

# THE SYSTEM OF INVESTMENT DECISION MAKING THROUGH ANALYSIS OF STOCK PORTFOLIO PERFORMANCE BASED SINGLE INDEX MODEL (COMPARISON STUDY OF SHARIAH STOCKS AND CONVENTIONAL STOCKS)

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## ABSTRACT

This research aimed : (1) to assess the effectiveness of the Single Index Model as methods in the system of investment decisionsmaking through formation of stock portfolios analysis; (2) to compare the performance of a portfolio of JII sharia stocks and IDX30 conventional stocks; and (3) to determine the most optimal stock portfolio that suitable as an investment instruments. The method used to establish a stock portfolio is Single Index Model and Sharpe index, Treynor index and Jensen index to measure the performance of their portfolios. The population of this research is all the stocks listed in the JII indices and the IDX30 indices year 2013-2015. While the sample are stocks that recorded in the both indices consistently over the research period. Based on calculation of the excess return to beta (ERB) value and the cut-off point (C \*) obtained the result that there are three (3) stocks of JII indices entered as member of portfolio i.e. stock of Unilever Indonesia (UNVR), AKR Corporindo (AKRA) and Indofood CBP Sukses Makmur (ICBP), and 3 (three) stocks of IDX30 indices, i.e. Unilever Indonesia (UNVR), Bank Rakyat Indonesia (BBRI) and Bank Central Asia (BBCA). The results of this research indicate that Single Index Model proved to be effective for screening and selecting stocks to form the optimal portfolio, so that the Single Index Model can be used as analysis tool in the System of Stock Investment Decision Making. The result show that the sharia stocks JII portfolio has a higher return rate and lower risk portfolio compare to conventional stock IDX30. While the views of the performance index, JII Islamic stock index has a value of Sharpe, Treynor index and Jensen index higher than conventional stock IDX30. It can be concluded that the portfolio of Islamic stocks JII has better performance than the conventional stock portfolio IDX30.

**Keywords:** *Single Index Model, Optimal Portfolio, Excess Return To Beta, Cut Off Point, Return Portfolio, Portfolio Risk, Sharpe Index, Treynor Index, The Index Jensen.*

## 1. INTRODUCTION

Investment is one of the major activities in financial management to optimize the use of funds and develop the company assets. Selection of appropriate investment is the key to develop funds for providing greater profits. Investments can be made in the real assets such as buildings, factories, housing or other property and financial assets such as bonds, stocks or other securities. Investments in financial assets can be carried out in the stock market. In the capital markets, the parties have the funds and those who need the funds met. [1]. One

interesting instruments in the capital markets is stocks. Expectations of investors to invest in stocks is to get return profuse with certain risks. Return of stocks can be obtained as capital gains and dividends. Investors expect a higher return of investment over time. Therefore, the ability to predict the rate of return on investment is very important for investors.[2]

To reduce the risk in stocks, investors can invest in many kinds of stocks by setting a portfolio. Investments in portfolio can be interpreted as an investment in a variety of financial instruments

traded on the Stock Exchange and Money Market. The objective of portfolio is to spread the source of return and the possibility of risk. Rational investor will decide to analyse the current situation, to design an optimal portfolio, make investment policy, carry out investment strategy, monitor and supervise the performance of the financial managers [3].

Portfolio analysis with regard to the desire of investors to have a group of securities and get return from each of these securities.[4] Through this analysis will be obtained a set of efficient portfolio establishing the optimal portfolio. The popular method for analyzing the investment portfolio of stocks is the Capital Asset Pricing Model (CAPM). This method can be used to estimate the expected return will be received by an investor related to the rate of risk. To measure the performance of a stock portfolio, CAPM method combined with Markowitz method. This method is very complicated because it involves a lot of variance and covariance in calculating risk portfolio. Markowitz model was developed to be Single Index Model (SIM) to make more simple and practical.[5]

Formation of portfolio to improve stock investment performance using SIM and other methods, has been extensively tested and analyzed by researchers. Australian researchers, McAleer and Veig[6] that analyzes stock index S & P500 (USA), the FTSE100 (UK), CAC40 (France), SMI (Swiss). In India, research conducted [7], [8], [9], [10]. In Indonesia, studies using SIM in the formation of stock portfolios have been done by [11], [12], [13], [14], [15], [16], [17] and [18]. The results of these studies addressed that is appropriate method in the formation of optimal stock portfolios as expectation of investors.

Portfolio performance should be analyzed and evaluated to maintain optimum performance of the portfolio. Portfolio performance can be measured using the Sharpe index and Treynor Index. Sharpe index is calculated by dividing the excess return with the variability of portfolio returns, while Treynor index is calculated by dividing the excess return with a volatility of its portfolio, which shows the volatility of the systematic risk (beta) stocks.[19]. Another model that can be used to measure the performance of the stock portfolio is

Jensen Index. This model is based on the concept of Security Market Line (SML), which is a line connecting the market portfolio with a risk-free investment opportunities. If there are deviations, where the same level of risk, the profitability of the portfolio is different with the benefit to the SML, the difference is called the Jensen index. If the actual profits of a portfolio is higher, then the index will be positive Jensen. If the opposite occurs, then the index will be negative Jensen [20].

