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Performance Analysis in ILQ-45 Stock for 2017-2020 Period

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Abstract

Research conducted by Fama and French in 1996 showed that there were factors other than the beta that were significantly able to predict stock returns. In other words, the Fama and French Three Factors Model (TFMFF) is better than the Capital Asset Pricing Model (CAPM). However, several subsequent studies showed inconsistent results. The discrepancy between the results of previous studies prompted this research to be carried out. In this study, the researchers selected the stocks used based on the criteria for company profits and return on equity (ROE) offered by Warren Buffett. This study uses Buffett's criteria in selecting stocks to compare the ability of CAPM and TFMFF to estimate the return of stocks grouped into the Fama & French portfolio. The method used is quantitative. The secondary data used are quarterly close price data, mining company equity value, Bank Indonesia interest rate (risk-free rate), and number of outstanding shares (number of shares outstanding). The results of this study indicate that TFMFF is more accurate than CAPM in predicting stock returns.

Keywords: *Risk Premium, Size, BE/ME, Rate of Return.*

Introduction

Investment is a delay in current consumption to be used in efficient production for a certain period (Hartono, 2022). Investment analysis often needs help, namely in assessing the risks faced by investors. The financial theory explains that when investment risk increases, the level of profit required by investors is greater. To reduce investment losses/risks, investors can invest in various types of stocks by forming a portfolio (Frank, 1999). Meanwhile, according to Jones (Jones, 2000), rational investors make investment decisions starting by analyzing the current situation, designing optimal portfolios, formulating investment policies, implying investment strategy, and monitoring and supervising the specific performance of financial managers.

The existence of a positive relationship between return and risk in investing is known as high risk-high return, which means the greater the risk that must be borne, the greater the return generated. Return is the result obtained from the investment. Returns can be in the form of realized returns that have occurred or expected returns that have not occurred but are expected to occur in the future. Meanwhile, portfolio risk consists of systematic and unsystematic risks. These two risks are often referred to as total risks (Hartono, 2022). According to Elton and Gruber (Elton & Gruber, 1977), portfolio analysis is concerned with the desire to acquire a group of securities to hold and earn profit from each of these securities. A portfolio is categorized as efficient if it has the same level of risk, can provide a higher level of profit, or can generate the same level of profit but with a lower risk. The optimal portfolio is a portfolio that an investor chooses from the many choices available in an efficient portfolio collection (Eduardus, 2001).

The diversification strategy is carried out with an optimal portfolio, which means that profits are obtained by diversifying into various investments with a certain number of securities that have a fairly high return. The optimal portfolio is achieved by performing simulations on several securities that are considered efficient using certain calculation procedures. Forming a portfolio or several requires selected stocks to be combined into the portfolio. The number of shares chosen to form a portfolio varies greatly; it depends on the investor's preference for the stock itself. In the context of investment, the saying can be interpreted as

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"Don't invest all the funds we have in just one asset, because if that asset fails, then all the funds that have been invested will disappear" (Eduardus, 2001).

The popular calculation model used is the Capital Asset Pricing Model (CAPM). In its application, the CAPM uses a single risk factor, namely market risk, as a measure of risk when estimating returns. According to Gitman and Zutter (2011), there are two types of risk in the CAPM. The first is unsystematic risk, and the second is systematic risk. When the two types of risk are combined, it is called total risk. However, the Capital Asset Pricing Model has yet to be proven empirically. The CAPM model has been widely used because it is fairly accurate in determining the return of stock. The CAPM model assumes that investors are planners in a single period who have the same perception of market conditions and seek the mean-variance of the optimal portfolio. Fama and French (1996) found that there are two other risk factors besides market risk, namely firm size, which is proxied by small minus big (SMB), and book-to-market equity, which is proxied by high minus low (HML) in their model. Known as the Three Factors Model Fama and French (TFMFF). The factors that influence the return, according to Fama and French, are size, beta, and book-to-market equity. Size (size) of shares seen through the market capitalization value of shares (number of shares outstanding multiplied by the share price). Small stocks tend to have a higher risk because they have a higher expected return than large stocks. Large book-to-market equity (BE/ME) reflects investors who are pessimistic about the company's future.

On the other hand, if investors are optimistic about the company's future, the book-to-market equity value will be small. Beta is a measure of the volatility (volatility) of a security's return or portfolio return on market returns. Fama and French (1996), in their research, found that firm size (SMB) and BE/ME (HML) had a significant effect on returns, and the double determination value of TFMFF was greater than CAPM. Some researchers agree with the findings of Fama and French (1996), such as the research that can be seen by Nur'ainy et al. (2013) and Pasaribu (2010). However, several other researchers disagree with Fama and French's research, such as the research that can be seen by Saputra and Martini (2008) and Sudiyatno and Irsad (2011).

