



Copyright Kemala Publisher
All rights reserved

Science, Engineering and Social Science Series
Vol. 1, No. 1, 2017 / ISSN: 2541 – 0369
Printed in Indonesia

Comparison Analysis of Portfolio Using Markowitz Model and Single Index Model: Case in Jakarta Islamic Index

Tri Yuwono¹ and Dadan Ramdhani¹

¹Master of Management, Faculty of Economics and Business, Esa Unggul University, Tangerang, 15170, Indonesia

The aim of this research are to establish the optimal portfolio of stocks listed on the Jakarta Islamic Index in Indonesia Stock Exchange in order to observe and measure their performance potential as a financial investment instrument for the people to invest in the capital market in Indonesia. Furthermore, this study offers a better choice in the decision making process in selecting the optimal portfolio of stocks listed on the Jakarta Islamic Index in Indonesia Stock Exchange using the modern theory of portfolio formation markowitz model and single index model. The sample used in this study is a company that always appear in the announcement of changes to the composition of stocks in the Jakarta Islamic Index in Indonesia Stock Exchange during the period 2010-2016. The sampling method used in this research using purposive sampling method. The analysis method used in this study using wilcoxon test with statistical software. The results showed that there was no significant difference between the level of return earned by using markowitz model and single index model, and the level of return earned by using markowitz model and single index model is not higher than the risk-free asset return.

Keywords: Markowitz Model, Single Index Model, Jakarta Islamic Index (JII), Portfolio.

1. INTRODUCTION

One of the most popular investment instruments in capital markets is stocks. For a novice investor investing in stocks may be very frightening. The fact that investing in stocks is easier to understand than what they think. Muhamad [15] concluded that the highest risk in investing is not on investment products, but on the investors themselves, namely the lack of investor knowledge of investment products and strategies in investing. The numbered of are uncertain or unexpected thing in life (limited funds, health conditions, disasters, investment market conditions) and high inflation rate a person invests in the capital market because it is triggered by future need the stated by Pratomo [21]. By investing stock in a stable company and having a good track record we can predict to build a portfolio [16]. The portfolio strategy in the investment is based on the investor's effort to optimize the funds invested in order to obtain the optimum profit with the risks that investors can accept. With regard to the utilization of portfolio strategy in assisting investment decision making, the basic question that investors must be answered is how to choose

a portfolio that suits the preferences of investors. Investors deserve to understand the use of which investment strategy is taken in order to achieve optimal investment. The portfolio that investors should choose is an efficient portfolio. Efficient portfolio is a portfolio that gives higher expected return with the risks that can be recommended by the investor. The choice of many efficient portfolio options is called the optimal portfolio [12].

This study assumes that there needs to be a reference for investors in the preparation of an optimal stock portfolio. As an investor effort to optimize the funds invested in order to obtain optimal benefits with risks that can be accepted by investors. So that investors get systematic steps in allocating funds to be invested in stocks compilers portfolios. One of the ways in which this study is carried out is by reiterating the basic theory of modern portfolios from Markowitz [6] and Sharpe [8]. Research on the optimization of the portfolio by using markowit model and single index model was made by frankfurter et al. [2] which states that the research results with short historical data single index model perform better than markowitz model. But in contrast with a long

*Email Address: yuwonotri88@gmail.com

historical data markowitz model perform better than the single index model. Comparison of portfolio optimization using a markowitz model and single index model to research conducted by Paudel et al. [7] showed that markowitz model perform better than the single index model. Bekhet et al. [1] found the results of the study stating that there was no significant difference between the optimization of the portfolio is formed by using a markowitz model and single index model. This study looks further than previous studies conducted in the study of the formation of the optimal portfolio by using markowitz model and single index model. Research on the optimization of the portfolio in stocks of Shari'ah in Indonesia Stock Exchange has previously been done by Hadiyoso et al. [3] with the object of research on stocks of Shari'ah listings in Indonesian Shari'ah Stock Index (ISSI). Research Hadiyoso et al. [3] using only one model of the single index portfolio theory model.

We tried to change the object of study of stocks of Shari'ah listings in Indonesian Shari'ah Stock Index (ISSI) into stocks of Shari'ah listed on the Jakarta Islamic Index (JII) at the Indonesian Stock Exchange by compared the two model of portfolio theory markowitz model and single index model. We also make modifications to previous studies conducted by Bekhet et al. [1], which uses the markowitz model and single index model by changing the model of the object, location and time of the research. Based on the formulation of the problem mentioned above, the purpose of this study is to analyze the level of return earned by using markowitz model, analyzing the level of return earned by using single index model, and determine the calculation model that can form the most optimal portfolio.