Indonesia Stock Exchange develop some kind of stock indice to facilitate the investors in choosing a stock portfolio. The stock indice is a kind of seed stock and can be classified into groups of Shariah stocks and shariah stocks (conventional stocks). Investors have own preference in determining the type of stock to be selected in investing, whether the desire to invest in Sharia-compliant stocks or non sharia-compliant stocks[1].

The performance of the both groups exceptionally diverse. Some research shows shariah stocks have a higher performance than conventional stocks, but several other studies show the performance of shariah stock were same or lower than conventional stock. The study was conducted by [16], [21] and [22] which gives results that conventional stock performance is better than sharia shares. Similar results were obtained from studies [23] in Australia, as well as [24] and [25] in Malaysia.

The diversity of the test results on the performance of shariah stocks and conventional stocks indicated in above studies prompted researcher to test the performance of both stock groups in the Indonesia Stock Exchange. Originality of this study is the using of IDX30 indices as representation conventional stocks and JII indices as a representation of shariah stocks. This study use a Single Index Model in forming stock portfolios as an analytical tool in the process of stock investment decisions. Assessment of the performance of a stock portfolio using indicators of portfolio return and portfolio risk, as well as based on the value of the index Sharpe, Treynor and Jensen.

The improvement of this method are the simplicity and practicability, because this method assuming that the return of two or more stocks have same correlation and reaction to single major factor

i.e. market return (composite stocks index). In other method, the correlation of all stocks should be calculated to each other to get portfolio stocks.

The aims of this research are to answer the follow questions : (1) how is the effectiveness of the Single Index Model as methods in the system of investment decisions making through formation of stock portfolios analysis; (2) how is the performance of a portfolio of JII sharia stocks compare to IDX30 conventional stocks; and (3) what is the most optimal stock portfolio that suitable as an investment instruments.

## 2. LITERATURE REVIEW

### 2.1. Investment Decision

One of the main tasks of financial management is to make investment decisions to optimize the use of funds and develop the assets owned by the company. Investment is to place some funds at this time in order to get benefit in the future. In general, the investment can be divided into two kinds, namely investments in financial assets and investments in real assets. Investments in financial assets can be carried out in the money market in the form of certificates of deposit, commercial paper, money market securities (SBPU), and others. Investments in financial assets can also be done in the capital market, in the form of stocks, bonds, warrants, options and more. While investing in real asset can be done with the purchase of productive assets, the establishment of the factory, the opening of mines, plantations, and others.

Achievement of investment goals requires need decision-making processes by considering the expected return can be obtained and the risks that may be encountered. According to [3], there are several stages in decision-making processes, i.e. :

1. Determine the investment policy.
2. Analysis of the securities.
3. Formation of the portfolio.
4. Revise the portfolio.
5. Evaluate the performance of the portfolio.

### 2.2. Return

Return is the profit earned by the investor (individual, company or institution) of the results of its investments policy. The main purpose of investors in investing is to obtain maximum return, without forgetting the investment risk that may be

encountered. Return is one of the factors that motivate investors to invest their funds. Source of return consists of two main components, namely yield and capital gain (loss). Yield is the return that reflects the components of cash flow obtained periodically from an investment. In stock securities, the yield is shown by the amount of dividends received. While the capital gain (loss) is the change in price of a security, demonstrated by increases or decreases in the price of securities that can provide gains or losses for investors[26].

Return may be a realized return and expected return. Realized return is calculated based on historical data and can be used as one measure of corporate performance. Realized return used as the basis to determine the expected return that is expected by investors in the future.[19].

### 2.3. Risk

Risk can be defined as the possibility of future losses of investors because of the uncertainty return that would be received in the future [27]. Another opinion explains that risk is the amount of deviation between the expected rate of return and the actual rate of return [20]. Investment consideration is not enough to just calculate the return, but also should calculate the risk. Investor preference towards risk can be divided into three categories, i.e. investors who like risk (risk seeker), investors who do not like risk (risk averter) and investors will ask for an increase rate of return equal to any increase in rate of risk (Risk Neutrality). Risk in the context of the portfolio include systematic risk and unsystemic risk. Systemic risk is the risk that can not be eliminated by diversifying and unsystematic risk is the risk that can be eliminated by diversifying. [20]

### 2.4. Relationship Return and Risk of Portfolio

The portfolio is a collection of investment instrument that was formed to meet the investment objectives. The formation of the portfolio is intended to reduce investment risk by spreading the funds to a variety of different assets, so that if an asset suffers a temporary loss, but the others can make profit [28].

Realized return and expected return of the portfolio is a weighted average of realized return and expected return of whole securities. However, the risk of the portfolio should not be equal to the

weighted average of the risks of the entire single securities. Portfolio risk can be even smaller than the weighted average risk of each single securities [19]. In the context of portfolio management, the more the number of stocks included in the portfolio, the greater the risk reduction. Nevertheless the benefit of reducing the portfolio risk will peak at a certain point where the portfolio consists of a number of specific stocks, and after that the portfolio risk reduction benefits will not be felt anymore [26].

### 2.5. Efficient and Optimal Portfolio Portfolio

Efficient portfolio is a portfolio that gives the greatest return expectations with a certain level of risk, or provide the smallest risk with a certain level of return expectations. Comparison between efficient and inefficient portfolio can be explained from the pattern of the relationship between the level of expected return on a portfolio with a risk level of the portfolio, where the higher level of risk must be offset by the increase in the level of returnnya [26].