The discrepancy between the results of previous studies prompted this research to be carried out. In this study, the researchers selected the stocks used based on the criteria for company profits and return on equity (ROE) offered by Warren Buffett. Warren Buffett, in his book "The Guru Investor: How to Beat Market Using History's Best Investment Strategies," states the criteria for company profits and good ROE for a company. This study uses Warren Buffett's criteria in selecting stocks to compare the ability of CAPM and TFMFF to estimate the return of stocks grouped into the Fama & French portfolio.

Literature Review

Investment in Shares

Investment can be interpreted as an activity to invest capital either directly or indirectly, with the hope that, in time, the owner of the capital will get several benefits from the investment. One alternative investment is capital market stocks. Investments in stocks are short-term investments and long-term investments, depending on the purpose of the purchase. Investments in the form of shares, which are classified as long-term investments, are usually carried out for various purposes (Jones, 2000), namely (1) to monitor the company, (2) to obtain fixed income every period, (3) to establish a special fund, (4) to ensure continuity of material supply, (5) to maintain relations between subsidiaries.

Return, Risk and Portfolio

Sharpe (1995) states that risk and return are two characteristics of investment; therefore, it is very important to know their origin. Important contributing factors must be identified and evaluated. This is the main task of securities analysis, and the results are crucial elements for forming portfolios, revising, evaluating, and establishing long-term investment strategies.

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Return is a reward for the courage of investors to take risks on the investments made. The sources of investment returns consist of two main components, namely yields and capital gains. Yield is a component of return that reflects the cash flow or income obtained periodically from an investment. Capital gain is an increase in the price of securities (shares or long-term debt), which can provide benefits for investors. The sum of yields and capital gains is referred to as the total return of an investment (Eduardus, 2001).

According to Ang (1997), a portfolio is a collection of investment instruments that are formed to meet investment targets. Jones (2000) argues that a portfolio is a collection of securities in which a relatively small amount of funds can be invested by buying shares of companies operating in various types of industries; in addition to that, the portfolio will reduce risk.

Diversification

Diversification is the distribution of assets. Diversification should be increased as long as the marginal profit exceeds the marginal cost. Statman (1987) states that the advantage of diversification is in reducing risk. While the costs are transaction fees. The difference of opinion for limiting diversification is that the marginal cost increases faster than the marginal profit from increasing diversification.

Furthermore, Sharpe (1995) argues that diversification can reduce risk, especially non-market risk. If the value of one stock is worse than expected, the other stock may be better than expected. Generally speaking, the more stocks in a portfolio, the more likely it is that enough good fortune (good stock) will emerge to offset bad luck (bad stock). Sharpe further stated that with increasing diversification, the amount of non-market risk can be expected to decrease but not proportionally.

Efficient Portfolio and Optimal Portfolio

Rational investors will choose an efficient portfolio because it is a portfolio formed by optimizing one of two dimensions, namely the expected return or portfolio return. An efficient portfolio is a portfolio that provides the largest expected return with a definite level of risk or a portfolio that contains the smallest risk with a definite level of expected return. A portfolio is said to be efficient if it lies in the efficient set or efficient frontier.

Warren Buffet Stock Selection Criteria

Warren Edward Buffett is an American investor, entrepreneur, and philanthropist. He is the most successful investor in the world. Buffett is a commissioner, managing director, and the largest shareholder in Berkshire Hathaway. He was the third richest person in the world in 2015, according to Forbes. Warrant Buffet divides investment techniques into 4 valuation principles, that is business principles (business tenet), management principles (management tenet), financial principles (financial tenet), and value principles (value tenet). In this study, the company's profit criteria and Return on Equity (ROE) were used as proposed by Warrant Buffet.

Capital Asset Pricing Model (CAPM)

The Capital Asset Pricing Model (CAPM) explains the relationship between return and beta. Understanding CAPM was first raised in the mid-1960s by Willian F. Sharpe, Linter, and Mossin. William F. Shape is a Professor of Finance at the Stanford University Graduate School of Business. Investors need an analytical tool to calculate the level of portfolio returns. The establishment of common equilibrium models allows investors to determine the relevant risk metrics. One of the existing balance models is the CAPM.

The main functions of the Capital Assets Pricing Model (CAPM) according to Zubir (2011) are:

As a benchmark in evaluating the rate of return on an investment

Assist in predicting or predicting the expected return of an asset that is or has not been traded in the market.

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Three Factors Model Fama and French (TFMFF)

Suppose the Capital Asset Pricing Model (CAPM) method is the only indicator of return assessment, which is the risk premium (beta). In that case, the theory development carried out by Fama and French involves two added variables to measure the stock returns owned by investors. Alternatively, it is known as the Capital Asset Pricing Model (CAPM) and the Three Factors Model Fama and French (TFMFF). The two variables are size and book-to-market equity. The addition of these two variables gives some researchers the assumption that this is the most efficient model to use in calculating returns.

