Testing TREYNOR-MAZUY Conditional Model in Bull and Bear Market

V. Santi Paramita
Faculty of Economics University of Jenderal Achmad Yani, Cimahi-Indonesia

Review of Integrative Business & Economics Research

ABSTRACT

This research was aimed to develop and test the Treynor-Mazuy conditional model. The proposal of Treynor-Mazuy conditional model was to accommodate several variables of macro economy as risk factors other than market risk as a determinant factor of mutual funds return. The research was using a sample of 30 mutual funds that were actively traded during the period of January 2008 – December 2012 in Indonesian stock market. This research built four alternatives for the Treynor-Mazuy conditional model and tested each models with two pass regression.
The further test of the selected models was performed in bull and bear market conditions. The study produced two empirical findings: In a constant beta test, the Treynor-Mazuy conditional model has two risk factors: interest rate and money supply can explain the variation of equity fund return. In addition, testing in bull and bear markets can improve the model specification. Test result in bull and bear markets showed that the Treynor-Mazuy conditional model has five risk factors: market risk, interest rate, money supply, exchange rate and market timing, which can explain the variation in mutual funds return better.

Keywords: Treynor-Mazuy Model, Bull and Bear Market.

I. Introduction

The Treynor-Mazuy Conditional Model is a portfolio performance measurement model that is based on CAPM. This model tried to mend the weakness of Jensen's Alpha Model related to assumption of linier relation between market risk and portfolio return. The Treynor-Mazuy (1966) test result showed that relation between market risk and market return is not always linier. They added the quadratic term on market risk premium in Jensen's Alpha model to accommodate the relation that is not linier between risk and return.

In the later development, some scientists criticized the Treynor-Mazuy Unconditional Model based on CAPM, because it only considers a risk factor, namely the market risk factor that explained the variation of portfolio return. Several empirical findings showed that the systematic risk factors other than market risk can explain the variation in stock returns, as in the research findings by Chen (1983), Roll dan Ross (1980 and 1984), Ross (1976), Brown and Weinstein (1983), Burmeister and Wall (1986). Their research result showed that multi-factor model is better in predicting portfolio return than single factor model. Their research result based on APT multi-factor model by Ross (1976). This empirical study produces the concept of Treynor-Mazuy Conditional Model that accommodates several risk factors other than market risk factor.

ISSN: 2304-1013 (Online); 2304-1269 (CDROM)

The other weakness of the Treynor-Mazuy Unconditional Model is beta assumption which is stationer in research period. The Treynor-Mazuy Unconditional Model showed that the relevant risk influencing portfolio return is only market risk, which is part of systematic risk (Jones, 2007). Systematic risk is the risk that influence financial asset traded in the capital market. Systematic risk can not be erased by investment diversification in many assets.

Beta is systematic risk measurement that shows relative risk measurement of a stock to market portfolio. Beta measurement can use single index model with connecting stocks return and market index return. Beta value reflects the volatility of stock return to market return. If the fluctuation of stock return to market return increases, the beta stocks will increase too. Vice versa, if the fluctuation of stock return to market return decreases, the beta stocks will also decrease.

Base on CAPM and Single Index Model, return and risk have linier relation. Those two models assume that beta is stationer. Beta is an important component in stocks estimation return model. However, the researches by Fama and French (1992), Wiggins (1992) Bhardwaj and Brooks (1993) found that market beta varies because of the influence of changing market condition. Market beta is not stationer from time to time. In this way, the market beta has to be adapted with fluctuating market condition. Using single beta in choosing stocks return will result bias estimation return. The use of constant beta will produced off set condition between bull and bear market so that it will produce no significant beta with flat slope. The research done by Pagan and Sossounov (2000) and Sudarsono (2010) showed the difference in beta value while bull and bear market. In bull market condition, it will produce positive beta, while in bear market beta it will produce negative beta.

Based on those conditions, some scientists proposed usage of different beta for different market condition. The estimation model is then proposed separate beta on bull and bear market condition. The bull market condition is showed from increase of stock price that tends to increase. This is signed by the increase of stock market price that surpasses recent stock market price. The condition of bear market occurs when the stock price tends to decrease, indicated by the decrease of stock market price below the recent stock market price.

Black (1972) and Levy (1970) examined the beta measurement that is different in the different market condition on the long term. Their research result showed that the separation of bull market condition and bear market condition produces different alpha and beta. The produced model based on different beta can estimate stock return better. Fabozzi and Francis (1977), Wiggins (1992) and Bhardwaj and Brook (1993) found that there is significant difference in alpha and beta coefficient in bull and bear market condition.