2. LITERATURE REVIEW

Shari'ah Investment. Investment is a form of investment either directly or indirectly. Reilly et al. [17] explains investment is the current commitment to money within a certain period of time in order to earn future results as a form of compensation for investors on the investment term commitment, expected inflation rate, and future consumption uncertainty. Bodie et al. [10] distinguishes two types of investment into real asset investment and financial investment assets. Islamic principles in muamalah that must be considered by the perpetrators of sharia investment accorded Muhamad [15], among others, first not seek livelihood on things that are prohibition, both in terms of substance and how to get it, and not use it for things that are unlawful. The second do not oppress and are not tyrannized. Third distribution justices of prosperity in the four transactions are done on the basis of the same pleasure of ridha. Fifth last no element of riba, maysir (gambling or speculation), and gharar (unclear or vague).

Shari'ah Capital Market. The definition of a capital market in accordance with Law Number 8 of 1995 concerning Capital Market (UUPM) is an activity

concerned with the Public Offering and Securities trading, Public Company related to its issued Securities, as well as institutions and professions related to Securities [20]. Shari'ah capital market can be interpreted as an activity in the capital market that is not contrary to the principles of shari'ah. Therefore, the shari'ah capital market is not a system separate from the capital market system as a whole. In general, the activity of the shari'ah capital market is in line with the capital market in general. However, there is a special characteristic of the shari'ah capital market that the product and the transaction mechanism cannot be contrary with the shari'ah principle in the capital market. Capital market activity is included in the muamalah group, so that transactions in the capital market are allowed as long as there is no prohibition under the shari'ah. Activities or actions prohibited by shari'ah in the capital market according to the National Sharia Board - Indonesian Council of Ulama.

Shari'ah Stocks. The concept of stock does not contradict the principles of shari'ah, because the stock is a securities evidence of capital participation from investors to the company, which then investors will get a dividend stock. The concept of equity with entitlement this business is a concept that does not conflict with the principles of shari'ah or musharaka or shirkah activities. However, not all stocks can be directly categorized as shari'ah stock. A stock may be categorized as a shari'ah effect, in other to two items, first of stocks issued by a company that explicitly declare it as a shari'ah company. The second stocks issued by the company that do not declare the business activities of the company according to shari'ah, but the company meets the criteria of shari'ah so that its stocks can be defined as shari'ah effect by the Financial Services Authority of Indonesia or the Issuing List of Sharia Securities.

Jakarta Islamic Index. Jakarta Islamic Index is a stock index which contains 30 stocks shari'ah listed on Indonesia stock exchanges with an average value of the largest capitalization and trading liquidity of the highest value in the last year. Jakarta Islamic Index is a measure of the performance of the stock portfolio of Shari'ah performing good and a recommendation for investors with enough funds [24]. Jakarta Islamic Index is also a priority for the novice investor for companies included in the list of Jakarta Islamic Index are good stocks cash flow [22]. Shari'ah stocks in the Jakarta Islamic Index it self are part of the List of Sharia Securities that are formed in order to increase investor confidence to invest in shari'ah based stock and provide benefits for investors in running the Islamic Shariah to do investment in Indonesia Stock Exchange[23].

Return and Risk. Return is the level of benefits enjoyed by investors on an investment made. While the risk is a discrepancy between expected return and actual return, meaning that the risk of a deviation from the fact the return is received.

Portfolio Theory Markowitz Model. A portfolio is the placement of funds into a set of assets that provide optimal returns with an acceptable risk to investors. Markowitz [6] launched a formal model of portfolio selection that incorporated the principle of diversification. Markowitz stock diversification strategy model seek to combine in a portfolio assets with returns that have less than perfect positive correlation, with the aim of reducing portfolio risk (variance) without reducing returns. Markowitz model can overcome the weaknesses of stock diversification randomized. To calculate the level of return using markowitz model according to Hartono [13] the first step is to calculate the return for each of stocks with the following formula:

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

Where, R_i is return of stocks i , P_t is price on period t , and P_{t-1} is price in previous period.