Hypothesis

• H1: Market risk as proxied by market return affects the rate of return for each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H).

• H2: Firm size proxied by SMB affects the rate of return for each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H).

• H3: BE/ME proxied by HML affects the rate of return for each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H).

Research Methods

Research Time and Location

This research was conducted on companies whose shares were listed in ILQ 45 for the 2017-2020 period. The secondary data used are quarterly close price data, mining company equity value, Bank Indonesia interest rate (risk-free rate), and number of outstanding shares (number of shares outstanding). The share price of each company per month is obtained from the Yahoo Finance website (www.yahoofinance.com), the equity value of each company and data on the number of outstanding shares are obtained from the financial statements of each company that have been published on the Indonesia Stock Exchange website (www.idx.co.id) as well as in the Indonesia Capital Asset Market Electronic Library (ICAMEL) database, and the risk-free rate per month is obtained from the Bank Indonesia website (www.bi.go.id).

Research Design and Type

Research Design

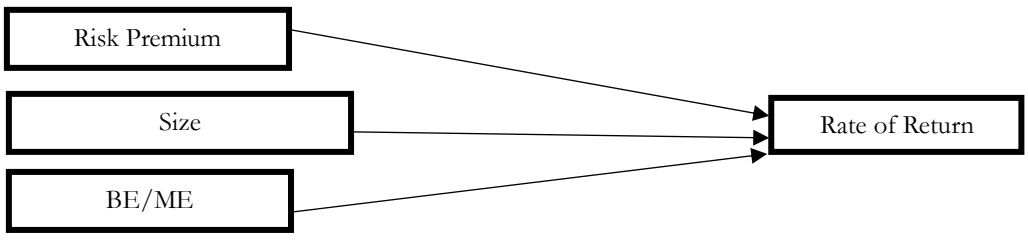

Figure 1. Research Framework

Independent Variables: Risk Premium, Size (Company Size) and BE/ME.

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Dependent Variable: Rate of Return

Types of Research

The type of research used in this research is quantitative research. The quantitative method is called the traditional method because this method has been used for a long time, so it has become traditional as a method for research. This method is called the positivistic method because it is based on the philosophy of positivism. This method is a scientific/scientific method because it has complied with scientific principles, namely concrete/empirical, objective, measurable, rational, and systematic. This method is also called the discovery method because, with this method, various new science and technology can be found and developed. This method is called the quantitative method because the research data is in the form of numbers, and the analysis uses statistics (Sugiyono, 2016).

Operational Definition and Measurement of Research Variables

Dependent Variable

The dependent variable or the dependent variable is a variable that is influenced or is the result of an independent variable(Sugiyono, 2016). This study uses stock returns as the dependent variable and can be formulated under market excess returns, namely the difference between quarterly stock returns and the quarterly average risk-free rate as follows (Hardianto & Suherman, 2009):

$$Excess\ Return = R_i t - R_f t$$

$$R_i = \frac{(P_t - P_{t-1})}{P_{t-1}}$$

Note:

$R_i t$ = stock return

$R_f t$ = risk-free return

P_t = stock price in month t

P_{t-1} = stock price in month t-1

Independent Variables

Independent variables or independent variables are variables that influence or cause changes or the emergence of dependent or dependent variables (Sugiyono, 2016). This study uses the factors contained in the Fama and French models.

Risk Premium

Market risk premium can be defined as the difference between the monthly average of all stocks (JCI) and the quarterly risk-free rate. The market premium risk value can be obtained based on historical data. Mathematically, the calculation of the risk premium is as follows (Sudiyatno, 2011):

$$RP_m = R_m - R_{rf}$$

$$R_m = \frac{(P_t - P_{t-1})}{P_{t-1}}$$

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Note:

RP_m = Market risk premium

R_m = JCI quarterly average

R_{rf} = Average risk-free rate quarterly

P_t = stock price in month t

P_{t-1} = stock price in month t-1

Size (company size)

Size is the multiplication of the number of outstanding shares with the share price of each company sampled (Sudiyatno, 2011). The size of this study is proxied by Small Minus Big (SMB). SMB measures the historical incremental returns that investors receive in investing in small-sized companies through the difference between the average return on shares in three portfolios with small market capitalization and the average return on shares in three portfolios with a large market capitalization (Yolita & Fauzie, 2014). This can be explained in the following formula:

Size = Share Price per share *x* Number of Shares Outstanding

$$SMB = \frac{\left(\frac{S}{L} + \frac{S}{M} + \frac{S}{H}\right) - \left(\frac{B}{L} + \frac{B}{M} + \frac{B}{H}\right)}{3}$$

Note:

SMB = The difference each month between the average returns on the three small stock portfolios (S/L, S/M, S/H) and the returns on the three large stock portfolios (B/L, B/M, BH)

S/L = Small size portfolio divided by BE/ME low

S/M = Small size portfolio divided by BE/ME medium

S/H = Small size portfolio divided by BE/ME high

B/L = Portfolio size is largely divided by BE/ME low

B/M = Portfolio size is largely divided by BE/ME medium

B/H = Portfolio size is largely divided by BE/ME high

The steps for establishing an SMB portfolio are as follows:

Calculating the market capitalization of each company obtained by multiplying the number of outstanding shares by the close price of each share.

