



Assesment of Mutual Fund Performance Using the Calculation Methods of Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square (Study on Indonesia Mutual Fund for the 2016-2018)

Indri Puspita Sari

Faculty of Economics and Business, Mercu Buana University, Indonesia

Asep Risman*

Faculty of Economics and Business, Mercu Buana University, Indonesia

Email: asep.risman@mercubuana.ac.id

Article History

Received: November 15, 2021

Revised: December 19, 2021

Accepted: December 22, 2021

Published: December 25, 2021

Abstract

The purpose of this study is to determine the difference in returns on the JCI or stock mutual funds returns and to find out how well the performance of the four stock mutual funds is in the conclusion that there is a difference or not in the consistency of the performance of stock mutual funds. In this study, the Mutual Fund Performance Evaluation Method used includes the Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square. The population in this study is equity mutual funds registered with the Financial Services Authority (OJK) for the 2016-2018 period. The results of the study based on the Wilcoxon signed rank test showed that there was a significant difference between stock mutual fund returns and JCI returns. Meanwhile, based on the Kruskal-Wallis test, it shows that there are differences in the consistency of the calculation of the Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square methods.

Keywords: Mutual fund; Sharpe ratio; Treynor ratio; Jensen alpha; M-Square.

1. Introduction

Like one frequency with economic growth, the capital market is an option for people who have a desire to develop in hope of getting benefits in the future (Mahfudhoh and Cahyonowati, 2014). According to the Indonesia Stock Exchange (IDX), capital market is a market for various long-term, tradable financial instruments, namely debt securities (postponement), equity (stocks), mutual funds, derivative instruments and other instruments.

Development of transactions in the capital market is increasing in line with the quantity of investors and the distribution of domestic investors in Indonesia. As a result, this is also able to make Mutual Fund investment more popular with public, according to the study Martalena and dan Malinda (2010) that Mutual Funds are an investment alternative for investor community, especially small investors and investors who do not have much time and expertise to calculate risk. on their investment.

Mutual Funds have experienced fast progressing starting in 1995 and existence of Law Number 8 of 1995 which becomes the legal basis for the Capital Market and participates in regulating matters relating to Mutual Funds. There are three important elements in Mutual Funds according to Siamat (2005), namely: existence of a pool of public funds, investment in the form of securities portfolios, and investment managers as fund managers.

Investors who choose Mutual Funds as a place for long-term investment, related to the management of these funds will be managed by Investment Manager and total funds are then often known as Net Asset Value (NAV). According to Siamat (2005), it can be seen from increase in net asset value which is also investment value owned by investors. Benefits of Mutual Funds for public, especially beginners, are commensurate with slogan inherent in Mutual Funds, namely "High Risk High Return" where Equity Funds are very suitable for those who have an aggressive risk profile.

Relationship between return and risk of mutual funds also has a relationship that affects the performance of mutual funds and benchmarking, namely the Composite Stock Price Index (IHSG). The difference in previous research when compared to research conducted by the author this time is in terms of Risk Adjusted Return, which is calculation of return that is adjusted to risk that must be borne (Jogiyanto, 2010).

Difference in the assessment of return and risk varies and there are still differences that need to be re-examined such as the existence of one or a variety of Mutual Funds that have positive performance where research is only based on one random sample and several Mutual Fund product samples that can be seen with several other methods.

Referring to the phenomenon that occurs in investment development and Mutual Fund performance every year that shows positive movements, so interested in conducting a study entitled "Mutual Fund Performance Assessment Using Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M. Square Calculations. (Study of Equity Mutual Funds Period 2016-2018).

*Corresponding Author

2. Theoretical Framework and Hypothesis Development

2.1. Rate of Return Equity Funds

Expecting high returns is goal of investors in deciding to invest, especially in mutual fund investments. Some previous researchers argued mutual fund performance was not always above so that it had a significant difference with market performance (IHSG), while others said if managed optimally, mutual fund returns would exceed market returns (Rantetonding, 2002).

2.2. Composite Stock Index (IHSG) as Mutual Fund Benchmark

Value of the movement Stock Index (IHSG) can be seen based on the relatively small number of listed company shares held by the public (free float) while market capitalization is quite large.