Second calculate expected return of each stock with the following formula:

$$E(R_i) = \frac{\sum_{j=1}^n R_{ij}}{N} \quad (2)$$

Where, $E(R_i)$ is the expected value of stock return i , R_{ij} is actual return of stock i in period j , and N is number of observation periods.

Third calculate risk of each stock with the following formula:

$$\sigma_i^2 = \sqrt{\frac{\sum_{i=1}^n [X_i - E(X_i)]^2}{n-1}} \quad (3)$$

Where, σ_i^2 is tock variant i , X_i is return of stock i , $E(X_i)$ is the value of the i -th expectations, and n is number of observations of historical data for large samples with n (most slightly 30 observations) and for small samples used $n-1$.

Fourth calculate covariance with the following formula:

$$\sigma_{RA, RB} = \sum_{i=1}^n \frac{[R_{Ai} - E(R_A)] \cdot [R_{Bi} - E(R_B)]}{n} \quad (4)$$

Where, $\sigma_{RA, RB}$ is covariance returns between stock A and B, R_{Ai} is return of stock A of condition i , R_{Bi} is future return of stock B of condition i , $E(R_A)$ is the expected value of the stock return A, $E(R_B)$ is the expected value of stock return B, and n is number of observations of historical data for large samples with n (most slightly 30 observations) and for small samples used $n-1$. Fifth calculate correlation coefficient with the following formula:

$$R_{A,B} = \frac{\sum_{i=1}^n (R_{Ai} - E(R_A)) \cdot (R_{Bi} - E(R_B))}{\sqrt{[\sum_{i=1}^n (R_{Ai} - E(R_A))^2][\sum_{i=1}^n (R_{Bi} - E(R_B))^2]}} \quad (5)$$

Where, $R_{A,B}$ is the correlation coefficient return of stock between A and B, R_{Ai} is future return of stock A condition i , R_{Bi} is future Return of stock B condition i , $E(R_A)$ is the expected value of the stock return A, $E(R_B)$ is the expected value of stock return B, and n is number of observation periods. Sixth calculate the proportion of funds from stocks candidate portfolio using the application program solver that is in Microsoft Excel. Seventh calculate expected return portfolio with the following formula:

$$E(R_p) = \sum_{i=1}^n (W_i \cdot E(R_i)) \quad (6)$$

Where, $E(R_p)$ is expected return portfolio, W_i is the weight or portion of funds invested in stocks i , $E(R_i)$ is expected return stock i , and n is number of shares in the portfolio. The eight calculate portfolio risk with the following formula:

$$\sigma_p^2 = \sum_{i=1}^n W_i \cdot \sigma_i^2 + \sum_{i=j}^n \sum_{j=1}^n W_i \cdot W_j \cdot \sigma_{ij} \quad (7)$$

Where, σ_p^2 is portfolio variant, σ_i^2 is stock return variant i , σ_{ij} is covariance between stocks i and j , W_i is the portion of funds invested in stocks i , W_j is the portion of funds invested in stocks j , and n is number of stocks in the portfolio.

Portfolio Theory Single Index Model. Sharpe [8] developed a theory of single index model portfolio is a simplification of theoretical model with far markowitz portfolio theory analyzes input and reduce the number of variables that need to be assessed. Elton et al. [11] states that this model is based on the assumption that securities are correlated because securities have the same response to market changes. Securities will move towards the same direction towards stock returns only if those securities have the same relation to market return. To calculate the level of return using a single index model by Hartono [13] the first step is to calculate the return for each of stocks with the following formula:

$$R_i = (P_t - P_{t-1}) / (P_{t-1}) \quad (8)$$

Where, R_i is return of stocks i , P_t is price on period t , and P_{t-1} is price in previous period. Second expected return of each stock with the following formula:

$$E(R_i) = \frac{\sum_{j=1}^n R_{ij}}{N} \quad (9)$$

Where, $E(R_i)$ is the expected value of stock return i , R_{ij} is actual return of stock i in period j , and N is number of observation periods. Third calculate market return with the following formula:

$$R_{M,t} = \frac{I_t - I_{t-1}}{I_{t-1}} \quad (10)$$

Where, $R_{M,t}$ is market return in period t, I_t is market index period t, and I_{t-1} is index of the previous period market. Fourth expected market return with the following formula:

$$E(R_{M,t}) = \frac{\sum_{t=1}^n R_{M,t}}{n} \quad (11)$$

Where, $E(R_{M,t})$ is the expected value of market return, $R_{M,t}$ is market return in period t, and n is number of observation periods. Fifth calculate covariance with the following formula:

$$\sigma_{im} = \sum_{i=1}^m [R_i - E(R_i)][R_m - E(R_m)] \quad (12)$$

Where, σ_{im} is covariance returns between stock i and market, R_i is stock return I, $E(R_i)$: is the expected value of stock return i, R_m is market return, $E(R_m)$ is the expected value of market return, and m is number of observations of historical data for large samples with n (at least 30 observations) and for small samples used m-1. Sixth calculate beta and alpha of each sample stocks with the following formula:

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2} \quad \text{and} \quad \alpha_i = R_i - \beta_i E(R_m) \quad (13)$$

Where, β_i is beta stock i, σ_{im} is covariance returns between stock i and market, σ_m^2 is variance of market return, α_i is alpha stock i, $E(R_i)$ is the expected value of stock return i, and $E(R_m)$ is the expected value of market return. Seventh calculate excess return to beta with the following formula:

$$ERB_i = \frac{E(R_i) - (R_{RR})}{\beta_i} \quad (14)$$

Where, ERB_i is excess return to beta stock i, $E(R_i)$: is the expected value of stock return i, R_{RR} is return of risk free assets, and β_i is beta stock i. Eighth calculate cut-off point with the following formula:

$$C_i = \frac{\sigma_m^2 \sum_{j=1}^k A_j}{1 + \sigma_m^2 \sum_{j=1}^k \beta_j} \quad (15)$$

Where, C_i is Cut off point, σ_m^2 is variant of the market index return, and β_j is beta stocks i. Ninth calculate the proportion of funds from stocks candidate portfolio with the following formula:

$$W_i = \frac{Z_i}{\sum_{j=1}^k Z_j} \quad \text{and} \quad Z_i = \frac{\beta_i}{\sigma_{ei}^2} (ERB_i - C^*) \quad (16)$$

Where, W_i is stock proportion i, K is the number of securities in the optimal portfolio, β_i is beta stock i, σ_{ei}^2 is variant of securities residue error i, C_i is the cutoff point

value is the biggest C_i , and ERB_i is excess return to beta stock i. Tenth calculate expected return portfolio with the following formula:

$$E(R_p) = \alpha_p + \beta_p \cdot E(R_m) \quad (17)$$

Where, $E(R_p)$ is expected return portfolio, β_p is the weighted average of each securities beta, α_p is the weighted average of alpha per securities, and $E(R_m)$ is expected return market. Eleventh calculate risk portfolio with the following formula:

$$\sigma_p^2 = \beta_p^2 \cdot \sigma_m^2 + (\sum_{i=1}^n W_i \cdot \sigma_{ei})^2 \quad (18)$$

Where, $\beta_p^2 \cdot \sigma_m^2$ is market related risks, σ_p^2 is portfolio variant, n is number of observation periods, and $W_i \cdot \sigma_{ei}^2$ is weighted average of risk.

3. METHODOLOGY

This study is a descriptive study with a quantitative approach that illustrates the determination of the optimal portfolio model with data that is processed using formulas theory portfolio markowitz model and single index model. Descriptive research is a study directed to provide the symptoms, facts, or events in a systematic and accurate about the characteristics of a particular population or region [18]. The approach used in this study is a quantitative approach [19]. The data used in this study is the monthly data from the closing price of 6 stocks listed on the Jakarta Islamic Index are listed on the Indonesia Stock Exchange started year 2010 to 2016. The 6 stocks selected for the sample are always in the announcement of the Jakarta Islamic Index (JII) from 2010-2016. The second consideration of these stocks has never experienced a stock split. Stocks that have done a stock split accorded by Bekhet et al. [1] causes the stock price is less than before, so it can affect the calculations in the study. The analysis method used in this study using Wilcoxon test with statistical software.

4. RESULTS AND DISCUSSION

Based on the results of data if the stocks are always included in the Jakarta Islamic Index started 2010-2016 and did not experience any stock split is Astra Agro Lestari, Indocement Tunggul Prakasa, Lippo Karawaci, Semen Indonesia, United Tractors and Unilever Indonesia. Stocks that become the object of this study has a market capitalization of higher than 5 quintillion Rupiahs means the stocks are included in stocks with large capitalization, or often referred to as the Blue Chip. Hadi [12] Stating that Blue Chip is the leading stocks that traded in the capital markets that have basic character of privilege include, first of its stock liquidity, second cash flow tends to be positive, third consistent dividend every year, The information with the rule conditions the company and followed with regulations are fourth numbered of stockholders of the above 400 parties

because almost all investors are being as funds managers portfolio is transparent by company.