This research is aimed to test Treynor-Mazuy Condition Model in bull and bear market condition. The Treynor-Mazuy Unconditional Model which is tested is Treynor-Mazuy multi factor model that include several macro economy variables into the model. So that, this Treynor-Mazuy Unconditional model established several risk factor rather than market risk factors into the model.

2. Review of Literature

2.1 Capital Asset Pricing Model (CAPM)

CAPM was introduced by Sharpe (1964), Lintner (1965) and Mossin (1969). CAPM based on portfolio theory was proposed by Markowitz (1959), with the assumption that each

ISSN: 2304-1013 (Online); 2304-1269 (CDROM)

investor will diversify their portfolios and select the optimal portfolio based on investor preferences for risk and return.

CAPM is an equilibrium model that provides an overview of the relationship between the risk of an asset with its expected return. That relationship provides useful information for the analysts and investors, because 1) The model provides a benchmark of rate of return for various investment possibilities. 2) The model helps provide educated guess to predict the expected return on an investment in the future. According to the theory of CAPM, the expected return of a security can be calculated by using the formula:

$$E(R_i) = R_f + \beta_i [(E(R_m) - R_f)]$$

Market risk is indicated by the beta. The magnitude of the beta coefficient can be estimated by using a market model. Equation of market model can be used to estimate the return of securities with regression between the returns of securities by the market index return. The regression will produce α_i value which is a measure of the return of securities *i* unrelated to the market return. In addition α_i also shows the magnitude of the slope which indicates an increase in the expected return on security *i* for each increase of 1% market return.

The tests on the CAPM have been done by several researchers. Test results on several capital markets at different time periods show that the model CPAM is valid to estimate stock return. Thus, their researches provide support for the CAPM model.

However, Roll (1977) stated that the CAPM has a weakness because too many assumptions that are used to simplify the model to make it easier to understand and be tested. In real conditions, assumptions of CAPM are difficult. Roll was also dubious about the market portfolio for it cannot be determined precisely. Testing the CAPM also face the problem of how to formulate something that has not happened (ex ante) is the expected return, based on past data.

Fama and French (1996) even stated that the CAPM is irrelevant used as a basis for estimation of the stock return because correlation between beta with expected return can not proved. Research results Fama and French (1996) found that the CAPM is valid only if the portfolio is formed by market capitalization, with produced beta in the large range. When stocks are grouped according to the size of the company and the same beta, beta can not be a guide to determine the return. Their results indicate that firm size and book to market value ratio can explain better return. Thus, the results of their research confirm that unsystematic risk factor can more explain variation portfolio return than systematic risk factors.

However, some other researchers like Black (1993), Kothari, Shanken, and Sloan (1995), Jagannathan and McGrattan (1995) still provide support for the validity of the CAPM. Their results showed that beta with expected return have a positive linear relationship, as well as permit a beta which varies throughout the business cycle. Until now, the CAPM is still popular as estimation model of securities return.

Although the results of empirical research on the CAPM model is still open to debate, until this day the CAPM equilibrium models are still often used to predict the portfolio return. CAPM is a simple or parsimony model that may describe or predict reality in a very complex market, as the research result by Sudarsono (2003).

2.2. Arbitrage Pricing Theory (APT)

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Arbitrage Pricing Theory (APT) (Ross, 1976), is a multi-factor model to estimate expected returns of a security. In APT, returns were not affected by the market portfolio because of the assumption that the expected return of a security is influenced by several other risk factors. Thus, the risk factor APT model is not measured by beta. APT assumes investors believe that the return of securities is determined by multi factor models. Thus, the actual return for securities *i* can be determined in equilibrium model using the following formula:

$$E(R_i) = a_0 + b_{i,1}\bar{F}_1 + b_{i,2}\bar{F}_2 + \ldots.. + b_{i,n}\bar{F}_n + e_i$$

The above equation shows that the APT model, defining risk (bi) as sensitivity of securities return toward macro economic factors. The magnitude of the expected return will be influenced by that sensitivity. Empirical testing results show that the APT model is more realistic applied to predict stock returns as the result of research by Chen (983), Roll dan Ross (1980 and 1984), Ross (1976), Burmeister and Wall (1986), and Türsoy, Günsel, Rjoub (2008). Their results showed the validity of the model and they found some proven risk factors affecting stock returns.