While the optimal portfolio is selected portfolio of an investor of the many options that exist in the set of efficient portfolios. Investors will choose the portfolio that fits the investor preference towards returns and risk. In order to establish an optimal portfolio should be determined in advance an efficient portfolio, because all of the optimal portfolio is an efficient portfolio. Investors who prefer a risk will choose the portfolio with high return and are willing to accept the risk is also higher[26].

### 2.6. Formation of Optimal Portfolio Based on Single Index Model.

Single Index Method is developed from Markowitz method by simplifying the input parameters. This method can also be used to calculate the expected return portfolio and the risk of the portfolio [19].

In this method, the value of excess return to beta (ERB) of each stock is calculated and to be ranked from highest to lower. Stocks with ERB value equal to or greater than the cut-off point ( $C^*$ ) is a candidate of the portfolio. Mathematically, single index method is formulated as follows:

$$R_i = \alpha_i + \beta_i R_m + e_i \quad (1)$$

Description:

$R_i$  = stock return;  
 $R_m$  = market return;  
 $\alpha_i$  = component return associated with the uniqueness of company;  
 $\beta_i$  = rate of stock sensitivity to market changes;  
 $e_i$  = residual error[26].

### 2.7. Optimal Portfolio Performance Measurement

The assessment method of the portfolio :

#### 2.7.1. Method Sharpe index

In this method of portfolio performance is measured by comparing the risk premium portfolio with portfolio risk represented by the standard deviation (total risk). Mathematically this method is formulated as  $S_{pi} = (R_{pi} - R_f) / SD_{pi}$ . Assessment criteria are the higher the Sharpe index value, the better the performance of the portfolio.

#### 2.7.2. Method Treynor Index.

In this method of portfolio performance is measured by comparing the risk premium portfolio with portfolio risk expressed by beta (market risk or systematic risk). Mathematically this method is formulated as  $T_{pi} = (R_{pi} - R_f) / \beta_{pi}$ . Assessment criteria are the higher the Treynor index value, the better the performance of the portfolio.

#### 2.7.3. Jensen Index Method

This method is based on the concept of Security Market Line (SML), which is a line connecting the market portfolio with a risk-free investment opportunities. Jensen index is formulated as  $J_{pi} = (ER_{pi} - ERF) - (ERM - ERF) \beta_{pi}$ , where the level of risk is expressed in beta as a measure of systematic risk of the market. The assessment criteria is if a positive Sharpe index value and the greater the level of benefit (performance) portfolio, the better [20].

### 2.8. Jakarta Islamic Index

In order to develop shariah financial instruments, Indonesian Stock Exchange in cooperation with PT. Danareksa Investment Management (DIM) launch stock index based on Islamic sharia namely Jakarta Islamic Index (JII). Jakarta Islamic Index consists of 30 stocks that based on the performance of stocks with

liquidity and market capitalization, as well as compliance with Islamic principles[1].

**2.9. Stock index IDX30**

IDX30 stock index is one of the representations of conventional stock that developed the Indonesia Stock Exchange. This index consists of 30 stocks selected from the constituents LQ45. Basic considerations of IDX30 index election is a quantitative factors associated with the value, and the frequency of transactions, as well as market capitalization, and information of business continuity, financial statements and other considerations such as suspension or not being enforced.

**3. RESEARCH METHODS**

**3.1. Conceptual framework and research design**

The conceptual framework reflects the paradigm and guidance to solve the problems discussed in the study. Concep of this study is about the system that need to be developed in the process of stock investment decisions using a single index model to establish the optimal stock portfolio. The conceptual framework of this study can be illustrated by the chart presented below. The research design includes all plans in detail explains the steps required in research to achieve the goals. Objective of this study were (1) to assess the effectiveness of the Single Index Model as an analytical tool to make portfolios in the system of stock investment decisions; (2) to compare the performance of a portfolio of JII shariah stocks and IDX30 conventional stocks; and (3) to determine the most optimal stock portfolio and suitable a as an investment vehicle.

