar where three factors model is applicable to Indian capital market. The only difference is that SenthilKumar (2009) reported a negative significant relation for firm size while book to market equity remains positive significant.

Research about Fama and French's Three Factors Model applied in emerging markets was done by Al-Mwalla (2012). The sample is Amman Stock Market from 1999-2010. The result indicates that firm size and book to market equity have great stake to explain stock return change. It means that three factors model can be applied CAPM well there. However, Rehman *et al.* (2013) disagreed with this finding and hence, they did research on Karachi Stock Exchange in Pakistan from 2003-2007.

They found that three factors model can not explain stock return phenomena in Pakistan. CAPM explains better than three factors model.

Colombo Stock Exchange has been observed by Shafana *et al.* (2013) and they found that three factors model is not effective in explaining stock return change. It shows that book to market equity has negative significant relation while firm size has positive but insignificant relation. The findings are not much different from Eraslan (2013) in their research at Istanbul Stock Exchange in period from 2003-2010. The result shows that firm size does not have significant influence on small companies but have significant influence on medium and big companies. It means that three factors model cannot be applied at emerging market. Drew and Veeraraghavan (2009) have observed Kuala Lumpur Exchange and find favorable application of three factors model.

Similar researches have been conducted on Indonesia Stock Exchange but various results. Come out Hardianto and Suherman have examined companies in Indonesia Stock Exchange from 2000-2004 and the result supports Fama and French's Three Factors Model. Ferdian *et al.* (2011) took samples from companies listed at Jakarta Islamic Index in period from 2007-2009 and the result also supports three factors model. It means that three factors model can be better than CAPM in explaining the phenomena of stock return change in shariah market in Indonesia. Book to market equity has significant influence but with negative sign. Murtini and Dede (2008) who observed LQ-45 companies group in period from 2000-2007 and Sudiyatno and Irsad (2011) who examined LQ-45 companies group in period from 2007-2009, reported similar result that CAPM is better than three factors model in explaining phenomena of stock return change.

It is proven that results of researches in emerging markets are not consistent to each other, especially in Indonesia. Researches about Fama and French's Three Factors Model in Indonesia is still very few. Therefore, this current research attempts to re-attest the application of Fama and French Three Factors Model within Indonesia Stock Exchange. The sample used is the companies listed in LQ-45 from January 2010 to December 2013.

Hypothesis: Some hypotheses are proposed:

- H_1 : There is a positive influence from excess market return on stock return
- H_2 : There is a positive influence from firm size on stock return
- H_3 : There is a positive influence from book to market equity ratio on stock return

MATERIALS AND METHODS

Sample: The objective of research is to review the behavior of stock return due to the change of firm size and book to market equity. Sample is taken from companies listed at LQ-45 from August 2013 to January 2014. The companies listed in LQ-45 are considered as 45 best companies and are representative of the existing companies in the list. The companies listed in LQ-45 are also the liquid companies because market capitalization of these companies is 74.53% of that of all companies listed in Indonesia Stock Exchange (Chandra, 2013). Sampling technique is purposive sampling. The sample must have registered with Indonesia Stock Exchange, since January 2010 to December 2013. The companies must neither have negative, nor negative profit.

Based on the data of LQ-45 companies, 43 companies are reliable while only 2 companies are not. One company is suffering from loss in 2 recent years and another company is only registered in 06 October 2010. These 43 LQ-45 companies are analyzed and given deep examination. Companies are classified into some big sector groups. This big sector groups consist of 7 companies in main sector (raw material producer industry), 12 companies in manufacture sector and 24 companies in service sector.

Operational definition of variables: Every variable will be defined to produce similar perception for all variables.