Normality tests using statistical software are performed to show that samples are drawn from normally distributed or abnormally distributed populations. If the result of normality test, P value (Sig.) less than 0.05 indicates that the data distribution not normal. Based on the results of normality test with statistical software return markowitz model versus risk free asset return earned P value (Sig.) less than 0.05. In the normality test return single index model versus risk free asset return also earned P value (Sig.) less than 0.05. Likewise the results of the normality test return markowitz model versus return single index model earned P value (Sig.) less than 0,05. P value (Sig.) less than 0.05 indicates that the data distribution is not normal.

Table I. Descriptive Statistics Markowitz and Single Index Model versus Return Risk-Free Asset

No.	Information	Mean
1.	Return UNVR	0.0173
2.	Return LPKR	0.0101
3.	Return ABR	0.0546

Table II. Descriptive Statistics Markowitz Model Versus Return Single Index Model

No.	Information	Mean
1.	Return markowitz model	0.0137
2.	Return single index model	0.0136

Based on the results Wilcoxon test with statistical software in Table I above, the value of mean return stocks Unilever Indonesia (UNVR) and Lippo Karawaci (LPKR) is not higher than the risk-free asset returns (Return ABR). Therefore the first and second hypothesis is not accepted because the data does not support the hypothesis. While Based on the results Wilcoxon test with statistical software in Table II indicates that there is no significant difference between return markowitz model with return single index model, so the third hypothesis is not accepted too because the data does not support the hypothesis.

The level of return earned by using markowitz model is not higher than the risk-free asset returns. Return risk-free assets that are used in this study is inflation. The level of return earned by using markowitz model is not higher than the risk-free asset returns, due to the general stock investments when inflation tends to rise, the stock investment performance potential under pressure. The performance of stock investments suffered considerable pressure during 2013, as inflation in July to December 2013 was very high above 8%. Thus causing the level of return earned by using markowitz model is not higher than the risk-free asset returns. The results of this study same with the results of research conducted by Hwang et al. [4] proved that the optimal portfolio is difficult to achieve in stocks listed on the UK Stock

Exchange using markowitz model. At a time when inflation tends to rise then the performance of stock investments has the potential to experience pressure. The impact of rising inflation is most felt by the financial stock sector and various industries. This is because with inflation increasingly higher it will affect the interest rate of Bank Indonesia.

If the interest rate of Bank Indonesia rises then the impact has the potential to cause the value of bad loans to raise, the implication of stock prices to fall. If the stock price falls then the stock return is also reduced. If the problem of non-performing loans is not finished then it will continue to worsen the Bank's performance implication stock prices will continue to fall and stock returns are also reduced. The Bank's business is to disburse loans with funds derived from depositors. If the credit Bank is bad, then the bear losses return into bail when the depositors take their money. The Bank recorded the loss as a provision for bad debts. Bank Indonesia stipulates that if the creditor has been in arrears for a certain period, for example 90 days late, the bank must make a provision of a certain percentage of the credit score (bank confidence determines the exact amount based on historical data on the recovery of non-performing loans) recorded as a loss in the income statement .

The Inflation Impact on Investment in various industry sectors such as manufacturing, will also increase on loan funds that were previously used for corporate expansion or other costs required by the company to undermine the company's earnings performance. Stock investors are likely to release shares in companies that cannot make a profit. Because a company that is not able to earn a profit is an indicator that the company is performing poorly, is not able to maximize existing resources. Thus the stock price of the company became decreased because many investors are releasing its shares. If the stock price falls then the stock return is also reduced. If the company's performance cannot be fixed, continuously cannot generate profits then certainly not many investors are interested to invest money in stock companies that are not able to generate profits.

The earned level of return by using single index model higher than the risk-free asset returns. The performance of stock investments suffered considerable pressure during 2013, as inflation in July to December 2013 was very high above 8%. Thus causing the level of return earned by using single index model is not higher than the risk-free asset returns. The level of return earned by using single model is not higher than the risk-free asset returns, due to the general stock investments when inflation tends to raise, the stock investment performance potential under pressure.