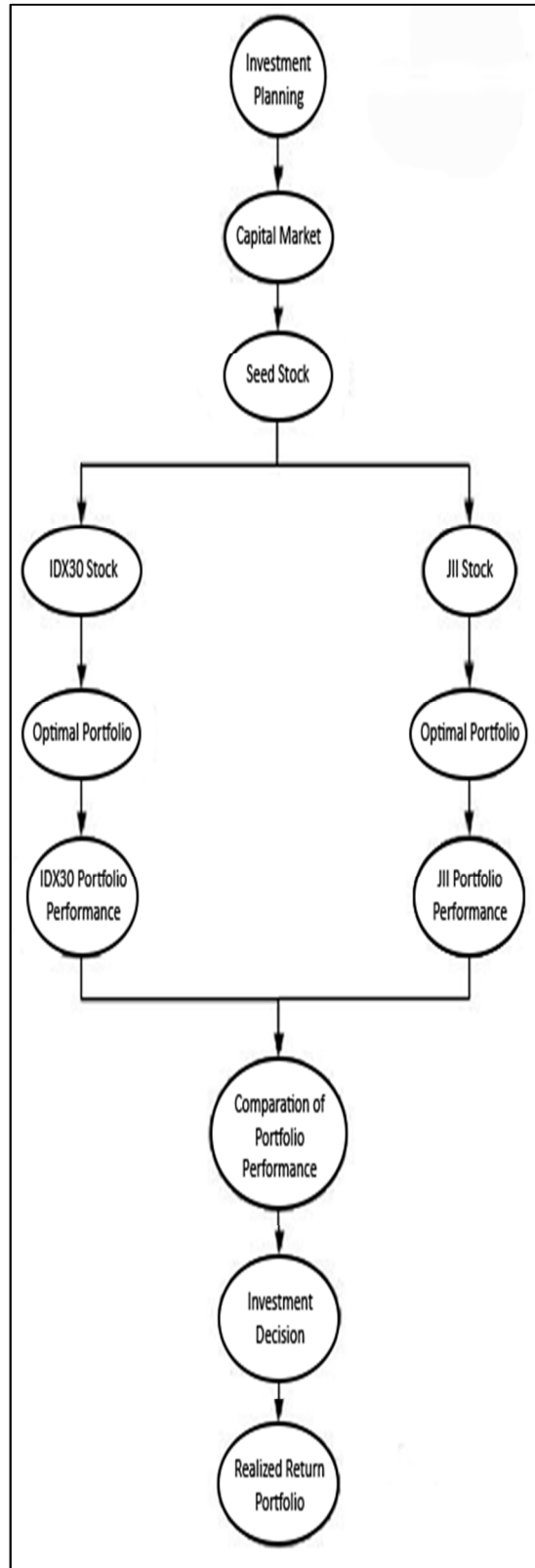


Figure 1 : Conceptual Framework

### 3.2. Population and Sample

Population which is a group of people, events, or any that have certain characteristics. Population is also defined as a generalization region consisting of objects or subjects that have certain characteristics[29]. The population in this study are all listed company in Jakarta Islamic Index and Index IDX30 during the observation period 2013 -2015. During the study period the carrying amount of the population JII stock index by 41 stocks and IDX30 index by 43 stocks.

Sample is researching some of the element of population, or in other word, the sample is a small part of the population[29]. Criteria samples in this study are the stocks should be listed at all publishing period of JII indices and IDX30 indices during the years 2013-2015. During the research period the Indonesia Stock Exchange published six times the stock list of JII indices and IDX30 indices.

Table 1 : Population and Sample

No	Code	Name of Issuers	Kind of Industry	JII	IDX 30
16	ITMG	Indo Tambangraya Megah	Mining	X	
17	KLBF	Kalbe Farma	Pharmacy	X	X
18	LPKR	Lippo Karawaci	Property	X	X
19	LSIP	PP London Sumatera Plnt.	Plantation	X	
20	MNCN	Media Nusantara Citra	Media		X
21	PGAS	Perusahaan Gas Negara	Energy	X	
22	SMGR	Semen Indonesia	Cements	X	X
23	TLKM	Telekomunikasi Indonesia	Telecommunication	X	X
24	UNTR	United Tractors	Wholesale	X	X
25	UNVR	Unilever Indonesia	Cosmetics	X	X
26	WIKA	Wijaya Karya	Construction	X	

No	Code	Name of Issuers	Kind of Industry	JII	IDX 30
1	AALI	Astra Agro Lestari	Plantation	X	
2	ADRO	Adaro Energy	Mining	X	X
3	AKRA	AKR Corporindo	Wholesales	X	
4	ASII	Astra International	Automotive	X	X
5	ASRI	Alam Sutera Realty	Property	X	
6	BBCA	Bank Central Asia	Banking		X
7	BBNI	Bank Negara Indonesia	Banking		X
8	BBRI	Bank Rakyat Indonesia	Banking		X
9	BMRI	Bank Mandiri	Banking		X
10	BSDE	Bumi Serpong Damai	Property	X	
11	CPIN	Charoen Phokphand Ind.	Poultry		X
12	GGRM	Gudang Garam	Cigarettes		X
13	ICBP	Indofood CBP Sukses M.	Foods	X	
14	INDF	Indofood Sukses Makmur	Foods	X	X
15	INTP	Indocement Tungal P.	Cements	X	X

### 3.3. Types and Sources of Data

The type of data used in this research is secondary data taken from the Indonesian Stock Exchange (BEI) and Bank Indonesia (BI). The main data is a monthly report of the Indonesia Stock Exchange on the stock prices of each issuer. Composite Stock Price Index (CSI), as well as a list of stocks included in the JII indices and IDX30 indices obtained from the website: [www.idx.co.id](http://www.idx.co.id). Data of the risk-free assets is taken from the interest rate of Bank Indonesia Certificates (SBI) published at : [www.bi.go.id](http://www.bi.go.id).

### 3.4. Data analysis method

Data analysis techniques in detail described as follows:

1. Choosing stock of JII indices and IDX30 indices as the criteria of population and sample, included the monthly price of each stock.
2. Develop optimal portfolio by Single Index Model, as follows :

#### a. Calculating the realized return

$$R_i = (P_t - P_{t-1}) / P_{t-1} \quad (2)$$

Description:

R<sub>i</sub> = return of stock-i;

$P_t$  = stock price period-t;  
 $P_{(t-1)}$  = stock price period t-1

Calculation of return of each stock use data of monthly stock price, ie the closing price at the end of every month.

**b. Calculating Expected Return**

$$E (R_i) = (\Sigma R_i) / N \quad (3)$$

Description:

$E (R_i)$  = the expected return on stock-i;  
 $N$  = the number of analysis units.