Market Return (R_M): Market return is a return obtained from market and it is represented by Indeks Harga Saham Gabungan (IHSG). Monthly historical IHSG is used to measure monthly market return. A mathematical formula for this measure is as follows:

$$R_M = (P_t - P_{t-1}) / P_{t-1} \tag{1}$$

Where:

- R_M = Market return
- P_t = IHSG at month t
- P_{t-1} = IHSG at month t-1

Stock Return (R_i): Stock return is the revenue obtained from the difference of the recent month stock price and previous month stock price. The calculation step of stock return is similar to market return but with different items which is:

$$R_i = (P_t - P_{t-1}) / P_{t-1} \tag{2}$$

Where:

- R_i = Stock return
- P_t = Stock price at month t
- P_{t-1} = Stock price at month t-1

Firm size: Firm size is the number of circulated stocks calculated by multiplying with the price of stocks held by the sample companies. The multiplication product will be the guide to classify companies into Big (B) and Small companies (S). Market capitalization is ordered from the biggest to the smallest. The median rate is obtained from this order. The companies above the median are included within Big companies group (B) while those below the median are classified into Small companies group (S).

Book to Market Equity ratio (BE/ME): Book to market equity ratio is also called Book Equity to Market Equity ratio (BE/ME). BE/ME is a process when book rate of capital divided by market rate of capital (market capitalization). Book rate of capital describes capital total outside preferred stock capital. Market rate of capital is the multiplication between the number of circulated stocks and the price of stocks in market (market capitalization).

Result of BE/ME calculation is ranked from the highest to the lowest. The ratio above 30% upper parts is included into High group (H), 40% in the middle part is set into Medium group (M) and 30% remaining are entered into Low group (L).

After the categories are arranged, the groupings based on firm size and BE/ME will be S/L, S/M, S/H, B/L, B/M and B/H. Portfolio is made for each group.

Small Minus Big (SMB): Small Minus Big (SMB) is a proxy of firm size. SMB is obtained from the differential between monthly average return of three stock portfolios in small companies (S/L, S/M, S/H) and that of three stock portfolios in big companies (B/L, B/M, B/H). The mathematic formula is written as follows:

$$SMB = 1/3(SL+S/M+S/H) - 1/3(B/L+B/M+B/H) \tag{3}$$

Where:

- SMB = The monthly differential between the average return of stock portfolios in small companies (S/L, S/M, S/H) and that of stock portfolios in big companies (B/L, B/M, B/H)
- S/L = Small portfolio size and Low BE/ME
- S/M = Small portfolio size and Medium BE/ME
- S/H = Small portfolio size and High BE/ME
- B/L = Big portfolio size and Low BE/ME
- B/M = Big portfolio size and Medium BE/ME
- B/H = Big portfolio size and High BE/ME

High Minus Low (HML): High Minus Low (SMB) is a proxy of book to market equity ratio. HML is the differential between the average return of two portfolios

with High BE/ME (S/H and B/H) and that of two portfolios with Low BE/ME (S/L and B/L). The formula is written as follows:

$$HML = 1/2(S/H+B/H) - 1/2(S/L+B/L) \quad (4)$$

Where:

HML = The differential between the average return of two portfolios with High BE/ME and that of two portfolios with Low BE/ME

S/H = Small portfolio size and High BE/ME

B/H = Big portfolio size and High BE/ME

S/L = Small portfolio size and Low BE/ME

B/L = Big portfolio size and Low BE/ME

Risk Free (R_F): Risk Free (R_F) is the interest rate which is not influenced by macroeconomic factors. Risk free in Indonesia refers to SBI's monthly interest rate. Indeed, SBI interest rate is considered risk free and reliable to be a proxy of R_F.

Data analysis technique: Fama and French's Three Factors Model is tested using the following model:

$$R_i - R_F = a + b_1(R_M - R_F) + b_2(SMB) + b_3(HML) + e \quad (5)$$

Where:

R_i = Stock Return i

R_F = Risk Free interest rate (monthly SBI)

R_M = Market Return described from IHSG return

SMB = Small Minus Big

HML = High Minus Low

a = Constant

b₁ = Regression coefficient or market beta from risk premium

b₂ = Regression coefficient of stock i from SMB

b₃ = Regression coefficient of stock i from HML

e = Error term

RESULTS AND DISCUSSION

The descriptive result of this research is illustrated in the following Table 1. Year 2011 is a misery year for Indonesian capital market if compared to Year 2010. Excess market return (R_M-R_F) decreases by 109% in 2011 compared to 2010. Stock return (R_i-R_F) of LQ-45 companies also deprives by 102.22% in 2011 compared to 2010. Further, observation on LQ-45 emittents has shown that this deprivation is due to the reduction in main sector group. The reduction in main sector group is 208.13% in 2011 compared to 2010. Both other sectors are also declining but the rate is still similar to the reduction of excess market return. Manufacture sector group decreases by 96.71% while service sector group declines by 90.51%.

