

Accuracy Level Analysis of Pricing Model on State-Owned Enterprises Stocks

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ABSTRACT

This study evaluates and compares the Capital Asset Pricing Model and Fama-French three-Factors (FF3) performance to explain the excess returns on state-owned companies listed on the Indonesia Stock Exchange. The results showed that the Fama-French Three-Factor Model was better than the Capital Asset Price Model to explain the excess returns in Indonesian state-owned companies. This study uses asset price factors of 2 x 3 types and excess returns of 6 Size-B / M as the dependent variable. This study uses Ordinary Least Square (OLS) with daily time-series data from 29 July 2019 to 10 December 2019. Based on the adjusted R2 average of the two models, FF3 explains that the portfolio's excess returns are better than the CAPM. For the Capital Asset Pricing Model, the average R2 value of the multiple linear regression results for the Size-BM portfolio group is 47%, and for the three-factor Fama-French model, the average R2 value of the multiple line regression results for the Size-BM portfolio is 52%. It can be said that the three-factor Fama-French model is more accurate in performing asset pricing on Indonesia State-Owned Enterprises.

Keywords: Pricing Model, Stock Price.

1. INTRODUCTION

Investors use news from various sources to invest in stocks on the public market listed on the Indonesia Stock Exchange (IDX). Shares listed on the IDX are required to provide a report intended for the public as the owner of investment funds. In addition to information that the company officially releases, various news appears in the market and can be used by investors to invest. Market information appears when a company's movement in its business processes, both positive and negative movements. Positive movements, for example, the company's efforts to increase the company's volume and the results of the company's performance, are driving investors to invest in the company.

Under normal conditions, investors want returns on investments made in the company and avoid losses with return conditions (return) is directly proportional to the risk faced by investors. In analyzing the rate of return, the results required a method to measure it. The capital asset pricing model (CAPM), is one way to measure expected returns associated with beta [1]. CAPM is a model introduced as in reference [2]. In its development

as in reference [3], called the Fama French three-factor model.

The Fama-French three-factor model is a development of the Capital Asset Pricing Model. Reference [4] conducted a study to examine the differences in returns between the CAPM and the Fama-French three-factor model that showed that the two models did not significantly differ in returns. When discussing research on the two models, there is a conclusion that the Fama-French three-factor model can explain the relationship between the level of risk and higher returns than the Capital Asset Pricing Model [5].

This study is an empirical effort to compare asset pricing models to determine whether the Fama and French estimation models can be more accurate to provide estimated return values compared to the previous models, the Capital Asset Pricing Model.

2. METHODS

This research uses the Fama-French three-factor model as a base measurement tool to form the portfolio.

The model is as follows:

$$R_{it} - R_{ft} = a_i + b(R_{mt} - R_{ft}) + s_iSMB_t + h_iHML_t + e_{it} \quad (1)$$

Where:

$R_{it} - R_{ft}$ is the excess return portfolio;

$R_{mt} - R_{ft}$ is the market excess return;

SMB_t is size;

HML_t is the value; and it is an error term.

This research uses Ordinary Least Square (OLS) estimation method. The standard error calculation method in this study uses an estimator. This corrected standard error value is referred to as HAC (heteroscedasticity and autocorrelation consistent) standard errors or Newey-West standard errors. This standard error calculation method makes the OLS method more robust on the issue of heteroscedasticity and autocorrelation.

2.1 Data

obtained from Thomson Reuters Datastream. The use of Thomson Reuters Datastream data sources helps overcome survivorship bias because the Datastream sample includes active and non-active companies [6]. The research period is 29 July 2019 to 31 October 2019. The data used include the closing price of shares, number of shares outstanding, stock price index, the book value of equity, risk-free rate, and total assets. This research uses Rupiah. The risk-free rate uses monthly data from BI 7-Days Repo Rate.

This study follows reference [3], [7] in the sampling criteria. The sampling criteria used are (1) shares listed on the SOE Ministry website; (2) excluding stocks with negative equity; (3) selected companies must have equity book value data for year t-1; and (4) selected companies must have total asset data for year t-1.

2.2 Research Variable

The variables of this research are asset pricing factors, including excess market return ($R_m - R_f$), Size factors (SMB), and book-to-market equity (HML) factors.

2.2.1 Risk-free Rate

In this study, the risk-free rate of return is characterized by R_f , which is the rate of return from a risk-free investment desired by investors. The proxy used for R_f is the BI 7-Day Repo Rate because the data in this study have been compared in the form of Rupiah (IDR). Because the BI 7-Day Repo Rate is the rate per month, the use of the risk-free rate of return every month must be adjusted according to the following formula.

$$R_f = (\text{BI 7 Days Repo Rate}) / 22 \quad (2)$$

2.2.2 Rate of Return on Market

In this study, the rate of return on the market is characterized by R_m , which is the return rate in a market. The proxy used for R_m is to use the Composite Stock Price Index (CSPI) because it is considered to reflect current market conditions.

$$R_m = \text{CSPI (Composite Stock Price Index)} \quad (3)$$

2.2.3 Firm Size

Firm Size is indicated by SMB (Small Minus Big), which is the difference between the average return on nine small stock portfolios and the average return on nine large stock portfolios (big stock).

$$SMB = \text{Small Size firm return} - \text{Big Size firm return} \quad (4)$$

2.2.4 Book-to-market Equity

This variable is characterized by High Minus Low (HML), which is the difference between returns on two portfolios that have a high book-to-market and between returns on two portfolios that have a low book-to-market.

$$HML = \text{Value} - \text{Growth} \quad (5)$$

In forming portfolios for the independent and dependent variables in this study 2x3 sorting will be used. The number of shares that are in the formation of an independent variable portfolio for the formation of factors from the research sample (period 29 July 2019 to 31 October 2019) will be used SOE shares listed on the Indonesia Stock Exchange (IDX) and the number of shares that are in the formation of variable portfolios. The dependent only comes from 25 BUMN shares.