**c. Calculating the market return and expected market return**

$$R_m = (CSI_t - CSI_{t-1}) / CSI_{t-1} \quad (4)$$

$$E (R_m) = \Sigma R_m / N \quad (5)$$

Description:

$R_m$  = market return;  
 $CSI_t$  = Composite Stock Price Index in period t;  
 $CSI_{t-1}$  = CSI in period t-1;  
 $E (R_m)$  = expected market return;  
 $N$  = the number of units of analysis.

**d. Calculating alpha ( $\alpha_i$ ) and beta ( $\beta_i$ ).**

Alpha and beta coefficient of each stock is used to calculate the total risk. Beta coefficient shows the return volatility of each stock to market return. The formula is as follows :

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2} \quad (6)$$

Another formula for calculating  $\beta_i$  is

$$\beta_i = \frac{\sum_{t=1}^n (R_{it} - ER_{it})(R_{mt} - ER_{mt})}{\sum_{t=1}^n (R_{mt} - ER_{mt})^2} \quad (7)$$

Alpha coefficient indicates the magnitude of changes in individual stock and not associates with market change :

$$\alpha_i = E (R_i) - \beta_i \cdot E (R_m) \quad (8)$$

**e. Calculating risk-free return assets (Rf)**

Return on risk-free assets generally refers to the interest rate of Bank Indonesia Certificates (SBI) monthly during the analysis period. Rf value calculated from the average SBI rate over the analysis period.

**f. Make a stock ranking by ERB**

Calculating the ratio of the ERB with formula as follow :

$$ERB = (E (R_i) - R_f) / \beta_i \quad (9)$$

Description:

ERB = excess return to beta;  
 $E (R_i)$  = the expected return on stocks i;  
 $R_f$  = risk free return;  $\beta_i$  = beta stocks-i

Ranking is based on the value ERB of stocks from the largest to the smallest.

**g. Determining the Cut Off Point (C \*)**

The value of C \* is determined based on the value of Cut Off Rate (Ci) that calculated from the value of Ai and Bi using the following equation :

$$A_i = \frac{[E(R_i) - R_f] \cdot \beta_i}{\sigma_{ei}^2} ; \quad B_i = \frac{\beta_i^2}{\sigma_{ei}^2} \quad (10)$$

$$C_i = \frac{\sigma_m^2 \sum_{j=1}^i A_j}{1 + \sigma_m^2 \sum_{j=1}^i B_j} \quad (11)$$

Furthermore, by substituting the value of Ai and Bi into the equation Ci Ci then the value can be determined using the following equation:

$$C_i = \frac{\sigma_m^2 \sum_{i=1}^n \frac{(R_i - R_f) \times \beta_i}{\sigma_{ei}^2}}{1 + \sigma_m^2 \sum_{i=1}^n \frac{\beta_i^2}{\sigma_{ei}^2}} \quad (12)$$

Description:

Ci = cut-off rate to the stock-i;  
 $\sigma_m^2$  = variance of the market return;  
 $\sigma_{ei}^2$  = variance of random error (unsystematic risk);  
 $R_i$  = stock return i;  
 $\beta_i$  = beta stocks-i

The cut off point (C \*) is the value of Ci where the value of ERB last time is still greater than the value of Ci. Candidates of portfolio are the

stockswith ERB value greater than or equal to the value ERB at point C\*.

**h. Determining the optimal proportion**

Determine the proportion of each stock selected in the optimal portfolio with the following equation:

$$w_i = \frac{z_i}{\sum_{j=1}^k z_j} ; z_i = \frac{\beta_i}{\sigma_{ei}^2} (ERB_i - C^*) \quad (13)$$

Description:

wi = proportion for each stock i selected  
zi = investment relative to each stock.

**i. Calculating alpha portfolio (αp) and beta portfolio (βp)**

Alpha portfolio is the average of the alpha of each stocks forming the portfolio.

$$(\alpha p) = \sum w_i . \alpha_i \quad (14)$$

Beta portfolio is the average of the beta of each stock forming the portfolio.

$$(\beta p) = \sum w_i . \beta_i \quad (15)$$

**j. Calculating Expected of Portfolio Return and Risk of Portfolio**

Expected Return portfolio is calculated by the following equation :

$$E (Rp) = \alpha p + \beta p . E (Rm) \quad (16)$$

Portfolio risk is calculated based on the standard deviation or variance of returns single securities contained in it. Variants of the portfolio can be calculated with the following formula:

$$\sigma p^2 = \beta p^2 . \sigma m^2 + [\sum w_i . \sigma_{ei}]^2 \quad (17)$$

The assesment of Optimal Portfolio Performance :

**1. Calculating Treynor Index**

$$Tpi = (ERpi - ERf) / \beta p \quad (18)$$

Description:

Tpi = Treynor Index Portfolio;  
ERpi = average portfolio return;  
ERf = average risk-free return;  
Bpi = Beta portfolio[20].

**2. Calculating Sharpe Index**

$$Spi = (ERpi - ERf) / Sdpi \quad (19)$$

Description:

Spi = Sharpe Index Portfolio;  
ERpi = average portfolio return;  
ERf = average risk-free return;  
SDpi = the Standard Deviation Portfolio.