Determine the median of the market capitalization value.

Sorting existing stocks based on market capitalization into two groups, namely 50% stocks with small market capitalization or small (S) and 50% stocks with large market capitalization or big (B).

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Book to Market Equity (BE/ME)

Book to Market Equity is the ratio of the market price of a stock to its book value (Brigham & Joel, 2011). Book value shows the net assets owned by shareholders. Net assets are equal to total shareholder equity. In this study, book-to-market equity is proxied by High Minus Low (HML). HML measures the historical additional returns that investors receive when investing in companies with high book-to-market equity values (Yolita & Fauzie, 2014).

$$Book\ to\ Market\ Equity = \frac{Total\ Equity}{Jumlah\ Saham\ Beredar\ x\ losing\ Price}$$

$$HML = \frac{\left(\frac{S}{H} + \frac{B}{H}\right) - \left(\frac{S}{L} + \frac{B}{L}\right)}{2}$$

Note:

HML = The difference each month between the average returns on the two portfolios with high BE/ME (S/H and B/H) and the average of returns on the two portfolios with low BE/ME (S/L and B/L)

S/H = Small size portfolio divided by BE/ME high

B/H = Portfolio size is large divided by BE/ME high

S/L = Small size portfolio divided by BE/ME low

B/L = Portfolio size is large divided by BE/ME low

The steps for forming an HML portfolio are as follows:

- Equating the total equity unit of the entire company into thousands of rupiah. If there is a company's total equity in dollars, it is equated using the middle exchange rate prevailing in that period, which is multiplying the total equity (in dollars) by the middle rate obtained from the sum of the selling rate and buying rate divided by two.

- Calculating the book to market equity value by dividing the total equity (in units of thousands of rupiah) obtained from the financial statements by multiplying the number of outstanding shares with the quarterly close price.

- Sorting stocks based on book to market equity value into three groups, namely 30% stocks with low book to market equity (L), 40% stocks with medium book to market equity (M) and 30% stocks with medium value high book to market equity (H).

Population and Research Sample

Research Population

The population in this study were all companies listed in ILQ 45 for the 2017-2020 period.

Research Sample

The sampling technique in this study is purposive sampling where the data are taken according to certain considerations (Sugiyono, 2016). The sample in this study has the following criteria:

- Shares of companies listed in ILQ 45 for the 2017-2020 period.

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- Companies that publish quarterly, second, third, and fourth-quarter financial reports on the Indonesia Stock Exchange website or in the Indonesian Capital Asset Market Electronic Library (ICAMEL) database during the research period.

- Companies that have an optimal average close price according to the estimates in this study.

- Companies that have a positive book-to-market equity value.

Data Collection Method

The data collection method used is the documentation method, which is a data collection technique in the form of a record of events that have passed. The collection is done by collecting documents in the form of data through the official website of the Indonesia Stock Exchange, Yahoo Finance, Bank Indonesia, and the Indonesian Capital Asset Market Electronic Library (ICAMEL).

Data Analysis Techniques

The analysis technique in this study is to use simple linear regression analysis and multiple linear regression with the Eviews 8 analysis tool. This method is used to determine how big the relationship between each independent variable and the dependent variable.

Prerequisite Test

Normality Test

The normality test is useful to find out whether the data population is normally distributed or not. This test is carried out to measure data on ordinal, interval, or ratio scales (Wiyono, 2011). Decision-making with the Jargue-Bera test or J-B test is if the value of the J-B test < X2 (Chi-Square) in the Chi-Square table.

Multicollinearity Test

It is used to determine whether or not there is a deviation from the classical assumption of multicollinearity, namely the existence of a linear relationship between independent variables in the regression model. The prerequisite that must be met in the regression model is the absence of multicollinearity, which is said to have no deviation between the dependent and independent variables if the correlation level does not exceed 0.90 (Wiyono, 2011). The test used looks at the value of the centered variance inflation factor (VIF).

Heteroscedasticity Test

According to (Wiyono, 2011), the heteroscedasticity test is used to determine whether or not there is a deviation from the classical assumption of heteroscedasticity, namely the existence of variance inequality from the residuals for all observations in the regression model. Heteroscedasticity testing was carried out using the White Heteroscedasticity Test (Gujarati, 2012). This test is done by looking at the probability of Obs*Rsquared.