However, there is also criticism to the APT model that was presented by Rool (1977) due to difficulties in determining the risk factors that are relevant for inclusion in the model specification. In addition, risk factors used in the formation of the APT model uses historical data (post-ante), thus assessed will lead to a bias to predict the future return (ex-ante). However, there is also criticism to the APT model that was presented by Rool (1977), Fama due to difficulties in determining the risk factors that are relevant for inclusion in the model specification. In addition, risk factors in the formation of the APT model uses historical data (post-ante), thus it will lead to a bias to predict the future return (ex-ante).

Until now there has been no agreement on risk factors that are relevant to influence stock returns. Therefore, on the application of the APT model, various risk factors could be included as a risk factor. The appeal of the APT model is no need to assume the existence of an efficient market portfolio should theoretically

2.3. Mutual Fund Performance Measurement Model

In the later development, CAPM and APT models are used as a basis for the development of mutual fund performance measurement model. Fund performance measurement model of Sharpe (1966) Treynor (1966) and Jensen (1968) were a development of the CAPM using risk adjustment factor (risk adjusted performance). This performance measurement model is known as the unconditional performance measure models, because it does not set any conditions in the calculation of risk and only uses market risk.

Furthermore, Treynor and Mazuy (1966) present a model of mutual fund performance measurement which is a development of the CAPM model, with the following equation:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \gamma_i(R_{mt} - R_{ft})^2 + e_{it}$$

Value α_i and γ_i in the equation above, reflects the performance of mutual funds. The value of α_i reflects the stock selection ability that demonstrates the ability of investment managers in selecting the right stocks in a portfolio of mutual funds. If α_i is positive, it means

ISSN: 2304-1013 (Online); 2304-1269 (CDROM)

that the investment manager is able to establish an optimal portfolio, and otherwise if α_i is negative, it means the investment manager is not able to establish an optimal portfolio.
The value γ_i reflects market timing abilities that demonstrate the ability of investment managers to make adjustments to the asset portfolio for anticipate changes market price movements in general. If γ_i is positive and significant, it indicates that the investment manager has the ability to market timing. Likewise, if γ_i is negative and significant, it indicates that the investment manager does not have the ability to market timing.

Mutual fund performance measurement using Treynor-Mazuy models, which have been carried out by Rao (2000), Sheikh and Nooren (2012), showed the weakness of the market timing ability of mutual fund managers. The evidence of weaknesses in market timing ability is also found in the research by Rouah and Sedzro (2003), Sehgal (2008), and Prasad and Srinivas (2012), that in general there is no evidence of good market timing, but there ins an evidence that the investment managers of the mutual fund management have the ability of stock selection. The evidence of weakness of market timing ability was also found by Nathani et al. (2011) and Sehgal, et al (2008).

Researches about Treynor-Mazuy Conditional models by incorporating macroeconomic variable that refers to the APT model has been carried out by Flannery and Protopapadakis (2002) and Yoruk (2000). Their results prove that economic factors such as money supply (M2), the price of crude oil, the consumer price index, import, export, gold prices, exchange rates, interest rates, gross domestic product (GDP), foreign exchange, unemployment and market index affect the market price of the stock. Research by Altay (2003) compares the impact of economic factors on asset returns on the capital markets of Germany and Turkey.

2.4. Constant Beta and Varying Beta

CAPM model is a model that shows the relationship between beta and average portfolio return. Beta is a measure of systematic risk which indicates the size of the relative risk of a stock or portfolio against the market portfolio. Beta value reflects the volatility of stock returns to market return. The tests on the CAPM performed by Jagannathan and MCGrattan (1995) and Clare, et al (1997) showed that beta is significantly affecting the portfolio return variation, based on the assumption of constant beta.

However, some studies showed that beta was not always constant. Research by Levy (1971), Fabozzy and Francis (1977) proved the presence of varying beta during the study period. Beta varies as a result of changes in the condition of a bull and bear market. Therefore, they propose the use of beta testing models that considers the changes in market conditions. Thus, there are two beta calculation based on bull and bear market. Pettengil et al. (1995) and Howton and Peterson (1998) found that beta is positive and significant in bull market, while beta in bear market is negative and significant. Spiceland and Trapnell (1983), Chen (1982) and Bhardwaj and Brooks (1993) showed that beta testing that separates the bull and bear market conditions, resulted better model of estimation returns.

3. Methodology

Research method that is used is explanatory research. Secondary data is received from Bank Indonesia and Indonesian stock market. This research conducted the beta test in different

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changing market condition, namely the bull and bear market condition. The data is monthly mutual fund stocks in recent five years.