**3. Calculating Jensen Index**

$$JPI = (ERpi - ERf) - (ERM - ERf) \beta pi \quad (19)$$

Description:

JPI = Jensen Index Portfolio;  
ERpi = average portfolio return;  
ERM = average market return;  
ERf = average risk-free rate;  
βpi = Beta portfolio

**4. RESULTS AND DISCUSSION**

**4.1. Research data**

**4.1.1. Issuer of JII Stocks and IDX30 Stocks**

Issuers of stocks used as sample as many as 19 stocks of JII indices and 17 stocksof IDX30 indices. Sample JII stocks include UNVR, AKRA, ICBP, WIKA, BSDE, KLBF, LPKR, INTP, AALI, LSIP, TLKM, INDF, UNTR, ASII, ASRI, SMGR, PGAS, ADRO and ITMG. While the stock sample IDX30 include UNVR, BBRI, BBKA, BBNI, KLBF, LPKR, GGRM, INTP, BMRI, MNCN, CPIN, TLKM, INDF, ASII, UNTR, SMGR and ADRO. Sample stocks listed in the index JII partly also listed in the index IDX30, namely the stock of ADRO,ASII, INDF, INTP, KLBF, LPKR, SMGR, TLKM, and UNVR (apendix 2).

The kind industry of the sample are very diverse, such as industrial estates, mining, telecommunications, property, banking, cosmetics, construction, media, trade (wholesale), cement, cigarettes, pharmaceuticals, automotive, food and energy. The diversity of type industrial stocks is



needed to support the diversification strategy of investing in stocks.

#### 4.1.2. Composite Stock Price Index (CSI)

CSI monthly price data obtained from Statistics Annually IDX year 2013 - 2015 which can be accessed through the website: [www.idx.co.id](http://www.idx.co.id). The data is taken from the composite stock price at closing time at the end of each month. From the list of the composite stock price, calculated the rate of market return ( $R_m$ ) on a monthly basis. Market return is used to determine the rate of expected market return ( $ER_m$ ). Calculation result show that values of expected market return ( $ER_m$ ) is 0.001699 with a standard deviation ( $\sigma$ ) of 0.040711 and variance ( $\sigma^2$ ) of 0.001657.

#### 4.1.3. Bank Indonesia Certificates (SBI)

Data of SBI interest rate were accessed on the website: [www.bi.go.id](http://www.bi.go.id) covering the period 2013 - 2015. The data provided is the annual interest rate that must be converted into a monthly interest rate. Risk-free asset value ( $R_f$ ) obtained from the average value of SBI interest rate is 5.803% per year or 0.4838% per month.

### 4.2. The Effectiveness Assessment of Single Index Model

#### 4.2.1. Return and Risk of Individual Stocks

Calculating the rate of individual stock returns based on the closing price of each stock at each month. Furthermore, the value of the monthly stock return is used to calculate the rate of expected return and risk of individual stocks. The rate of return JII stocks that have a positive return, namely stock of AALI, AKRA, BSDE, ICBP, INTP, KLBF, LPKR, UNVR and WIKA, while JII stocks with negatif return were stock of ADRO, ASII, ASRI, NDF, ITMG, LSIP, PGN, SMGR, TLKM and UNTR. Stocks with positive return are qualify asset for investment, and there are five stocks that provide the biggest return is stock of AKRA, WIKA, ICBP, UNVR and BSDE with the rate of return per month and risk respectively by 2.16% (0.0081%); 2.10% (1.51%); 1.81% (0.0064%); 1.65% (0.0033%) and 1.26% (0.0112%).

IDX30 stocks that have a positive return is stock of BBKA, BBNI, BBRI, BMRI, GGRM,

INTP, KLBF, LPKR and UNVR. Meanwhile, stocks with a negative return is ADRO, ASII, CPIN, INDF, MNCN, SMGR, TLKM and UNTR. Five stocks provide the biggest return are UNVR, BBRI, BBNI, BBKA and KLBF with the rate of return per month and risk respectively of 1.65% (0.0033%); 1.49% (0.0092%); 1.15% (0.0092%); 1.10% (0.0038%) and 0.79% (0.0050%). Above data show that generally the rate of return JII stock better than IDX30 stocks.

#### 4.2.2. Beta, Alpha and Varian Error Residues Of Individual Stocks

The result of the calculation coefficient beta, alpha and residual error variance of JII stocks and IDX30 stocks shows all stocks have beta coefficient  $> 1$ , so that the stocks are aggressive stock. This means an increase of market return by X% will cause an increase in stock returns of more than X%. The highest beta coefficient of JII stocks was in LSIP stock, followed by TLKM, ASRI, LPKR and WIKA with a beta coefficient of 3.97; 3.75; 3.51; 3.06 and 3.02. While in IDX30 stocks there are five stocks that have high beta coefficient i.e. TLKM, CPIN, LPKR, ADRO and MNCN 3.75 with value of coefisient respectively; 3.13; 3.06; 2.82 and 2.56. Beta coefficient JII stocks on average higher than IDX30 stocks, which means JII stocks more aggressive than IDX30 stocks. But it also means JII stocks more risk than IDX30 stocks because it is more volatile to market changes.