The single index model in Mary et al. [15] study was applied using a monthly price closing 10 companies listed on the National Securities Exchange of India with secondary data from 2010 to 2014 and for risk free rate

used T-Bill. From the empirical analysis in Mary et al [15] concluded that from 10 companies only one company is selected for investment purposes because 9 companies offer less return than risk free rate while in this study using secondary data from 2010 to 2016 and for risk free rate using inflation. The result of the 6 stocks listed in the Jakarta Islamic Index only obtained 2 shares for investment purposes. But the returns earned from the 2 stocks are still below the risk free of assets.

Inflation occurring in July to December 2013 is very high above 8%. In line with the above explanation when inflation tends to rise, the stock investment performance has the potential to experience pressure. Return of stock Unilever Indonesia (UNVR) and Lippo Karawaci (LPKR) experienced a very significant decrease in line with the increase in inflation in July to December 2013. Prior to the inflation inception in early 2013 in January to March return of stocks Lippo Karawaci. Gain, but after the inflation increase from June to December 2013 stock Lippo Karawaci loss.

Likewise Unilever Indonesia also shares of the prior to the inflation of early 2013 in January to February return of Unilever Indonesia. Gain, but after the inflation increase from June to December 2013 stock return Unilever Indonesia loss. Based on the above explanation it can be concluded that the level of return earned on stock investment using single index model is not higher than the risk free asset return. Sarker research [9] proved that the portfolio share return that was formed was not higher than the interest rate. Whereas if stock return compared to Composite Stock Price Index (return market) in research Hadiyoso et al. [3] the result proved that the stock return on the formed portfolio is higher than the Composite Stock Price Index (return market).

The calculation of the optimal portfolio is not by using single index model. Based on the results of testing this hypothesis find evidence that there was no significant difference from the calculation of the portfolio earned by using single index model compared with markowitz model. Basically, the single index model and markowitz model have same as. The difference is in the calculation markowitz more complex and complicated model while single index model calculation is a simplification compared markowitz model. So the logic is the result of the formation of the portfolio acquired with markowitz model and single index model no significant difference because it comes from the same source. The results are consistent with the results of research conducted by Bekhet et al. [1], which proved that there is nothing better between markowitz model and single index model. Both have same results, there was no significant difference between the results of the optimization of the portfolio earned by using markowitz model and single index model. The results of comparison in this study showed that the single index model and markowitz model did not provide optimally significant different portfolio performance. Therefore, it is strongly recommended that

the next study should not compare the single index model and the markowitz model, since the results of the calculations of these two models are just as different as the formula of calculation. Subsequent studies comparing the markowitz model or single index model with different portfolio formation models and not the simplified form of calculation, should be different models. One model of portfolio formation is recommended to compare with the markowitz model or single index model that is using the model of optimal portfolio formation post modern portfolio theory which is a change of model of portfolio formation from modern era to post-modern era by using downside risk concept. Downside risk is a portfolio analysis tool used in post modern portfolio theory. The concept of downside risks was developed due to criticism leveled on the standard deviations used in modern portfolio theory analysis. The post modern portfolio theory that uses the concept of downside risks only considers returns under desired returns that are considered risky, in contrast to the standard deviation of the markowitz model which considers all uncertainty to be a risk. Based on the above explanation it is clear that the model of optimal portfolio formation post modern portfolio theory which is a change in the model of portfolio formation from the modern era to the postmodern era using the concept of downside risks are different from the markowitz model so it is highly recommended to be compared in Further research.

The future research suggestions, First subsequent studies need to use more secondary data. Second subsequent studies used several stock index as well as other stock sectors. The third of future research by using benchmark data return of risk-free assets to calculate inflation. The fourth development of future research are also advised to use a method of forming an optimal portfolio of post modern portfolio theory (PMPT) which is changing in the model portfolio formation of the modern era to post-modern by using the concept of downside risk. The markowitz model and single index model are the concept of downside is the better risk the stated by Hartono [14].

5. CONCLUSIONS

The findings in this study on the first hypothesis, the second hypothesis, and the third hypothesis found the results of data analysis that does not support the hypothesis. Based on the results Wilcoxon test using statistical software showed no significant difference between the level of return earned by using markowitz model and single index model. Difference in return markowitz model with single index model is not difference significant only 0.0001. The level of return earned by using markowitz model and single index model is not higher than the risk-free asset. The portfolio returns earned by using the markowitz model and single index model also do not have significant difference.