3. RESULTS AND DISCUSSION

3.1 Portfolio Form

In this study, a portfolio is formed as the definition of excess return or the dependent variable. Shares in the dependent variable portfolio consist of 25 stocks of State-Owned Enterprises (SOE) as the research sample. The number of shares in the dependent variable portfolio consists of 25 SOE shares and processed based on the extensive portfolio groups.

Table 1. Size-Book to Market (SnBn) Portfolio

Portfolio	Number of Stocks
S1B1	5
S1B2	4

S1B3	5
S2B1	4
S2B2	4
S2B3	4

3.2 Descriptive Statistics

From the sample of research data processed on EViews, descriptive statistical results were obtained for each independent variable, namely Rm-Rf, SMB, and HML. Descriptive Statistics of Independent Variables in Overall Data (Period 29 July 2019-10 December 2019)

Table 2. Summary of Statistics Asset Pricing and Correlation Factors

Panel A: Summary of Statistics Asset Pricing Factors			
	Rm - Rf	SMB	HML
Mean	-0.0026	-0.0009	-0.0007
Median	-0.0013	-0.0006	-0.0008
Maximum	0.0113	0.0099	0.0063
Minimum	-0.0288	-0.0121	-0.0073
Std. Dev	0.0075	0.0039	0.0031
Panel B: Correlation			
	Rm - Rf	SMB	HML
Rm - Rf	1,0000	-0,5639	0,3264
SMB	-0,5639	1,0000	-0,0873
HML	0,3264	-0,0873	1,0000

With 69 observations, the average value of Rm-Rf returns is -0.0026. The average value of SMB is -0,0009. The average return value of HML is -0,0007.

Correlation is used to see whether in the research data there is a linear relationship between errors in a series of observations ordered by time (time series data). Therefore, before conducting further analysis, the independent variables, namely Rm-Rf, SMB, HML, will be tested for correlation first.

If seen from the results of the above table, it can be concluded that the independent variables, namely Rm-Rf, SMB, HML, each have a correlation value that is below 80%. This means that the independent variable does not find multicollinearity in the study variable.

3.3 Spanning Factor Regression Test

As explained earlier, that factor spanning regression test is a test to test whether the independent variable can be explained using other independent variables. The spanning factor regression test can be done by regressing the return of one independent variable to the return of all other independent variables and analyzing the intercept of the regression results.

From the results of Table 3, it can be concluded that for the Rm-Rf variable, the intercept is not statistically significant ($t = -4.5858$), and the variable that does not significantly affect Rm-Rf is SMB. For the SMB variable, the intercept was also not statistically significant ($t = -3.9012$), and the variable that did not significantly affect the SMB was Rm-Rf. For HML

variables, intercept shows a statistically significant value ($t = -0.3835$), and there are no significant variables affecting HML.

Table 3. Results of Spanning Factor Regression Test

	a	Coef.	Rm-Rf	SMB	HML
Rm-Rf	-4,5858	0,0005		-4,0792	0,2252
SMB	-3,9012	-0,0017	-4,0792		0,5264
HML	0,3835	-0,0001	0,2252	0,5264	

3.3 Multiple Linear Regression Test

The multiple linear regression test was conducted in this study for the Capital Asset Pricing Model and the Fama-French Three-Factor Model to produce in-tercepts and slopes on each independent variable based on the dependent variable.

From the results of multiple linear regression in the study, data obtained intercept and slope for each independent variable associated with the dependent variable. In addition, this test produces R2 for each regression equation. To find out how accurate each of the models tested is the Capital Asset Pricing Model, the Fama-French Three-Factor Model, in ad-vance to analyze the R2 value of each model.

Table 4. CAPM, FF3F Regression for 6 Size-BM Portfolios

B / M	low	medium	high
Panel A: CAPM			
		a	
Small	-0.0012	0.0037	0.0021
Big	0.0028	0.0017	0.0021
Adj R ²	0.4749		
Panel B: Three-Factor Model			
		a	
Small	-0.0016	0.0033	0.0006
Big	0.002	0.0012	0.0015
Adj R ²	0.5218		

For the Capital Asset Pricing Model, the average value of R2 from the results of multiple linear regressions for the Size-BM portfolio group is 47% which means that the independent variable can explain its effect as much as 47% on the dependent variable in the Size-BM portfolio group. For the second model, the Fama-French three-factor model, the average value of R2 from the results of multiple linear regression for the Size-BM portfolio is 52%, which means that the independent variable can explain its effect by 52% on the dependent variable in the Size-BM portfolio group.

4. CONCLUSION

This study compares the asset pricing model of the three factors and the five Fama-French factors in explaining excess portfolio returns in Indonesia using the zero intercept criteria as in reference [8]and the adjusted R2 average of each model.

Based on the results of the analysis that the author has presented (analyzing the accuracy of the two models of determining asset pricing using the Fama-French three-factor model and the Capital Asset Pricing Model for state-owned companies), the three Fama-French factors can explain stock portfolio excess returns more accurately compared to CAPM. This is also supported by the research results from several previous journals that the Fama-French three-factor model is superior to the existing model. The Fama-French three-factor model can produce more accurate results than one factor. This can be proven from the research results that the average R² of three Fama-French factors in each portfolio group is greater than the average R² of the CAPM. There is no premium size in the Indonesian stock market which is proxied by SMB having a negative average coefficient on stock returns.

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