According to Samsul (2006) and Risman *et al.* (2021) that stock index (IHSG) changes every day due to changes in market prices that occur every day and existence of additional. Composite Stock Price Index (IHSG) movement value can be seen based on relatively small number of listed company shares held by public (free float) while the market capitalization is quite large. According to Samsul (2006) that Stock Index (IHSG) changes every day due to changes in market prices that occur everyday and existence of additional shares.

2.3. Sharpe Method

According to Sharpe (1999) a method that introduces measurement of portfolio performance for risk adjustment, known as Reward to Variability Ratio (RVAR). Sharpe method is based on the risk premium ratio to standard deviation. Risk premium is average difference between Mutual Fund generates and average risk-free.

2.4. Treynor Method

According to Halim (2005), this method measures portfolio performance by comparing portfolio risk premium (the difference between average portfolio rate of return and average risk-free interest) with portfolio risk expressed in Beta (β). Mutual Fund portfolio that is not diversified will rank highly for Treynor Ratio.

2.5. Jensen Alpha Method

According to Halim (2005), this method is based on the concept of security market line (SML), which is a line that connects market portfolio with risk-free investment opportunities. If actual rate of return of a portfolio is greater than rate of return in accordance with SML equation, it means that Jensen index will be positive. Conversely, if actual rate of return of a portfolio is smaller than rate of return in accordance with SML equation, it means that Jensen index will be negative.

2.6. M-Square Method

According to Sharpe *et al.* (2005), this method is used to calculate how much portfolio returns if it has the same standard deviation as the market portfolio or benchmark. Knowing whether a portfolio is performing well or poorly, M-Square can be compared directly with average return on the market portfolio.

Based on this discussion, the research hypothesis is:

H1 = Suspected that return of Equity Fund is a significant difference from market portfolio return (IHSG).

H2 = Suspected that performance of Equity Fund i is better than performance of other Equity Funds.

H3 = Suspected that overall performance of Equity Fund is a significant difference from performance of market portfolio or Composite Stock Price Index (IHSG).

3. Research Methods

Search data method in this research is the census method, which is all equity funds listed in Bareksa. Data taken by Equity Funds that publish monthly Net Asset Value (NAV) reports from end of December 2015 to end of December 2018 and have a good rating for 3 consecutive years so that list of Equity Funds used is 26 Equity Funds. Detailed data on the development of Composite Stock Price Index (IHSG) as a market portfolio will be compared and data is obtained from Yahoo Finance website using JKSE code. Then, data on monthly interest rates is obtained from Bank Indonesia website at www.bi.go.id.

Research design to use a comparative approach which aims to assess and compare how the performance of equity funds in Indonesia is using Sharpe Ratio calculation method, Treynor Ratio method, Jensen Alpha method, and M-Square method. Research uses census research type. Census research is a study that takes a population group as a sample as a whole and uses a structured questionnaire as a primary data learning tool to obtain specific information (Jogiyanto, 2007).

The references in this study are the results of the performance value of the Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square. The data needed in this research are equity fund Net Asset Value (NAV) data, interest rate data (BI Rate) and IHSG data. Then processed in order to produce a variable that role in the comparison of the performance of the Equity Fund portfolio and market portfolios as follows:

1. Mutual Fund returns
2. Market rate of return (IHSG)
3. Mutual Fund and market standard deviation
4. Beta Mutual Funds and markets
5. Average BI Rate

4. Operationalization of Variable

When this research was conducted from October 2019 to completion in the food and beverage sub-sector companies listed on the IDX. This study used data in the form of financial statements in the food and beverage sub-sector for the period 2011-2018. The data required for this study were obtained through the website: www.idx.co.id.

4.1. Calculating the Return of a Mutual Fund

The required value of the NAV, which each period will change as well as the price of Mutual Fund. Next step is to calculate average return using arithmetic average rate of return, which is weighted average of sub-period returns (Fabozzi, 2000).

4.2. Calculating Return Composite Stock Price Index (IHSG)

Which is the need for a data value in the end of the month closing stock index that will be used as a benchmark by the performance of the Fund Shares.

4.3. Calculating the Standard Deviation (Risk)

That needs to be known is that there are two standard deviations, namely the standard deviation of the Equity Fund based on the return of the Equity Fund and the market standard deviation of Stock Index (IHSG) (IHSG) which is also obtained based on the market return Stock Index (IHSG).