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

Variables (R _i -R _F)	Years			
	2010	2011	2012	2013
Main	0.03000	-0.03244	-0.00774	-0.00420
Manufacture	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

The reduction of stock return in 2011 compared to 2010 in main sector group is evenly distributed, including in agriculture and mining sector. A company with sharp reduction remains in agriculture sector which is PP London Sumatera Tbk (LSIP) with reduction of 361.95%. Other company with quite sharp reduction is also in agriculture sector which are Astra Agro Lestari Tbk (AALI) with reduction of 320.75%. Other companies have their reduction below 100%.

Main sector group experiences the reduced stock return by 96.71% in 2011 compared to 2010. This reduction is triggered by the decline in base and chemical sector by 115.38% while industry variety sector and consumption goods sector only show decrement of 80.76 and 73.58%. The decline in base and chemical sector begins with the deterioration of Malindo Feedmill Tbk (MAIN) and Charoen Pokphand Indonesia Tbk (CPIN). The return of MAIN declines by 130.41% while that of CPIN decreases by 112.51%. Other companies also experience degradation but it still remains below 100%.

Service sector group decreases by 90.51% in 2011 compared to 2010. The decrease is mostly contributed by infrastructure, utility and transportation sector and financial sector. The infrastructure, utility and transportation sector declines by 119.84% while financial sector declines by 119.79%. Property and real estate sector and also trade, service and investment sector have experienced such condition but not too big deprivation (still below 100%). The sharpest decline is found in infrastructure, utility and transportation sector which occurs within Perusahaan Gas Negara Tbk (PGAS) by 270.89%. The decline in financial sector is greatly contributed by the decline in Bank Danamon Tbk (BDMN) by 223.176%.

Market condition in Year 2012 has improved. Excess market return is increasing by 362.61% compared to 2011. Stock return of LQ-45 Companies also improves by 911.94% compared to 2011. The increase of stock return in Indonesia capital market is greatly contributed by service sector group. Stock return at service sector group has ascended by 262.24% in 2012 compared to 2011. Main

sector group only increases by 76.14%. In contrast, manufacture sector group has its stock return reduced by 41.90% in 2012 compared to 2011.

Stock return reduction experienced by manufacture sector group in 2012 is mostly caused by the decline of return in industry variety sector and consumption goods sector. Base and chemical industry sector has its excess market return increased. The greatest contribution to the decline comes from industry variety sector, precisely from Astra International Tbk (ASII) by 454.89%. The greatest decline in consumption good sector is experienced by Kalbe Farma Tbk (KLBF) of 1954%.

Service sector group improves by 262.24% from 2011 to 2012. This improvement is greatly contributed by the increment in infrastructure, utility and transportation and financial sector. The inclined stock return in 2012 in infrastructure, utility and transportation sector is 453.42% while the financial sector is increased by 271.05%. Other sectors in service sector group are property and real estate and trade sector, service and investment sector. Both sectors also experience the inclined stock return in 2012 which is by 33.7% for property and real estate sector and 23.10% for trade, service and investment sector. The increment of both sectors is not quite big compared to other first two sectors in service sector group.

Indonesian capital market, however, regains the decline in 2013 compared to 2012. This decline is apparent with the decreased excess market return by 195.68%. The decline is also proven by the stock return of LQ-45 companies which decreases by 163.69%. The decline in 2013 is greatly caused by the decrement of service sector group and manufacture sector group. Conversely, main sector groups experience increment in 2013.