Alpha coefficient values vary, some stocks have a negative alpha value and the other is positive. In JII stock alpha coefficient is positive happened to the stock AKRA, BSDE, ICBP, INTP, KLBF, LPKR, UNVR, WIKA and is negative at AALI, DRO, ASII, ASRI, INDF, ITMG, LSIP, PGN, SMGR, TLKM, UNTR. In IDX30 stocks the positive alpha coefficient on BBKA, BBNI, BBRI, BMRI, GGRM, INTP, KLBF, LPKR, UNVR and is negative on the stock ADRO, ASII, CPIN, INDF, MNCN, SMGR, TLKM, UNTR. Alpha coefficient indicate a component stock returns associated with the condition of the issuer's stocks itself and not affected by changes in the market. The higher the alpha value, the higher the rate of return.

Varian residual error describe unsystemic risk of the issuer company itself and not affected by changes in the market. This risk can be eliminated by diversifying the stock. In JII shares, the largest

residual error variance occurs in KLBF stock amounted to 0.064178 and the smallest in ASII stock amounted to 0.003519. While in IDX30 stocks, the largest residual error variance occurs in KLBF stock amounted to 0.064178 and the smallest share of BMRI amounted to 0.001334. In the analysis of the formation of the optimal stock portfolio, residual error variance used to calculate the value of  $C_i$  as the basis for determining the cut-off point ( $C^*$ ).

**4.2.3. Formation of Optimal Portfolio**

The calculation results of ERB show there are 7 stocks of JII indices have positive value i.e. stock of UNVR, AKRA, ICBP, WIKA, BSDE, KLBF, LPKR and as many as 12 stocks have a negative value, namely stock of INTP, AALI, LSIP, TLKM, INDF, ASII, UNTR, ASRI, SMGR, PGN, ADRO, ITMG. While in IDX30 indices, there are six stocks have positive value i.e. stock of UNVR, BBRI, BBKA, BBNI, KLBF, LPKR and 11 stocks is negative, namely stock GGRM, INTP, BMRI, MNCN, CPIN, TLKM, INDF, ASII, UNTR, SMGR, ADRO. Only stocks with positive ERB value taken into account in the formation of stock portfolios. The highest ERB value obtained by the ERB UNVR amounted to 0.008197 and the lowest achieved by LPKR amounted to 0.000866, either in JII stocks or IDX30 stocks. The higher ERB value, the higher chances to be a candidate of optimal portfolio. Furthermore, the stocks are ranked by the value ERB from the largest to the smallest.

The calculations results of cut off rate and cut off point show the  $C^*$  value in JII stocks is 0,005426 and 0,003948 in IDX30 stocks. The candidates of portfolio are stocks that have ERB value greater than or equal to the value ERB at point  $C^*$ . The list of stocks with positive ERB value compared with the ERB value at point  $C^*$ . The result at JII stocks there are three stocks as a candidate of optimal portfolio, namely UNVR (Unilever Indonesia), AKRA (AKR) and ICBP (Indofood CBP Sukses Makmur). In stock IDX30 also have three stocks listed as a candidate of optimal portfolio i.e. UNVR (Unilever Indonesia), BBRI (Bank Rakyat Indonesia) and BBKA (Bank Central Asia).

**4.2.4. Stock Proportion Portfolio Analysis**

After determining the stocks of portfolios candidates, the proportion of funds to be invested for each stock must be set in order to obtain return of portfolio and the risk portfolio. The proportion determined according to a weighted scale of each stock based on the value of beta, residual error variance, ERB and the cut off point. The funds proportion for each stock of optimal portfolio in JII indices and IDX30 indices are presented in below table.

Table 2 : Stock Proportion Portfolio

No	JII Stock	%	IDX30 Stock	%
1	UNVR	44.59	UNVR	81.16
2	ICBP	28.55	BBRI	12.81
3	AKRA	26.86	BBCA	6.03

Above table shows that the funds proportion of portfolio stocks of JII indices are UNVR (Unilever Indonesia) stock amounted to 44.59%; ICBP (Indofood CBP Sukses Makmur) amounted to 28.55% and the stock AKRA (AKR Corporindo) amounted to 26.86% and. While the funds proportion of portfolio stocks of IDX30 indices are UNVR (Unilever Indonesia) amounted to 81.16%; BBRI (Bank Rakyat Indonesia) amounted to 12.81% and BBKA (Bank Central Asia) amounted of 6.03%.

**4.2.5. Analysis of Alpha, Beta, Return and Risk Portfolio**

Table 3 : Alpha, Beta, Return and Risk Portfolio

No	Portfolio	JII Stock	IDX30 Stock
1	Alpha ( $\alpha_p$ )	0,01527	0,01332
2	Beta ( $\beta_p$ )	1,78834	1,54386
3	Return( $ER_p$ )	0,01831	0,01594
4	Risk ( $\sigma_p^2$ )	0,00599	0,00849

Above table shows that the portfolio expected return of JII stocks amounted to 0.01831 (1.831% per month) and IDX30 stocks of 0.01594 (1.594% per month). These values are higher than expected return market of 0,001699 (0,169% per month) and interest rate of Bank Indonesia Certificate of 0,483% per month. It can be concluded that Single

Index Model is effective for forming optimal portfolio stocks in JII stocks and IDX stocks.

#### 4.3. The Comparison of Optimal Portfolio Performance

The analysis result of optimal portfolio performance using the Sharpe index, Treynor index and Jensen index are presented in the following table.