Autocorrelation Test

The autocorrelation test aims to determine whether or not there is a deviation from the classical assumption of autocorrelation, namely the correlation that occurs between residuals in one other observation in the regression model (Wiyono, 2011). Decision-making is made on whether autocorrelation exists through the Breusch-Godfrey Serial Correlation Test. If the p-value is higher than the commonly used level of significance (1%, 5%, or 10%), then the data is free from autocorrelation.

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Test Statistics

Simple Regression Test

Simple linear regression analysis was performed on the CAPM with the following model:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$$

Note:

R_{it} = Return on asset i in period t

R_{ft} = Risk-free asset return in period t

α_i = intercept

β_i = Market beta or stock regression coefficient i

R_{mt} = Return or market profit rate for period t

Multiple Regression Test

Multiple linear regression analysis is useful for analyzing the linear relationship between two or more independent variables with one dependent variable (Priyatno, 2009). Multiple linear regression analysis was performed on TFMFF with the following model:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + \varepsilon_{it}$$

Note:

R_{it} = Return on asset i in period t

R_{ft} = Risk-free asset return in period t

α_i = intercept

β_i = Market beta or stock regression coefficient i

R_{mt} = Return or market profit rate for period t

$s_i SMB_t$ = Small Minus Big, which is the difference between small stock portfolio returns and large stock portfolio

$h_i HML_t$ = High Minus Low, which is the difference between the return of a stock portfolio with a high B/M and a stock portfolio with a low B/M

ε_{it} = error term

SMB and HML calculations are as follows:

$$\text{SMB} = \frac{1}{3}\left(\frac{S}{L} + \frac{S}{M} + \frac{S}{H}\right) - \frac{1}{3}\left(\frac{B}{L} + \frac{B}{M} + \frac{B}{H}\right)$$

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$$HML = \frac{1}{2}\left(\frac{S}{H} + \frac{B}{H}\right) - \frac{1}{2}\left(\frac{S}{L} + \frac{B}{L}\right)$$

Note:

S/L = a portfolio of stocks that have a small size and a low book-to-market equity value.

S/M = a portfolio of stocks that have a small size and a medium book-to-market equity value.

S/H = a portfolio of stocks that have a small size and a high book-to-market equity value.

B/L = a portfolio of stocks that have a large size and a low book-to-market equity value.

B/M = a portfolio of stocks with a large size and a medium book-to-market equity value.

B/H = a portfolio of stocks with a large size and a high book-to-market equity value.

Simultaneous Test (Test f)

The model test is a joint regression coefficient test to see the significance of the effect of each independent variable on the dependent variable. The test uses a significance level of 0.05. The steps of the F test are as follows:

Formulate Hypotheses

Ho: market risk, firm size, and book-to-market equity simultaneously have no effect on returns for each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H).

Ha: market risk, firm size, and book-to-market equity simultaneously affect the return of each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H).

Determine F count and significance

Determine F table by looking at table F.

Testing criteria:

a. If F counts F table, then Ho is accepted.

b. If F counts F table, then Ho is rejected.

Partial Test (t-Test)

According to Ghozali (2006), the t-test difference test is used to test how far the influence of the independent variables used in this study individually explains the dependent variable partially. This t-test was used to test the significance of the CAPM and TFMFF parameters.

Coefficient of Determination Test (Adjusted R Square)

The coefficient of determination (Adjusted R Square) was used to measure the influence of the model used to explain all the dependent variables in this study. The values of the coefficient of determination are 0 (zero) and 1 (one). The amount of Adjusted R2 will measure the proportion or percentage of the total variation in Y described by the regression model (Gujarati & Porter, 2012).

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Results And Discussion

Results

According to Morissan (2012: 19), the population is a collection of subjects, variables, concepts, or phenomena. We can examine each member of the population to determine the nature of the population in question. The sample is part of the population that is the source of data in the study, where the population is part of the number of characteristics possessed by the population (Sugiyono, 2016). In this study, secondary data. According to Husein Umar (2013: 42), primary data has been further processed and presented either by primary data collectors or by other parties, for example, in the form of tables or diagrams.

This research was conducted on companies whose shares were listed in ILQ 45 for the 2017-2020 period. The secondary data used are quarterly close price data, mining company equity value, Bank Indonesia interest rate (risk-free rate), and number of outstanding shares (number of shares outstanding). The share price of each company per month is obtained from the Yahoo Finance website (www.yahoofinance.com), the equity value of each company and data on the number of outstanding shares are obtained from the financial statements of each company that have been published on the Indonesia Stock Exchange website (www.idx.co.id) as well as in the Indonesia Capital Asset Market Electronic Library (ICAMEL) database, and the risk-free rate per month is obtained from the Bank Indonesia website (www.bi.go.id). The total companies used in this study were 45 companies. With a duration of 4 years, the total final sample was 180 samples. From that number of companies, they are grouped (excess return) into 5 division categories, namely S (small), B (big), L (low), M (medium), and H (high).