The increment of stock return in main sector group in 2013 is contributed by the improvement of agriculture sector. Stock return in agriculture sector inclines by 492.31% from 2012 to 2013. The inclined stock return in agriculture sector is greatly contributed by Astra Agro Lestari Tbk (AALI) and PP London Sumatera Tbk (LSIP). The improvement in 2013 represents the counter flow against the decrement in 2011. The mining sector in main sector group is declining. Although, the mining sector is deteriorated in average vale Indonesia Tbk (INCO) which

is a company in the mining sector, experiences an improvement. Manufacture sector group has its stock return reduced by 315.65% in 2013 compared to 2012. The reduction of stock return is mostly contributed by base and chemical industry sector. Meanwhile, industry variety sector and consumption goods sector experience the improvement.

Excess market return fluctuated from 2010 to 2013 and so did the factor of firm size (SMB). Only in 2012, the improvement is proven for excess market return without being followed by firm size. It means that market movement is always followed by firm size. Factor of book to market equity (HML) always follows market fluctuation. Any increment or decrement in market is always followed by similar trend.

The testing of multiple linear regression models: The testing of multiple linear regression models involves eight models. Four models are used for Fama and French's Three Factors Model and four others are for CAPM. Each model is counted to produce the total that represents LQ-45 companies. All models are broken down into main sector group, manufacture sector group and service sector group. Multiple linear regression models will attest the influence of Fama and French's Three Factors Model, consisting of excess market return, firm size (SMB) and book to market equity (HML) on stock return. The result of multiple linear regression models is shown in Table 2.

LQ-45 companies: Models and hypotheses elaborated in this section are used to answer the problems faced by LQ-45 companies. The following are hypotheses and multiple linear regression models developed to answer those problems.

Hypotheses:

- H₁: there is a positive influence from excess market return on stock return
- H₂: there is a positive influence from firm size on stock return
- H₃: there is a positive influence from book to market equity ratio on stock return

Table 2: Result of hypothesis testing

Sector groups	FF3 factor (variables)							CAPM (Variables)						
	Market		SMB		HML		F-ratio		Market		F-ratio		R ²	
	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Adj. R ²	Coefficient	Sig.			
Main	0.199	0	0.212	0.004	0.131	0.070	9.913	0	0.084	0.245	0	20.813	0	0.107
Manufacture	0.266	0	0.027	0.626	-0.181	0.001	23.411	0	0.107	0.267	0	43.110	0	0.071
Service	0.348	0	0.222	0.000	0.172	0.000	84.191	0	0.181	0.348	0	209.515	0	0.157
Total	0.296	0	0.151	0.000	0.043	0.129	93.521	0	0.121	0.296	0	241.240	0	0.107

Fama and French's Three Factors Model:

$$Y_{SR} = -0.001(0.811) + 1.109(0.000)X_{MR} + 0.336(0.000)X_{SMB} + 0.072(0.129)X_{HML}$$

CAPM:

$$Y_{SR} = 0.013(0.000) + 1.225(0.000)X_{MR}$$

Both Fama and French Three Factors Model and CAPM Model show good results. F-ratio in Fama and French's Three Factors Model is 93.521 at significance level of $0.000 < 0.05$. Therefore, null hypothesis is rejected. It means that Fama and French's Three Factors Model can give good explanation about stock return phenomena. The similar case is also evident in CAPM. The obtained F-ratio is 241.240 at significance level of $0.000 < 0.05$ and thus, null hypothesis is also rejected. It means that CAPM can explain in expected way the occurrence of stock return. Coefficients of determination of Fama and French's Three Factors Model and CAPM are 0.121 and 0.107. It means that three factors in Fama and French's Three Factors Model such as excess market return, firm size (SMB) and book to market equity (HML), are able to explain any changes of stock return by 12.1% while the remaining 87.9% are explained by other factors beyond excess market return, firm size (SMB) and book to market equity (HML) at LQ-45 companies. For CAPM, excess market return can explain stock return changes by 10.7% while the remaining 89.3% is explained by other factors other than excess market return at LQ-45 companies.