References

1. Bekhet, Hussain Ali., & Matar, Ali. Risk Adjusted Performance: A two model Approach Application in Amman Stock Exchange. *International Journal of Business and Social Science*. 3, 7 (2012).
2. Frankfurter, George M., Phillips, Herbert E., & Seagle, John P. Performance of the Sharpe portfolio Selection model: a comparison. *Journal of Financial and Quantitative Analysis*. 11, 2 (1976).
3. Hadiyoso, Asto., Firdaus, Muhammad., & Sasongko, Hendro. Building an Optimal Portfolio on Indonesia Sharia Stock Index (ISSI). *International Journal of Administrative Science & Organization*. 22, 2 (2015).
4. Hwang, Tienyu., Gao, Simon., & Owen, Heather. Markowitz efficiency and size effect: evidence from the UK stock market. *International Journal of Quantitative Finance and Accounting Review*. (2014), doi: 10.1007/s11156-013-0390-8.
5. Mary, J. Francis., & Rathika, G. The Single Index Model and the Construction of Optimal Portfolio with Cnxpharma Scrip. *International Journal of Management*. 6, 1 (2015).
6. Markowitz, Harry. Portfolio Selection. *The Journal Of Finance*. 7, 1 (1975).
7. Paudel. Rajan Bahadur & Koirala, Sujana. Application of Markowitz and Sharpe Models in Nepalese Stock Market. *The Journal of Nepalase Business Study*. 3, 1 (2006).
8. Sharpe, William F. A Simplified Model for Portfolio Analysis. *Management Science Journal*. 9, 2 (1963).
9. Sarker, Mokta Rani. Markowitz Portfolio Model: Evidence from Dhaka Stock Exchange in Bangladesh. *International Organization of Scientific Research Journal of Business and Management*. 8, 6 (2013).
10. Bodie, Z., Kane, A., & Marcus, A. J. *Investments*. New York: The McGraw-Hill Companies. (2014).
11. Elton, E.J., Gruber, M.J., Brown, S.J., & Goetzman, W.N. *Modern Portfolio Theory and Investment Analysis*. New York: John Wiley & Sons, Inc. (2014).
12. Hadi, Nor. *Capital Market*. Yogyakarta: Graha Ilmu. (2015).
13. Hartono, Jogiyanto. *Portfolio Theory and Investment Analysis*. Yogyakarta: BPFE – Yogyakarta. (2016).
14. Hartono, Jogiyanto. *Theory and Practice Portfolio with Excel*. Jakarta: Salemba Empat. (2014).
15. Muhamad. *Shari'ah Financial Management*. Yogyakarta: UPP STIM YKPN. (2016).
16. Riegelhuth, Sarah. *Get Rich Slow, Start Now, Start Small, Achieve Real Wealth*. Australia: John Wiley & Sons. (2013).
17. Reilly, Frank K. & Brown, Keith C. *Investment Analysis & Portfolio Management*. United State of America: South - Western Cengage Learning. (2012).
18. Sugiyono. *Qualitative Quantitative Research Methods and R & D*. Bandung: CV. Alfabeta. (2012).
19. Umar, Husein. *Research Methods for the final project and the Business Thesis*. Jakarta: PT. Raja Grafindo Persada. (2014).
20. The Financial Services Authority in Indonesia, (2016) <http://www.ojk.go.id/id/kanal/syariah/Pages/Pasar-Modal-Syariah.aspx>.
21. Pratomo, E. P, (2017) <http://aria.bapepam.go.id/reksadana/files/edukasi/berwisatareksadana.pdf>.
22. Respati, Yogie, (2016) <http://akucintakeuangansyariah.com/24215/ingin-investasi-saham-syariah-tapi-masih-pemula-pilih-saham-di-jii-saja/>.
23. Suharso, Yudi, (2016) <http://akucintakeuangansyariah.com/22614/apa-sih-bedanya-des-dan-jii-simak-tulisan-berikut/>.
24. Suharso, Yudi, (2016) <http://akucintakeuangansyariah.com/23908/strategi-saham-syariah-dana-kamu-besar-lebih-bagus-pilih-saham-jii/>.

Received: 22 September 2017, Accepted: 10 November 2017