4.4. Calculating Beta

Which is to find out any risk that affects market risk, as suggested by Jogiyanto (2007) Beta is a systematic risk measure of a stock or portfolio relative to market portfolio.

4.5. Calculating the Risk Free Rate

The interest rate data used refers to the BI 7-Day Repo (Reverse) Rate from January 2016 to December 2018.

4.6. Measuring the Performance of Equity Funds and IHSG Using the Sharpe, Treynor, Jensen Alpha, and M-Square Methods

1. Sharpe:

$$S_{RD} = \frac{(\check{R}_{rd} - \check{R}_f)}{\sigma_{rd}}$$

2. Treynor:

$$T_{RD} = \frac{(\check{R}_{rd} - \check{R}_f)}{\beta_{rd}}$$

3. Jensen Alpha:

$$J_{RD} = (\check{R}_{rd} - \check{R}_f) - (\check{R}_m - \check{R}_f) \beta_{rd}$$

4. M-Square:

$$M2 = \left(\frac{\check{R}_{rd} - \check{R}_f}{\sigma_{rd}} \right) \sigma_m - (\check{R}_m - \check{R}_f)$$

5. Results and Discussion

5.1. Calculating the Return of a Mutual Fund

Before the data is analyzed, it is known that the returns of the Mutual Funds and Stock Index (IHSG) of 26 Equity Mutual Funds have been calculated in accordance with the data analysis variables that produce the performance values of the Mutual Funds and the Stock Index (IHSG) so that the stock normality test is carried out. the data can directly adjust to the research hypothesis.

Table-1. Two-Sample Kolmogorov-Smirnov Test

Test Statistic	0.159
Asymp. Sig. (2-tailed)	.000 ^c

Source: SPSS software data processing results, 2020.

Based on **Table 1**, Asymp-Sign value (2-tailed) where the value is 0.000 (probability <0.05) so that Ho is rejected, then the difference test is carried out using the non-parametric Wilcoxon signed rank test test.

Table-2. Two-Sample Kolmogorov-Smirnov Test Normality

		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Hasil Kinerja	Sharpe_RD	0.064	78	.200*	0.977	78	.178
	Treynor_RD	0.357	78	.000	0.274	78	.000
	JensenAlpha_RD	0.116	78	.011	0.819	78	.000
	MSquare_RD	0.324	78	.000	0.734	78	.000

Source: SPSS software data processing results, 2020.

It can be seen from **Table 2**, that the Kolmogorov-Smirnov Test above shows that the average of each of the above variables has a significance value below 0.05 ($p < \alpha: 0.000, 0.05$) which means that the data is significant and Ho is rejected, it can be stated that the data used in this study are not normally distributed.

Table-3. Two-Sample Kolmogorov-Smirnov Test Normality

Hasil Kinerja	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
RD_SHARPE	0.064	78	.200*	0.977	78	.178
RD_TREYNOR	0.357	78	.000	0.274	78	.000
RD_JENSENALPHA	0.116	78	.011	0.819	78	.000
RD_MSQUARE	0.324	78	.000	0.734	78	.000
IHSG	0.326	78	.000	0.725	78	.000

Source: SPSS software data processing results, 2020.

Based on **Table 3**, The overall performance of the Mutual Funds shows negative results so that it has a significant difference with stock returns. Because the expected normality test is that the data is not significant ($p > \alpha$) and Ho is accepted, it can be stated that the data used in this study are not normally distributed.

Homogeneity test used in this study is through the Homogeneity of Variance test with the Levene Test where the value is significant (probability < 0.05), then the Ho will be rejected that the group has different variants and this violates the assumption. The desired result is that it cannot reject the Ho or the Levene Test result is not significant (probability < 0.05).

Table-4. Two-Sample Kolmogorov-Smirnov

Levene Statistic	df1	df2	Sig.
120.261	3	308	0.000

Source: SPSS software data processing results, 2020.

From the results of the Levene test above, the Levene Statistic value is 120,261 and proven to be significant at 0,000, which means, $sig < \alpha$ ($0,000 < 0.05$), so it can be said the Ho states that the same variant is rejected and Ha is accepted, meaning that the data have different variants.