The sample is mutual fund stocks that are published by Security Company, listed in Indonesian Stock Market over the period of January 2008-December 2012, which is established with purposive sampling technique, with sample as much as thirty mutual fund stocks.

The tests were using a two pass regression. The first regression used time series data consisting of 60 monthly fund return data. Beta coefficient of the first pass regression results will be correlated with the return of the portfolio in the second pass regression based on cross section data. On the second pass regression, regression was done by separating beta in bull and bear market. Identification of the beta indicates that the data of this study have beta in bull market as much as 30 observations, while beta in bear market as much as 24 observations. Beta in bull market is identified of the value of Rf-Rm> 0, which reflects the stock market return is higher than the risk-free return. While beta in bear market is identified from the value of Rf-Rm <0, which reflects the stock market return is lower than the risk-free return. Tests using a cross section test have been carried out by Fama and Franch (1992), Pettengil et, al (2002) and Howton Peterson (1998) based on constant beta model and the dual beta models.

4. Result and Discussion

4..1 Formation and test of the Treynor-Mazuy Unconditional Model.

This research proposed Treynor-Mazuy Unconditional Model by adding macro economy variables as risk factor. The macro economy variables that are included the model are inflation, interest rate, money supply and rupiah exchange value. There are two alternatives Treynor-Mazuy models being tested:

1. Treynor-Mazuy Unconditional Model without Market Risk Factor
2. Treynor-Mazuy Unconditional Model including Market Risk Factor

Treynor-Mazuy Unconditional Model test used nested model with two pass regression. First pass regression is based on times series data, continued with second pass regression based on cross section data. The second pass regression test result to Treynor-Mazuy Unconditional Model can be looked in Table 4.1.

The results of testing the validity and robustness of the two alternative of Treynor-Mazuy Conditional model generate two-factor model. Both models indicate that the interest rate risk factor and the money supply can explain variations portfolio return. However, market risk factors are not able to explain the variation in portfolio returns. The examination results showed that the model of panel B produced the largest value of R^2 and Adj R^2 and smallest value of AIC and SIC. These is looked from R2 value in the amount of 60.87% and Adj R2 value in the amount of 50.67% and AIC value in the amount of –8.4121 and SIC value in the amount of -8.3075. Thus it can be said that the model of Panel B is better than the model of Panel A. Thus it can be said that the model of Panel B is better than the model of Panel A.

However, the model of Panel B shows that relation between SBI interest rate factors with mutual fund returns are positive, that is meant inconsistent in supporting theory. This shows that during the period of the study, namely the period of 2008-2012, an increase in the interest rate does not affect the decision of investors to shift funds to the investment banking products more secure as it gets assurance from the Government of Indonesia. This indicates that investors assess

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the investment in stocks more attractive than in banking products. Low interest rate policy set by the Government of Indonesia for the period of the study, seems to make investors reluctant to shift their funds to banking products, because the return received is not proportional to the increase in the rate of inflation. Investors are willing to bear the potential loss when investing in stocks because it promises higher return opportunities in long term. The high interest of investors to invest in the shares causes increase stock price and generate a positive return. Thus, increasing interest rate does not cause a decrease in the share price, or it can be said that the relationship between the interest rate and the stock price is positive. Model B also shows the correlation between money supply (M2) with a mutual fund returns are negative, which means that consistently support the theory.

Table 4.1.
Nested Test Results of Treynor-Mazuy Uncondition Model

a. Treynor-Mazuy Unconditional Model Without Market Risk Factor

$$\overline{Rp - Rfi} = \alpha_0 + \gamma_2(\beta_{INF})_i + \gamma_3(\beta_{SBI})_i + \gamma_4(\beta_{M2})_i + \gamma_5(\beta_{KURS})_i + \gamma_6(\beta_{MT})_i + \varepsilon_i$$

b. Treynor-Mazuy Unconditional Model Including Market Risk Factor

$$\overline{Rp - Rfi} = \alpha_0 + \gamma_1(\beta_{RM})_i + \gamma_2(\beta_{INF})_i + \gamma_3(\beta_{SBI})_i + \gamma_4(\beta_{M2})_i + \gamma_5(\beta_{KURS})_i + \gamma_6(\beta_{MT})_i + \varepsilon_i$$