Result of testing with multiple linear regression against CAPM and Fama and French's Three Factors Model is elucidated as follows. Factor of excess market return is significant (Sig. $0.000 < 0.05$) such that null hypothesis is rejected. It means that CAPM can answer the phenomena of stock return changes. Firm size (SMB) in Fama and French's Three Factors Model is significant (Sig. $0.000 < 0.05$) such that null hypothesis is rejected. However, book to market equity (HML) is showing insignificant result (Sig. $0.129 > 0.05$) such that null hypothesis is accepted. For Fama and French's Three Factors Model, only factors of excess market return and firm size that have significant influence on stock return while book to market equity has positive orientation but the influence is not significant.

Main sector group: Models and hypotheses discussed here will be used to answer the problems faced by companies at main sector group. The following are hypotheses and multiple linear regression models developed to answer those problems.

Hypotheses:

- H₁: There is a positive influence from excess market return on stock return
- H₂: There is a positive influence from firm size on stock return
- H₃: There is a positive influence from book to market equity ratio on stock return

Fama and French's Three Factors Model:

$$Y_{SR} = -0.016(0.021) + 0.588(0.000)X_{MR} + 0.372(0.004)X_{SMB} + 0.172(0.070)X_{HML}$$

CAPM:

$$Y_{SR} = -0.003(0.607) + 0.721(0.000)X_{MR}$$

The models used in main sector group are similar to those used in LQ-45 companies. Both Fama and French's Three Factors Model and CAPM are showing good results. F-ratio in Fama and French's Three Factors Model is 9.913 at significance level of $0.000 < 0.05$ and therefore, null hypothesis is rejected. It means that Fama and French's Three Factors Model can provide good explanation about stock return phenomena. The similar case is also found in CAPM where the obtained F-ratio is 20.813 at significance level of $0.000 < 0.05$ and thus, null hypothesis is also rejected. It means that CAPM can give good explanation about stock return phenomena. Coefficients of determination of Fama and French's Three Factors Model and CAPM are 0.084 and 0.060 respectively, it means that three factors in Fama and French's Three Factors Model such as excess market return, firm size (SMB) and book to market equity (HML) are able to explain the changes of stock return by 8.4%, while the remaining 91.6% are explained by other factors other than excess market return, firm size (SMB) and book to market equity (HML) in companies in main sector group. In CAPM, excess market return can explain stock return changes by 6% while the remaining 94% must be explained by other factors other than excess market return in companies at main sector group.

Result of testing with multiple linear regression against CAPM and Fama and French's Three Factors Model in main sector group is illustrated as follows. It indicates that factor of excess market return is significant (Sig. $0.000 < 0.05$) such that null hypothesis is rejected. It means that CAPM can answer the phenomena of stock return changes. Firm size (SMB) in Fama and French's Three Factors Model is significant (Sig. $0.004 < 0.05$), such that null hypothesis is also rejected. However, book to market equity (HML) is showing insignificant result (Sig. $0.070 > 0.05$) such that null hypothesis is accepted.

For Fama and French's Three Factors Model, only factors of excess market return and firm size have significant influence on stock return while book to market equity is only significant if the alpha is 10%.

Manufacture sector group: Models and hypotheses used in this section are used to answer the problems faced by companies in manufacture sector group. The following are hypotheses and multiple linear regression models developed to answer those problems.

Hypotheses:

- H₁: There is a positive influence from excess market return on stock return
- H₂: There is a positive influence from firm size on stock return
- H₃: There is a positive influence from book to market equity ratio on stock return

Fama and French's Three Factors Model:

$$Y_{SR} = -0.001(0.900) + 1.227(0.000)X_{MR} + 0.074(0.626)X_{SMB} - 0.372(0.001)X_{HML}$$

CAPM:

$$Y_{SR} = 0.017(0.022) + 1.229(0.000)X_{MR}$$

The models used in manufacture sector group are similar to those used in LQ-45 companies and main sector group. Both Fama and French's Three Factors Model and CAPM are showing good results. F-ratio in Fama and French's Three Factors Model is 23.411 at significance level of 0.000<0.05 and therefore, null hypothesis is rejected. It means that Fama and French's Three Factors Model can provide good explanation about stock return phenomena. The similar case is also found in CAPM where the obtained F-ratio is 43.110 at significance level of 0.000<0.05 and thus, null hypothesis is also rejected. It means that CAPM can give good explanation about stock return phenomena. Coefficients of determination of Fama and French's Three Factors Model and CAPM are 0.107 and 0.071. It means that three factors in Fama and French's Three Factors Model such as excess market return, firm size (SMB) and book to market equity (HML) can explain the changes of stock return by 10.7% while the remaining 80.3% is explained by other factors other than excess market return, firm size (SMB) and book to market equity (HML) in companies at manufacture sector group. In CAPM, excess market return can explain stock return changes by 7.1% while the remaining 92.9% must be explained by other factors other than excess market return in companies at manufacture sector group.

Result of testing with multiple linear regression against CAPM and Fama and French's Three Factors Model in manufacture sector group is elaborated as follows. It is shown that factor of excess market return is significant (Sig. 0.000<0.05) such that null hypothesis is rejected. It means that CAPM can answer the phenomena of stock return changes. Firm size (SMB) in Fama and French's Three Factors Model is significant (Sig. 0.626<0.05) such that null hypothesis is also rejected. Although, book to market equity (HML) is showing significance level at 0.001<0.05 but the direction of influence is negative. This direction is not matched with hypothesis and therefore, null hypothesis is accepted. In Fama and French's Three Factors Model, only factor of excess market return has significant influence on stock return while book to market equity is also significant but with negative orientation.

Service sector group: Models and hypotheses used by service sector group are applied to answer the problems faced by companies at service sector group. The following are hypotheses and multiple linear regression models developed to answer those problems.

Hypotheses:

- H₁: There is a positive influence from excess market return on stock return
- H₂: There is a positive influence from firm size on stock return
- H₃: There is a positive influence from book to market equity ratio on stock return

Fama and French's Three Factors Model:

$$Y_{SR} = 0.004(0.368) + 1.202(0.000)X_{MR} + 0.457(0.000)X_{SMB} - 0.265(0.000)X_{HML}$$

CAPM:

$$Y_{SR} = 0.016(0.000) + 1.370(0.000)X_{MR}$$

The models used in service sector group are better than those used by other groups. Both Fama and French's Three Factors Model and CAPM show good results. F-ratio in Fama and French's Three Factors Model is 84.191 at significance level of 0.000<0.05 and therefore, null hypothesis is rejected. It means that Fama and French's Three Factors Model can provide good explanation about stock return phenomena. The similar case is also apparent in CAPM where the obtained F-ratio is 209.515 at significance level of 0.000<0.05 and thus, null hypothesis is also rejected. It means that CAPM can give good explanation about stock return phenomena.

Coefficients of determination of Fama and French's Three Factors Model and CAPM are 0.181 and 0.157, respectively, it means that three factors in Fama and French's Three Factors Model such as excess market return, firm size (SMB) and book to market equity (HML), can explain the changes of stock return by 18.1% while the remaining 81.9% is explained by other factors other than excess market return, firm size (SMB) and book to market equity (HML) in companies in service sector group. In CAPM, excess market return can explain stock return changes by 15.7% while the remaining 84.3% must be explained by other factors other than excess market return in companies in service sector group.

Result of testing with multiple linear regression against CAPM and Fama and French's Three Factors Model in service sector group is explained as follows. It is indicated that factor of excess market return is significant (Sig. $0.000 < 0.05$) such that null hypothesis is rejected. It means that CAPM can answer the phenomena of stock return changes. Firm size (SMB) in Fama and French's Three Factors Model is significant (Sig. $0.000 < 0.05$), such that null hypothesis is also rejected. Factor of book to market equity (HML) shows significance level at $0.000 > 0.05$, thus, null hypothesis is rejected. In Fama and French's Three Factors Model of service sector group, all factors including excess market return, firm size and book to market equity display significant result.