According to **Ghazali (2011)**, in this case this assumption is violated, namely if the Levene test results show a significant probability, which means that the variance is not the same (different), analysis can still be continued as long as the group has a large number of samples different (proportionally).

5.2. Results of the Mutual Fund Return Test are Significant Differences with the Market Portfolio Return (IHSG)

That needs to be known is that there are two standard deviations, namely the standard deviation of the Equity Fund based on the return of the Equity Fund and the market standard deviation (IHSG) which is also obtained based on the market return (IHSG).

If probability (Asymp.Sig) < 0.05 then H1 is accepted

If probability (Asymp.Sig) > 0.05 then H1 is rejected

Table-5. Wilcoxon Signed Rank Test

		N	Mean Rank	Sum of Ranks	ReturnRD-IHSG	
ReturnRD - IHSG	Negative Ranks	68 ^a	39.04	2655.00	Z	-5.857 ^b
	Positive Ranks	9 ^b	38.67	348.00	Asymp. Sig. (2-tailed)	0.000
	Ties	1 ^c			a. Wilcoxon Signed Ranks Test.	
	Total	78				
a. ReturnRD < IHSG						
b. ReturnRD > IHSG						
c. ReturnRD = IHSG					b. Based on positive ranks	

Source: SPSS software data processing results, 2020.

From the results of research using Wilcoxon Signed Rank Test, the Asymp value is obtained. Sig 2-Tailed is 0.0000 < value 0.05. Therefore, it can be concluded that "H1 is accepted". Thus, it can be said that there is a significant difference (better) between the return of the Equity Fund and the return of the IHSG.

5.3. Results of Testing the Performance of Mutual Fund I Better than that of other Mutual Funds

According to Santoso (2014) Guidelines or the basis for taking Chi-Square test can be done by looking at the value of "Chi-Square" output table from results of SPSS data processing which is guided by:

If the value is Asymp. Sig (2-Sided) < 0.05, then H0 is rejected, Ha is accepted

If the value is Asymp. Sig (2-Sided) > 0.05, then H0 is accepted, Ha is rejected

Table-6. Wilcoxon Signed Rank Test

Performance Method	N	Mean Rank
Sharpe_RD	78	198.56
Treynor_RD	78	152.47
JensenAlpha_RD	78	92.46
MSquare_RD	78	182.51
Total	312	

Test Statistics^{a,b}

	Performance Results
Chi-Square	62.916
df	3
Asymp. Sig.	.000
a. Kruskal Wallis Test	
b. Grouping Variable: Performance Results	

Source: SPSS software data processing results, 2020.

Chi-Square test error rate is 5% (0.05), (can be seen in the table above) from the test results obtained the Asymp value. Sig of 0,000. This shows that Asymp. Sig. < α (0.000 < 0.05) which means it is proven if Ho which describes the mean of the four Equity Fund performance methods is not different (same) is rejected with a confidence level of 95%. Thus the hypothesis which states that the mean with Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square methods has an equation (not different) in other words, the Ho is rejected and the alternative hypothesis (H2) is accepted.

5.4. Significant Difference between the Overall Equity Fund Performance and Market Portfolio Performance (IHSG)

Period used in this study whether the method is consistently better (significantly) against benchmarking (IHSG).

Table-7. Kruskal-Wallis Test

IHSG	2016	39.50	
	2017	65.50	
	2018	13.50	
RD_SHARPE	RD_Period	N	Mean Rank
	2016	26	41.02
	2017	26	61.17
	2018	26	16.31
	Total	78	
RD_TREYNOR	2016	26	42.81
	2017	26	57.88
	2018	26	17.81
	Total	78	
	RD_JENSENALPHA	2016	26

RD_MSQUARE	2017	26	42.38
	2018	26	38.88
	Total	78	
	2016	26	20.79
	2017	26	61.81
	2018	26	35.90
	Total	78	

Source: SPSS software data processing results, 2020.

In 2016, only the performance of Sharpe Ratio and Tryenor Ratio were able to above the mean rank of IHSG. Then, in 2017, none of the methods were able to outperform the IHSG. Meanwhile, in 2018 the results shown by four Mutual Fund methods were the mean rank that was able to outperform IHSG.