Descriptive Statistics

Table 1. Table of Descriptive Statistics of Research Data

Portofolio	Mean	Median	Maksimum	Minimum	Std.Dev
S/L	3.795503	1.8972	48.0792	1.6582	6.750478
S/M	0.631825	0.6526	0.6997	0.5227	0.058185
S/H	0.288318	0.2914	0.3401	0.1931	0.035119
B/L	9.47677	4.0374	129.1811	3.4157	18.46949
B/M	1.424445	1.4168	1.5187	1.3415	0.040476
B/H	0.654387	0.6939	0.7388	0.3978	0.087607
Marjet Risk	0.004167	0.000000	0.340000	-0.140000	0.061055
SMB	-1.221877	0.042385	3.159565	-22.74676	4.738656
HML	3.646911	-2.085608	91.84453	-40.88306	23.04546

Source: Data processed with Eviews 10 program

Table 1 above describes the descriptive statistics of the data used in this study. Starting from the mean, median, maximum data, minimum data, and standard deviation of the three independent variables, namely market risk variables, size risk variables (SMB), and book-to-market ratio (HML) risk variables, as well as six portfolios forming the independent variable (S). /L, S/M, S/H, B/L, B/M, and B/H). The average value of market risk is 0.004167, which means that the average monthly market return is above the large risk-return. This positive value indicates that market returns tend to be above the risk-free rate of return. A negative SMB (Small Minus Big) value (-1.221877) indicates that, on average, relatively smaller companies have lower returns, while a positive HML (High Minus Low) value (3.646911) indicates that companies with a BM value (book-to-market) outperform companies with low BM values.

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Prerequisite Test

Normality test

The normality test is useful to find out whether the data population is normally distributed or not. This test is carried out to measure data on ordinal, interval, or ratio scales (Wiyono, 2011). Decision making with Jargue-Bera test.

Table 2. Normality test

	Normality test	
	Jarque-Bera	Prob
Excess Return (Y)	29.0563	0.3385
Premi Resiko (X1)	34.3319	0.3400
SMB (X2)	94.8450	0.0990
HML (X3)	93.1000	0.6900

Source: Data processed with Eviews 10 program

From the table above, it can be seen that the Jarque-Bera probability values for each research variable are 0.3385 (excess return), 0.3400 (risk premium), 0.990 (SMB), and 0.6900 (HML). The four values meet the minimum threshold value of 5% so that the assumption of normality is met.

Multicollinearity Test

Table 3. Multicollinearity Test

Variable	**Coefficient Variance**	**Uncentered VIF**	**Centered VIF**
Risk Premium (X1)	6.14E-05	1.142431	1.13706
SMB (X2)	8.79E-07	464.5176	1.10110
HML (X3)	2.48E-10	1.153799	1.13706

Source: Data processed with Eviews 10 program

From table 3 above, it can be seen that the centered VIF values for each independent variable are as follows, the risk premium is 1.13706, the SMB is 1.10110 and the HML is 1.13706. The four values show values below 10. This means that the multicollinearity assumption is met.

Autocorrelation Test

Table 4. Autocorrelation Test

F-statistic	**145.61370**	**Prob. F (2,220)**	**0.78230**
Obs*R-squared	128.17420	Prob. Chi-Square (2)	0.68350

Source: Data processed with Eviews 10 program

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From table 4 above, it can be seen that the Chi-Square shows the number 0.68350. This value exceeds 5%, meaning that the autocorrelation test assumption is met.

Heteroscedasticity Test

Table 5. Heteroscedasticity Test

F-statistic	**26.390830**	**Prob. F (5,219)**	**0.011900**
Obs*R-squared	84.597040	Prob. Chi-Square (5)	0.072900
Scaled explained SS	143.849900	Prob. Chi-Square (5)	0.782700

Source: Data processed with Eviews 10 program

From table 5 above, it can be seen that the Chi-Square shows the number 0.072900. This value exceeds 5%, meaning that the heteroscedasticity test assumption is met.

Regression Test

Table 6. CAPM Regression Test on Portfolio

Portofolio	Variable	Coeficient	Std. Error	t-Statistic	Prob
S/L	C	-0.0534	0.0007	-81.7101	0.0000
	Market Risk	0.9706	0.0074	131.1604	0.0000
S/M	C	-0.0562	0.0008	-68.2033	0.0000
	Market Risk	0.9417	0.0108	87.5355	0.0000
S/H	C	-0.0425	0.0007	-57.9608	0.0000
	Market Risk	0.9989	0.0047	210.9713	0.0000
B/L	C	-0.0502	0.0004	-125.4946	0.0000
	Market Risk	1.0927	0.0087	125.5931	0.0000
B/M	C	-0.0496	0.0006	-89.3379	0.0000
	Market Risk	1.0097	0.0099	101.6372	0.0000
B/H	C	-0.0526	0.0007	-70.4246	0.0000
	Market Risk	1.0558	0.0133	79.1111	0.0000