	Exp Sign	Panel A Treynor- Mazuy Unconditional Model Without Market Risk Factor	Panel B Treynor- Mazuy Unconditional Model Including Market Risk Factor
C		0.024867**	0.010086
$\gamma_{1\beta RM}$	+		0.005671
$\gamma_{2\beta INF}$	+	-0.008064	0.150572
$\gamma_{3\beta SBI}$	–	0.000940***	0.001219***
$\gamma_{4\beta M2}$	–	-350762.7***	-359988.1***
$\gamma_{5\beta KURS}$	–	4.711345	-158.2418
$\gamma_{6\beta MT}$	+	-0.000683	-0.000949
R^2		0.499992	0.608796
Adj R^2		0.395824	0.506743
AIC		-8.233448	-8.412176
SIC		-7.953208	-8.307583
F- Test		4.799844***	5.965475 *

***) significant at level 1%; **) significant at level 5%; *) significant at level 10%

$\gamma_{1\beta RM}$ is market risk factor; $\gamma_{2\beta INF}$ is inflation risk factor;

$\gamma_{3\beta SBI}$ is interest rate risk factor a; $\gamma_{4\beta M2}$ is money supply risk factor ;

$\gamma_{5\beta KURS}$ is rupiah exchange value risk factor; $\gamma\beta_{6MT}$ is *market timing*

Single beta testing of two factors Treynor-Mazuy Conditional model produces two-factor model that does not fully support the theory. The indication is almost all risk factors forming the model do not generate significant value, which means rejecting the theory that systematic risk factors forming the model affect the returns of mutual fund shares.

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The results of testing Two Factors Treynor-Mazuy model are consistent with the research result of Fama and French (1992) who showed that beta CAPM has no power to explain the variation in the return of securities. However insignificant in market risk factors and other systematic risk factors that set out in the model allegedly due to the use of a single beta that assumes constant beta throughout the study period. Research results Schwert (1989), Fama and Frech (1992), Ferson and Harvey (1991) prove that the market beta is not constant or varies due to the influence of changes in market conditions. Their research shows that the estimation model that does not consider betas variation will produce beta bias. Beta bias from first regression result, potentially generate misspecification and invalid model at the second pass regression. This is indicated by the beta coefficient. This is indicated by the beta coefficient inconsistent with theory.

Research results Maheu and McCurdy (2000), Tandelilin (2001), Pagan and Sossounov (2003), as well as Ghasarma, et al (2013) supports research on the presence of different beta (varying beta) in the bullish and bearish market conditions. Their research with dual beta testing produce conclusion that the use dual beta more consistent with the theory.

4.2. Test of validity and robustness of Treynor-Mazuy Conditional Model with Dual Beta

This test aims to test the validity and robustness of Treynor-Mazuy Conditional model at beta conditions that fluctuate due to changes in market conditions. Volatility of bull and bear market reflects a different beta. Tests carried out through two pass regression. The first pass regression using 60 monthly time series data has detected bull market condition in the amount of 36 observations, while down market conditions were 24 observations. Test results of Treynor-Mazuy Conditional model which considering bull and bear market conditions can be seen in Table 4.2.

However, the model of Panel B shows that relation between SBI interest rate factors with mutual fund returns are positive, that is meant inconsistent in supporting theory. This shows that during the period of the study, namely the period of 2008-2012, an increase in the interest rate does not affect the decision of investors to shift funds to the investment banking products more secure as it gets assurance from the Government of Indonesia. This indicates that investors assess the investment in stocks more attractive than in banking products. Low interest rate policy set by the Government of Indonesia for the period of the study seems to make investors reluctant to shift their funds to banking products, because the return received is not proportional to the increase in the rate of inflation. Investors are willing to bear the potential loss when investing in stocks because it promises higher return opportunities in long term. The high interest of investors to invest in the shares causes increase stock price and generate a positive return. Thus, increasing interest rate does not cause a decrease in the share price, or it can be said that the relationship between the interest rate and the stock price is positive. Model B also shows the correlation between money supply (M2) with a mutual fund returns are negative, which means that consistently support the theory.

The results of testing the validity and robustness of the model Treynor-Mazuy Five factors indicate that this model is valid and robust as well as more consistent to support the theory. The findings of this study support the results of research conducted by Mahe and McCurdy (2000), Tandelilin (2001), Pagan and Sossounov (2003), as well as Ghasarma, et al (2013) which proved the existence of varying-beta and showed that testing the model by separating beta in bull and bear market produces a better estimation model. Model testing

ISSN: 2304-1013 (Online); 2304-1269 (CDROM)

procedure that separates condition of bull market and bear market follow a formal procedure conducted by Pettengil et al. (2002).