The error rate generated in Chi-Square test is 5% (0.05), (can be seen in Table 10 below) from test results obtained Asymp value. Sig of 0,000. This shows that Asymp. Sig. < α (0.000 < 0.05) which means it is proven if the Ho which describes the mean of four Equity Fund performance methods is not different (same) is rejected with a confidence level of 95%.

Table-8. Chi-Square Test Test Statistics^{a,b}

	IHSG	Performance Results
Chi-Square	77.000	62.916
df	2	3
Asymp. Sig.	.000	.000

Source: SPSS software data processing results, 2020.

Hypothesis which states that the mean with Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square methods has similarities (not different) in other words, Ho is rejected and alternative hypothesis (H3) is accepted. So it can be said that the four Equity Fund performance methods Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square are proven to be significant and there are differences with the performance of IHSG.

5.4. Comparison Return of Equity Funds to Return IHSG

Based on the results of hypothesis 1 testing, there is no single Equity Fund product that has consistently outperformed IHSG for 3 years with 4 methods: Sharpe, Treynor, Jensen Alpha, and M-Square. It is not much different from the return of Equity Fund which also shows its inability to beat IHSG consistently for 3 years.

5.5. Equity Fund Performance Assessment

Based on the results of hypothesis 1 testing, there is no single Equity Fund product that has consistently outperformed the IHSG for 3 years with 4 methods: Sharpe, Treynor, Jensen Alpha, and M-Square. It is also not much different from the return of the Equity Fund which also shows an inability to beat the IHSG consistently for 3 years, because there will be a year when the performance or return of the Equity Fund is below the IHSG so that it shows results that do not have a significant difference to the IHSG.

Table-9. Comparison of Equity Fund Performance with IHSG (2016-2018)

Period	Total of Return Stock Mutual Funds > IHSG				IHSG			
	Sharpe	Treynor	Jensen Alpha	M-Square	Sharpe	Treynor	Jensen Alpha	M-Square
2016	2	4	3	18	0.2720	0.0073	0.0000	0.0000
2017	4	7	8	24	0.5851	0.0117	0.0000	0.0000
2018	7	7	7	23	-0.0740	-0.0023	0.0000	0.0000

Source: SPSS software data processing results, 2020.

Based on Table 9 above, it can be concluded that Mutual Fund assessment is very dependent on market conditions both internally and externally so that it affects return and risk of each portfolio but does not affect stock prices. This is in accordance with the results of research that the increase in the IHSG doesn't mean that all types of stocks have experienced an increase in price, but only some have experienced an increase while some have decreased. Likewise, a fall in IHSG can mean that some stocks have decreased and some have increased. If a stock rises, it means that the stock has a positive correlation with the increase in IHSG.

Table-10. Performance of Mutual Funds is most often superior with all four methods compared to IHSG (> 1x RD performance exceeds IHSG)

No	Mutual Fund	Performance			Measurement Method			
		2016	2017	2018	Sharpe	Treynor	Jensen Alpha	M-Square
1	Syailendra Equity Opportunity Fund	0.0000	0.6236	0.0000	√			
		0.0000	0.0128	0.0000		√		
		0.0000	0.0010	0.0024			√	
		0.0028	0.1042	0.0023				√

2	HPAM Ultima Ekuitas 1	0.0082	0.0144	0.0000		√		
		0.0079	0.0019	0.0000			√	
		0.0127	0.0598	0.0040				√
3	TRIM Kapital	0.0000	0.0125	-0.0004		√		
		0.0000	0.0006	0.0021			√	
		0.0000	0.0807	0.0025				√
4	TRIM Kapital Plus	0.2695	0.0000	0.0017		√		
		0.0014	0.0384	0.0015				√
5	Simas Saham Unggulan	0.0022	0.0002	0.0184			√	
		0.0033	0.0235	0.0000				√

Source: SPSS software data processing results, 2020.

After knowing the performance comparison between Mutual Funds and IHSG, it can be concluded that Mutual Fund products have positive and consistent performance according to Table 10 above, Syailendra Equity Opportunity Fund are the best superior because consistently positive by using four performance measurement methods.