Source: Data processed with Eviews 10 program

The regression analysis process using Eviews 10 CAPM is carried out on a portfolio based on company size, and the market risk premium is based on the calculation of the difference between the monthly average of all stocks (JCI) and the quarterly risk-free rate. From Table 6 above, the portfolio perspective is better at describing than when using individual CAPM estimates. From a portfolio perspective, we can see the results of the market risk premium regression on each portfolio (S/L, S/M, S/H, B/L, B/M, B/H) on the dependent variable. The market risk coefficient shows consistent numbers, namely S/L of 0.9706, S/M of 0.9417, S/H of 0.9989, B/L of 1.0927, and B/H of 1.0558. This shows that the larger the portfolio formed, the greater the market risk that will be accepted.

Based on Table 6, it can be seen that the entire portfolio formed (S/L, S/M, S/H, B/L, B/M, B/H) shows a significance number of 0.0000. This means that the entire portfolio in the independent variable has a significant effect on the dependent variable, with a confidence level of 99.9%. H1 is accepted, namely market risk as proxied by market return has a significant effect on the rate of return of each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H).

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Table 7. TFMFF Regression Test on Portfolio

Portofolio	Variable	Coeficient	Std. Error	t-Statistic	Prob
S/L	C	-0.0523	0.0015	-34.2624	0.0000
	X1 (Market Risk)	0.9374	0.0117	79.8621	0.0000
	X2 (SMB)	-0.0024	0.0009	-2.5059	0.0145
	X3 (HML)	0.0014	0.0006	2.4207	0.0181
S/M	C	-0.0723	0.0076	-9.5022	0.0000
	X1 (Market Risk)	3.7665	0.2570	14.6576	0.0000
	X2 (SMB)	-0.0396	0.0037	-10.6883	0.0000
	X3 (HML)	0.0243	0.0023	10.4213	0.0000
S/H	C	-0.0433	0.0024	-18.0176	0.0000
	X1 (Market Risk)	1.1554	0.0209	55.2740	0.0000
	X2 (SMB)	0.006976	0.002881	2.421375	0.0246
	X3 (HML)	0.01427	0.00194	7.36900	0.00000
B/L	C	-0.0218	0.0018	-11.9729	0.0000
	X1 (Market Risk)	0.2982	0.0152	19.6023	0.0000
	X2 (SMB)	-0.01038	0.0029	-3.57847	0.0018
	X3 (HML)	-0.0068	0.0007	-9.7953	0.0000
B/M	C	0.0719	0.0194	3.7036	0.0004
	X1 (Market Risk)	-2.2404	0.3891	-5.7577	0.0000
	X2 (SMB)	0.1864	0.0173	10.7456	0.0000
	X3 (HML)	0.056132	0.030786	1.823283	0.0859
B/H	C	-0.0354	0.0031	-11.3171	0.0000
	X1 (Market Risk)	0.290036	0.027254	10.64208	0.0000
	X2 (SMB)	-0.004847	0.001456	-3.328955	0.0014
	X3 (HML)	0.002972	0.00092	3.230598	0.0019

Source: Data processed with Eviews 10 program

To increase the level of accuracy of stock performance measurement, Fama and Friends propose 2 more measurement variables, namely Firm Size and Book to Market Equity (BE/ME). In this research, Firm size is proxied by SMB, and BE/ME is proxied by HML. Based on Table 7, for the independent firm size (SMB) variable, it can be seen that in the first portfolio, namely S/L, the significance value is 0.0145. The second portfolio, S/M, shows a significance value of 0.0000. The S/H portfolio shows a significance of 0.0246. The B/L portfolio shows a significant number of 0.0018. The B/M portfolio shows a significance value of 0.0000. Finally, the B/H portfolio shows a significance number of 0.0014. All types of portfolios show a significant number of less than 5%. So, the firm size proxied by SMB has a significant effect on the rate of return of each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H). H2 is accepted.

Based on Table 5.10, for the independent variable BE/ME (HML), it can be seen that in the first portfolio, namely S/L, the significance value is 0.0181. The second portfolio, S/M, shows a significance value of 0.0000. The S/H portfolio shows a significance of 0.0000. The B/L portfolio shows a significant number of 0.0000. The B/M portfolio shows a significant number of 0.0859. Finally, the B/H portfolio shows a significant number of 0.0019. All types of portfolios show a significant number of less than 10%. So BE/ME proxied by HML has a significant effect on the rate of return of each type of Fama and French portfolio (S/L, S/M, S/H, B/L, B/M, and B/H). H3 is accepted.

