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Optimization of ISSI Stock Portfolio using Single Index Models in 2013-2017

Firsty Dzanurrahmana Zein[1], Khurul Aimmatul Umah, Khalwat Asyaria[1], Sri Herianingrum[1], A. Syifaul Qulub[1], and Sylva Alif Rusmita[2]

[1]Student Postgraduate Science of Islamic Economics, Airlangga University, Indonesia
[2]Lecturer Faculty of Economic and Business, Airlangga Universtity, Indonesia

1. Introduction

1.1. Background

Corresponding Author:
Firsty Dzanurrahmana Zein
firstydzanurrahmana@gmail.com

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The function of the stock price index is an indicator of profit for investors, as a formation facility passive portfolio, as a tool for calculating systematic risk, namely risk that cannot be mitigated through risk management, including diversification, as a means of finding investment opportunities, and for viewing economic developments, as well as a means of developing derivative investment instrument products. The risk in question is seen from how much price changes an effect deviates from changes in overall stock prices (Triharyanto, 2013). When someone decides to invest in shares, it will expect returns future as profits (Yuniarti, 2007).

Fatwa of the National Sharia Council of the Indonesian Ulema Council No. 20 / DSN-MUI / IX / 2000 concerning Investment in Sharia Mutual Funds, which concludes that stock investment in Islam is permissible. One of the sharia shares is shares listed on the ISSI because this index includes more shares, namely 366 shares (OJK, 2018). Large indexes in the formation of optimal portfolios can diversify risk to the maximum because more shares are included in the calculation.

Risk diversification is very important for investors because it can minimize risk without having to reduce the return received, in several ways, such as forming a portfolio containing many assets, randomly or diversified by the Markowitz method (Jogiyanto, 2010: 279). If investors are rational, they will choose the optimal portfolio, namely the portfolio with the best combination of return expected and risk (Jogiyanto, 2010: 88).

The reason for taking a single index model as a research study, first is a simplification of the Markowitz and Capital Asset Pricing Model (CAPM). Second, a single index model is based on stock prices, which will experience price increases if the stock price index

rises. Also applies to the opposite law (Husnan, 2003; Jogiyanto, 2010: 339). Third, the widespread use of the investment product index as an investment guide for investors in determining investment decisions such as ISSI. So, researchers want to know how the optimal portfolio formation that was formed in 2013-2017 and the limited research that discusses the formation of an optimal portfolio at the ISSI.

2. Theory Basis

2.1. Return

Return is a return on income received from an investment plus a change in market prices, usually expressed as a percentage of the initial investment market price (Van Horne, 1997). Actual return is the rate of return that has been obtained by previous investors. Expected return is the level of return anticipated by investors in the future and is calculated based on the average derived from a distribution return (Elton and Gruber, 1995).

2.2. Single index model

Single Index Model was first put forward by William Sharpe in 1963. This model can determine whether a stock entered into the optimal portfolio or not using a unique ranking criterion. Shares will be sorted by performance measured using an excess ratio return to risk, so that if a stock enters an optimal portfolio, then stocks with a higher ranking will also enter into the portfolio (Bakhoirudin, 2015).

2.3. Previous research

Sarker, (2013) analyse an optimal portfolio by using Markowitz model. For this purpose the monthly closing prices of 164 companies listed in Dhaka Stock Exchange (DSE) and DSE all share price index for the period of July 2007 to June 2012 have been considered. The proposed method formulates an efficient set, selects portfolio having excess return to standard deviation ratio satisfying the constraint that the sum of proportions invested in the assets equals one. The optimum portfolio consists of twenty stocks selected out of 164 stocks, giving the return of 6.48%.

Ivanova and Dospatliev (2017) provide a practical study of Markowitz model on the Bulgarian stock market from 2013 to 2016. The significance of this study arises from

the fact that although Markowitz model has been widely used by investors worldwide, its application on Bulgarian stock market is still relatively limited. From the data inputs which are weekly closing prices of 50 stocks traded on Bulgarian Stock Exchange between January 2013 and December 2016, efficient frontiers in addition to optimal portfolios are determined on the basis of Markowitz theory.

Kulali (2016) had test Markowitz mean-variance approach on Istanbul Stock Exchange (BIST). 252 days of data belonging a year of 2015 are analyzed. In empiricial analysis, The Author followed meanvariance model and created many portfolios. The model adjusted them as a minimum variance for a given expected return. Investors choose any of them as their risk preferences. Because they are all efficient. The Author optimal portfolio is constructed by eight assets with different weights. It provides more return comparing with aportfolio with equal shares of ten stocks.

3. Research Method

The approach of this study is a quantitative descriptive approach. The data analysis technique uses descriptive statistics. The data sample used is companies that are listed and actively traded on the Indonesian Syariah Stock Index (ISSI) from 2013-2017. Samples were taken by methods non probability sampling and purposive sampling. The required data is in the form of secondary data, namely: issuer's stock price data at the closing price at the end of the month, Composite Stock Price Index (CSPI), Indonesian Sharia Stock Index (ISSI), yield rate of the 2013- Bank Indonesia Sharia Certificate 2017. The identification of variables in this study is the optimal portfolio using a single index method, ERB> C *.