6. Conclusion

Wilcoxon Signed Rank Test difference test in knowing whether or not there is a difference between the return of Equity Fund and the return of IHSG shows that there is no significant difference between the return of the Equity Fund and the return of IHSG. However, there are 7 mutual funds out of 26 that recorded better equity fund returns than IHSG (2016-2018) including RHB Alpha Sector Rotation Equity Funds, Simas Saham Unggulan, TRIM Kapital Plus, Syailendra Equity Opportunity Fund, TRAM Infrastructure Plus, TRIM Kapital, and Mega Asset Maxima. Kruskal-Wallis difference test in knowing whether or not there is a difference in the results of each calculation method shows that there are significant differences in the results in calculation of Sharpe Ratio, Treynor Ratio, Jensen Alpha, and M-Square methods.

During the research period (2016-2018) it shows that some Equity Mutual Funds as a whole cannot consistently beat the performance of IHSG as benchmarking and there are only a few Equity Funds that for 3 consecutive years were able to beat IHSG. It was proven that in 2016 only the performance of Sharpe Ratio and Tryenor Ratio were able to excel above the mean rank of IHSG. Then, in 2017, none of the methods were able to outperform IHSG. Whereas the last, in 2018 good results were shown by four Mutual Fund methods whose mean rank was able to outperform IHSG.

7. Limitations

The limitation in this study is the number of Equity Mutual Fund lists which may still be relatively small, namely 26 data by only focusing on one type and one category of Mutual Funds, namely Shares Mutual Funds with conventional categories. The categories can also be considered whether conventional or sharia-based. In addition, adding the number of methods used such as the Erov method, the Sortino method and others.

8. Suggestion

Based on the research results and conclusions above, some suggestions can be made as follows:

1. The composition of the portfolio that needs to be considered and re-analyzed by the investment manager, so as to be able to generate a more adequate return. In addition, investment managers also feel the need to be more observant in formulating reliable policies and strategies. When market conditions are bearish, it will not affect the Mutual Fund portfolio, which is feared to have a bigger impact than before.
2. For the investor, Assessing the performance of Mutual Funds, especially Equity Funds, is not necessarily seen and based on the final conclusion of each year's performance, but it is necessary to review in detail what factors cause Equity Mutual Funds to increase or decrease every year because it is not necessarily the increase and decrease that occurs for short term and long term. However, in this study, the appropriate method used to assess the performance of Equity Mutual Funds is the Sharpe Ratio and M-Square Ratio as well as Equity Mutual Funds that have an investment grade category, namely the Syailendra Equity Opportunity Fund.

References

- Fabozzi, F. J. (2000). *Investment management: Buku 2*. Salemba Empat: Jakarta.
- Ghazali, I. (2011). *Application of multivariate analysis with IBM SPSS 19 program*. 5th edn: Semarang: Publishing Agency UNDIP.
- Halim, A. (2005). *Investment analysis*. 2nd edn: Salemba Empat: Jakarta.
- Jogiyanto (2007). *Behavioral information system*. Andi: Yogyakarta.
- Jogiyanto (2010). *Analysis and information system design*. Yogyakarta: Andi.
- Mahfudhoh, R. U. and Cahyonowati, N. (2014). Analysis of factors affecting bond ratings. *Diponegoro Journal of Accounting*, 1(1): 1-13.
- Martalena and dan Malinda, M. (2010). *Introduction to capital market*. ANDI Publisher: Yogyakarta.

- Rantetonding, S. (2002). *Analysis of mutual fund performance with sharpe method, periode 1998-2001*. Tesis MM UNDIP: Semarang, Tidak Dipublikasikan.
- Risman, A., Mulyana, B., Silvatika, B. and Sulaeman, A. (2021). The effect of digital finance on financial stability. *Management Science Letters*, 11(7): 1979-84.
- Samsul, M. (2006). *Capital markets and portfolio management*. Erlangga: Surabaya.
- Santoso, S. (2014). *Parametric statistics: Concepts and applications with SPSS*. PT. Elex Media Komputindo: Surabaya.
- Sharpe (1999). *Investment*. 6th edn: Prentice Hall: New Jersey.
- Sharpe, Gordon, J. A. and Jeffery, V. B. (2005). *Investment*. 6th edn Indeks: Jakarta.
- Siamat, D. (2005). *Management of financial institutions: Monetary policy and banking, five editiona, publishing institute faculty of economics*. University of Indonesia: Jakarta.