Table 4.2. Test Results of Two Factors Treynor-Mazuy Model at Bull And Bear Market (*Second Pass Regression)*

a. Model Treynor-Mazuy Uncondition (*Single Beta*)

$$\overline{Rp - Rf_i} = \lambda_0 + \lambda_1(\beta_{RM})_i + \lambda_2(\beta_{INF})_i + \lambda_3(\beta_{SBI})_i + \lambda_4(\beta_{M2})_i + \lambda_5(\beta_{KURS})_i + \lambda_6(\beta_{MT})_i + e$$

b. Model Treynor-Mazuy *Bull Market Beta*

$$\overline{Rp - Rf_i} = \gamma_0 + \gamma_1(\hat{\beta}_{upRM})_i + \gamma_2(\hat{\beta}_{upINF})_i + \gamma_3(\hat{\beta}_{upSBI})_i + \gamma_4(\hat{\beta}_{upM2})_i + \gamma_5(\hat{\beta}_{upKURS})_i + \gamma_6(\hat{\beta}_{upMT})_i + e$$

c. Model Treynor-Mazuy *Bear Market Beta*

$$\overline{Rp - Rf_i} = \gamma_0 + \gamma_1(\hat{\beta}_{dwRMdw})_i + \gamma_2(\hat{\beta}_{dwINF})_i + \gamma_3(\hat{\beta}_{dwSBI})_i + \gamma_4(\hat{\beta}_{dwM2})_i + \gamma_5(\hat{\beta}_{dwKUR})_i + \gamma_6(\hat{\beta}_{dwMT})_i + e$$

Coeff.	Exp Sign	Panel A	Panel B	
		Single Beta (60)	Bull Market Beta (36)	Bear Market Beta (24)
C		0.010086	0.043384***	-0.018715
$\lambda_{1\beta RM}$	+	0.005671		
$\lambda_{2\beta INF}$	+	0.150572		
$\lambda_{3\beta SBI}$	–	0.001219***		
$\lambda_{4\beta M2}$	–	-359988.1***		
$\lambda_{5\beta KURS}$	+	-158.2418		
$\lambda_{6\beta MT}$	+	-0.000949		
$\gamma_{1\beta up/dwRM}$	+/-		0.032920***	-0.057089***
$\gamma_{2\beta up/dwINF}$	+		0.002147	0.377874
$\gamma_{3\beta up/dwSBI}$	–		0.000684***	0.000673*
$\gamma_{4\beta up/dwM2}$	–		-286374.1***	-272555.6***
$\gamma_{5\beta up/dwKURS}$	-/+		-363.3559**	394.0255***
$\gamma_{6\beta upMT}$	+		0.006221***	0.010147*
R^2		0.608796	0.833713	0.648123
Adj R^2		0.506743	0.790334	0.556329
AIC		-8.4121	-8.0122	-7.0302
SIC		-8.3075	-7,9188	-6.9368
F- Test		5.965475*	19.21919***	7.060623***
Prob Fstat		0.000712***	0.000000***	0.000235***

***) signicant at level 1%; **) significant at level 5%; *) significant at level 10%;

$\lambda_{1\beta RM}$; $\gamma_{1\beta up/dwRM}$ is market risk factor; $\lambda_{2\beta INF}$; γ_{2INF} is inflation risk faktor ;

$\lambda_{3\beta SBI}$; $\gamma_{3\beta up/dwSBI}$ is interest rate risk factor; $\lambda_{4\beta M2}$; $\gamma_{4\beta up/dwM2}$ is money supply risk factor;

$\lambda_{5\beta KURS}$; $\gamma_{5\beta up/dwKURS}$ is exchange rate risk factor; $\lambda_{6\beta MT}$; $\gamma_{6\beta up/dwMT}$ is *market timing*

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5. Conclusion

The test results of Treynorl-Mazuy Conditional model proved that: (1) Establishment of Treynor-Mazuy Conditional models based on constant beta resulted two factors models that showed only a risk factor of interest rate and money supply that can explained variation in returns of mutual funds. The results showed that the market risk factors and other systematic risk factors do not significantly affect the returns of mutual funds. (2) Testing with dual beta indicates there is more of risk factors that can explain the variation in returns of mutual funds, so that resulting Five Factors Treynor-Mazuy model. Testing that separates the bullish and bearish market conditions indicate that the market-risk factors, SBI interest rate, money supply, exchange rate and market timing affects the returns of mutual funds. The results of testing the validity and robustness of *t* in Five Factors Treynor-Mazuy model indicates that this model further supports the theory and resulted a better model specification.

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