Table 4 : Optimal Portfolio Performance

No	Index	JII Stock	IDX30 Stock
1	Sharpe	0,17407	0,12054
2	Treynor	0,00753	0,00719
3	Jensen	0,01909	0,01595

Above table show the value of the index Sharpe, Treynor and Jensen of optimal portfolio of JII stocks and IDX30 stocks. Based on the index value shown in the table above, it can be concluded that the overall performance of the JII stock portfolios is better than IDX30 stock portfolio. It can be seen from a comparison of its performance index score, which the Sharpe index of JII stocks amounted of 0.17407 was higher than IDX30 stocks of 0.12054. Treynor index of JII stocks amounted of 0.00753 higher than IDX30 stocks of 0.00719. While the value of Jensen index of JII stocks amounted of 0.01909 also higher than IDX30 stocks of 0.01595. This comparison indicates that the portfolio performance of JII stocks better than IDX30 stocks.

Finally it is known that the results of calculation of the value of Sharpe index, Treynor index and Jensen index are in line with the analysis results of alpha portfolio, beta portfolio, rate of return portfolio and risk portfolio. The portfolio value of alpha, beta and expected return of JII stocks were higher and the risk of the total portfolio ( $\sigma_p$ ) lower than stock portfolios IDX30 index. Although the JII stocks have a beta coefficient higher than IDX30 stocks, but the performance indicated by Treynor index show that JII stocks is better than IDX30 stocks. It can be concluded that the shariah portfolio represented by JII stocks has better performance than the conventional stock portfolio represented by IDX30 stocks.

#### 4.4. The Most Optimal Portfolio Stocks

Based on research results above, it can be concluded that the most optimal portfolio stocks are JII portfolio stocks, i.e. stock of Unilever Indonesia (UNVR), Indofood CBP Sukses Makmur (ICBP) and AKR Corporindo (AKRA) with proportion stocks respectively 44,59%; 28,55% and 26,86%.

This research results are in line with previous studies conducted by Karim, Datip and Shukri (2014) which analyzes the comparative of Islamic stocks and conventional stocks in the Malaysian stock exchange. Similar research results obtained by Reddy and Fu (2014) which analyzes the Australian Stock Exchange (ASX) with the conclusion that the Islamic stocks statistically not different significantly from conventional stocks, but tend to have a higher rate of return. Islamic stocks have higher beta coefficient, which means Islamic stocks are more vulnerable to changes in market returns, but offset by a higher level of return. In Indonesia, the research that gives similar results is the research conducted by Putry, Sugema and Lubis (2015) comparing the stock performance JII and Composite Price Stock Index (CPI), with the results that at the same level of risk, investors who invest in stocks JII can expect the return higher than CPI.

## 5. CONCLUSION

### 5.1. Conclusion

Based on the objectives and results of research, it can be concluded as follows:

1. Single Index Model proved to be effective for screening and selecting stocks to form the optimal portfolio, so that the Single Index Model can be used as a tool of analysis in Stock Investment Decision Making System. The portfolio candidates of JII stocks are Unilever Indonesia (UNVR), Indofood CBP Sukses Makmur (ICBP) and AKR (AKRA) in proportion respectively 44.59%; 28.55% and 26.86%. While the portfolio candidate of IDX30 is Unilever Indonesia (UNVR), Bank Rakyat Indonesia (BBRI) and Bank Central Asia (BBCA) in proportion respectively 81.16%; 12.81% and 6.03%.
2. The performance comparison of the stock portfolios show that JII shariah stocks have portfolio rate of return of 0.01831 (1.831%)

higher than IDX30 conventional stock of 0.01594 (1.594%). While the portfolio rate of risk of JII shariah stocks amounted to 0.00599 (0.599%) was lower than the conventional stock IDX30 of 0.00849 (0.849%). The performance of the stock portfolio based on Sharpe index values for JII shariah stocks amounted to 0.17407 higher than IDX30 conventional stock at 0.12054. Treynor index values in JII shariah stock at 0.00753 higher than IDX30 conventional stock at 0.00719. While Jensen index value JII shariah stocks of 0.01909 also higher than IDX30 conventional stocks at 0.01595. The results of this analysis indicate that the portfolio performance of JII shariah stocks is better than the IDX30 conventional stock.

3. The stock portfolios that have the most optimal performance and deserve to be recommended to investors is JII shariah stocks which includes stock of Unilever Indonesia (44.59%), AKR Corporindo (28.55%), and Indofood CBP Sukses Makmur (26.86%).

## 5.2. Research Limititation

1. In this research only tested one kind of conventional stock indice, although there are several other kinds of stock indices that need to be considered.
2. The stock price data used are monthly closing stock price, so the daily stock price changes are not considered.

## 5.3. Suggestion

1. For investors who want to buy stocks in the capital market, it is advisable to select a stock portfolio of shariah stocks at the Jakarta Islamic Index group, especially the stock of Unilever Indonesia, AKR Corporindo and Indofood CBP Sukses Makmur.
2. For investors or prospective investors who wants to invest in the capital market are advised to use a single index method in determining the stock portfolio in selecting stocks and use the index Sharpe, Treynor and Jensen in assessing the performance of stock portfolios formed.
3. For further research is recommended to use daily close price to increase the possibility obtain more precise results. Besides, it is also advisable to

carry out comparison test with the other stock indices in order to obtain more comprehensive results to be recommended to investors or potential investors.

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