CONCLUSION

Based on the results of CAPM from LQ-45 companies main sector group, manufacture sector group and service sector group, it is shown that CAPM can explain stock return phenomena. It aligns with Ross (1976) and Rehman *et al.* (2013). Researches with similar topic are conducted in Indonesia by Murtini and Dede (2008) and Sudiyatno and Irsad (2011). Those researches above contrasted with Ferdian *et al.* (2011) for Indonesia shariah companies. Indonesia investors do not consider market risk adhered to shariah companies. Other investors seem very considerate to market risk in companies listed on LQ-45 because those companies are considered as high-rank companies. This finding is supported by Murtini and Dede (2008).

In the case of Fama and French's Three Factors Model, the various results are obtained from LQ-45 companies, main, manufacture and service sector group. The role of excess market return in explaining the phenomena of stock return changes is admitted by all samples in LQ-45 companies, main, manufacture and service sector group. Such result is consistent to Fama

and French (1993), Davis *et al.* (2000), Charitou and Constantinidi (2003), Ajili (2003), Taneja (2010) and Al-Mwalla (2012). The similar result is also obtained within Indonesia context as shown by Murtini and Dede (2008), Ferdian *et al.* (2011). In the case of Indonesia, all agree that excess market return has clear contribution to describe stock return phenomena.

Second factor in Fama and French's Three Factors Model is firm size (SMB). Result of current research indicates that LQ-45 companies and companies in main sector group and service sector group have admitted that firm size plays important role in explaining stock return changes. Manufacture sector group disagrees with the contribution of firm size to stock return changes. Banz (1981), Blume and Stambaugh (1983), Chan *et al.* (1991), Fama and French (1993), Liew and Vassalou (2000), Davis *et al.* (2000), Charitao and Constantinidi (2003), Ajili (2003), Taneja (2010), Drew *et al.* (2003), Wang and Xu (2004), Djajadikerta and Nartea (2009) and Al-Mwalla (2012), all of them support the conclusion about the role of firm size to stock return changes. Indonesian research which supports the role of firm size includes Ferdian *et al.* (2011). Results for manufacture sector group do not admit the role of firm size and this result is supported by Shafana *et al.* (2013) for Colombo Stock Exchange and also by Eraslan (2013) for small companies at Istanbul Stock Exchange. Indonesian research which rejects the role of firm size is for LQ-45 companies in period from 2007-2009. It means that only investors in manufacture sector group and/or those experiencing 2008-2009 crisis are who do not consider the role of firm size.

RECOMMENDATIONS

Book to market equity (HML) is the third factor of Fama and French's Three Factors Model. This factor is not responded well by investors in LQ-45 companies. Investors seem more considering toward book to market equity of sector groups, except investors from manufacture sector group who give negative response to this factor. The finding of less response to book to market equity in LQ-45 companies is supported by Griffin and Lemmon (2002), Drew and Veeraraghavan (2009), Charitou and Constantinidi (2003), Ajili (2003), SenthilKumar (2009), Taneja (2010), Al-Mwalla (2012) and Eraslan (2013). Indonesian research supporting this finding is Hardianto and Suherman for Jakarta Stock Exchange in period from 2000-2004. Manufacture sector group is unique because it gives good response, although the direction of influence is negative. This finding is supported by Shafana *et al.* (2013) and Ferdian *et al.* (2011).

All results of this current research have various implications. In general, buying the stocks of LQ-45 companies shall not be necessary to consider book to market equity. However, firm size and excess market return are very important to consider if the investors do expecting better stock return. Only in main sector group, those factors above have similar behavior. In manufacture sector group, firm size is not the determinant for stock selection but excess market return and book to market equity are more influential. In service sector group, all three factors in Fama and French's Three Factors Model are important to consider.

Although, LQ-45 companies have been deeply observed, further research is still needed to overview the sector groups in Indonesia Stock Exchange. The membership of these sector groups may vary. For example, service sector group comprises of: property and real estate sector; trade, service and investment sector; infrastructure, utility and transportation sector and financial sector. Each sector has different characteristic. Therefore, it may be suggested that the next researches shall do deep examination about the consistency of the current results to the other existing sectors at Indonesia Stock Exchange.

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