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Table 8. Simultaneous Test Results (F) and Adjusted R-Square

Portofolio	F-Test		Adjusted R-Square	
	F-Statistic	Prob	CAPM	Fama and Friend
S/L	135.2772	0.0000	0.6478	0.8317
S/M	186.5572	0.0000	0.2208	0.7177
S/H	6.7953	0.0111	0.0735	0.0812
B/L	146.3624	0.0000	0.0991	0.6695
B/M	18.7461	0.0000	0.1956	0.2625
B/H	32.2296	0.0000	0.0798	0.2996

Source: Data processed with Eviews 10 program

The T-test shows the partial effect of the independent variables (market risk, firm size as proxied by SMB, and BE/ME as proxied by HML) individually on the dependent variable (earnings return). All independent variables partially show a significant effect on the dependent variable for each type of existing portfolio (S/L, S/M, S/H, B/L, B/M, and B/H).

The F (simultaneous) test was conducted to measure the effect of the three independent variables simultaneously or simultaneously on the dependent variable. Based on Table 8 above, it can be seen that the three variables in this study have a simultaneous and significant effect on the dependent variable for all types of portfolios.

Finally, the best model used in this study will be determined. Based on Table 8, it can be seen that the adjusted r-squared value for the CAPM model for each portfolio (S/L, S/M, S/H, B/L, B/M, and B/H) is as follows: 0.6478, 0.2208, 0.0735, 0.0991, 0.1956, and 0.0798. Meanwhile, the adjusted r-squared values for the TFMFF model for each portfolio (S/L, S/M, S/H, B/L, B/M, and B/H) are as follows: 0.8317, 0.7177, 0.0812, 0.6695, 0.2625 and 0.2996.

Based on these data, it can be seen that the adjusted r-square value of the portfolio in the TFMFF is consistently higher than the portfolio in the CAPM. This means that the TFMFF model is proven to have higher accuracy in predicting the dependent variable.

Discussion

This research is in line with research conducted by (Eraslan, 2013). The results of the coefficients in this study show different numerical values for each form of a portfolio. This means that after the addition of the independent variables, size and BE/ME, the market risk variable can still explain the risk-free rate of return for each form of a portfolio. This shows that the influence of the market on investor decisions is different for companies with different sizes and BE/ME.

However, this study is not in line with research conducted by Lozano (2006), Fama French (1993), and Sunil K. Bundoo (2008). With the addition of 2 independent variables, the market coefficient or market risk in each form of the portfolio will approach the value of one. With the addition of two independent variables, the market risk coefficient or beta in each portfolio will be close to one. The market risk coefficient that is close to one for all portfolios indicates that market risk cannot explain stock returns for each form of the portfolio after adding size and BE/ME.

The inconsistency of the results of this study with previous studies shows that the samples used in previous studies such as the NYSE (New et al.), AMEX (American et al.), NASDAQ (National Association of Securities Dealers Automated Quotations), Stock Exchange of Mauritius and Istanbul The Stock Exchange has different investor behavior from investors in stocks that are members of the LQ-45 index. The market risk value that is close to number one indicates that there is no abnormal return on the return of investors'

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shares. The absence of abnormal returns indicates that the capital market in this study is included in the category of "strong" market form, where all investors have the same information when making investment decisions. The market risk value in this study shows different numbers in each form of a portfolio. This indicates that the capital market used in this study is in the form of a "weak" market, where historical information can predict future prices, and investors tend to have different behaviors and slow reactions due to differences in the information received. Therefore, abnormal returns are still visible and need to be fixed for a long period. In addition to capital market factors and different market forms in previous studies, the variation in market risk values in this study is also caused by the limited sample used, namely companies that are members of the LQ-45 index.

Conclusions

Tests using the capital asset pricing model (CAPM) in this study showed a significant effect of the independent variable (market risk) on the dependent variable (excess return). However, when 2 more variables were added, namely size and BE/ME, the Three Factor Model Fama and Friend (TFMFF) test in this study showed significant results on all independent variables (market risk, size proxied by SMB and BE/ME which proxied by HML), to the dependent variable (excess return) for each type of portfolio form (S/L, S/M, S/H, B/L, B/M, and B/H). The significance of almost every portfolio shows that both CAPM and TFMFF can explain the return of stocks that are included in the LQ-45 index.

Furthermore, when viewed from empirical testing with adjusted R-square, TFMFF can explain stock returns above the risk-free rate of return better than the CAPM model. In other words, the TFMFF model has a better level of accuracy in predicting the behavior of stock returns than the CAPM model.

Suggestion

This study was only conducted on companies that are members of the LQ-45 index and was only carried out for a limited period. Further research may be carried out, not only expanding the sample for companies other than the LQ-45 index but also extending to other companies in Indonesia. In addition, to improve the academic perspective, a sample of companies from abroad can also be added. The addition of the research period will also increase the perspective of research on the same topic.

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