The operational definition in this study is (Jogiyanto, 2010: 20-239):

3.1. Optimal portfolio

The formation of an optimal portfolio is based on the excess return to beta (ERB) of each security. ERB is the excess return of securities on asset return a risk-free(risk free rate)as measured by beta. Excess Return to Beta is calculated by:

$$\text{ERBi} = \frac{E(R_i - R_f)}{\beta_i}$$

ERBi = Excess Return to Beta stock to i

Rf = Risk Free Rate of Return

E (Ri) = Return of expectation from investment stock i

βi = Beta stock to i

Before calculating ERB, must look for:

1. Realized return individual (Rit):

$$\text{Rit} = \frac{R_t - R_{t-1} + D_t}{R_{t-1}}$$

Ri = Return realized of stock realization to i period t

Rt = Stock price in period t

R_{t-1}= Stock price in the previous period

Dt = Share dividend paid in period t

2. Expected Return (E(Ri))

$$\text{E(Ri)} = \frac{\sum_i^{n=1} R_{it}}{n}$$

E (Ri) = Expected return from stock i

Rit = Return on stock realization i period t

n = Number of observations

3. Return Market (R_m)

$$R_m = \frac{\text{ISSIt} - \text{ISSIt} - 1}{\text{ISSIt} - 1} \qquad E(R_m) = \frac{\sum R_m}{n}$$

Rm = Return Market period t

ISSI_t=ISSI in period t

ISSI_{t-1} = ISSI in the previous period

E (Rm) = Expected return market

n = Time of observation

4. Standard deviation (σ)

Calculation of risk from return realization of each stock with the formula:

$$\sigma = \sqrt{\sum_{i=1}^{n} \frac{R_i - E(R_i)^2}{n}}$$

σ = stock standard deviation i

Ri = return stock realized i

E (Ri) = expected return stock i

n = total return stock realized i

$$\sigma_m = \sqrt{\sum_{i=1}^{n} \frac{R_{mt} - E(R_m)^2}{n}}$$

σ_m = standard market deviation

R_{mt} = Return market to t

E (R_m) = Expected return market

n = Number returns of stock realization i

5. Variance ($\sigma^2 i$)

As a measure of the risk of the expected return of each stock, with the formula:

$$\sigma^{2i} = \sum_{i=1}^{n} \frac{R_i - E(R_i)^2}{n}$$

$$\sigma^{2m} = \sum_{i=1}^{n} \frac{R_m - E(R_m)^2}{n}$$

6. Variance (σ_{ei})

Variant of residual error stocki which is also a unique or non-systematic risk (Tandelilin, 2010: 169)

$$\sigma ei(i) = \sigma^2{}_i - (\sigma^2{}_m \cdot (\alpha i)^2)$$

σ_{ei} (i) = Variance ei stock i

$\sigma^2 i$ = variance Stocki

$\sigma^2{}_m$ = variance Market

αi = Alpha stock i

7. Beta (βi)

Beta to reduce the number of variables that need to be estimated (Husnan, 2003).

$$\beta i = \frac{\sigma_{i,m}}{\sigma^2 m}$$

βi = Beta stock i

σi, m = Covariance of returns stocki with return market

$\sigma^2{}_m$ = Variance return market

8. Alpha (α)

   Calculation return of stock realization i with return market in a certain period of time (Tandelilin, 2010: 132)

   αi = Rm - βi

   αi = Alpha stock to i

   βi = Beta stock to i

   R_m = return Market

9. Ai value and Bi

$$Ai = \frac{[E(R_i) - R_f], \beta_i}{\sigma_{ei}}$$

$$Bi = \frac{\beta_i^2}{\sigma_{ei}}$$

   E (Ri) = Expected return stock i

   Rf = Risk free rate of return

   βi = Stock beta i

   σ_{ei} = Variance of shares (unique risk)

10. Cut - off - Point (C *)

    Results for market variance and return premium on error variance stock and is a measure for stocks included in the optimal portfolio

$$Ci = \frac{\sigma^2 m \sum_{j=1}^{i} A_i}{1 + \sigma^2 m \sum_{j=1}^{i} B_i}$$

    σ^2_m = Variance realized return market

11. Proportion of funds per share by calculating the percentage of each share selected in the formation of an optimal portfolio

$$W_i = \frac{X_i}{\sum_{i=1}^{n} X_i}$$

$$X_i = \frac{\beta_i}{\sigma_{ei^2}}(ERB - C*)$$

    W_i = Large percentage of funds invested in stock i

    X_i= Proportion of stock i

    C^*= Value $C_i$is greatest

12. Calculate portfolio return and expected return, with:

$$R_p = \sum_{i=1}^{n} W_i R_i$$

R_p = Return portofolio

$$E(R_p) = \alpha_p + \beta_p R_p,$$

where

$$\alpha_p = \sum_{i=1}^{n} W_i \alpha_i$$

$$\beta_p = \sum_{i=1}^{n} W_i \beta_i$$

13. Calculate portfolio risk, with:

$$\sigma_p^2 = \beta_p^2 \sigma_m^2 + \sum_{i=1}^{n} W_i^2 \sigma_{ei}^2$$

$$\sigma_p = \sqrt{\beta_p^2 \sigma_m^2 + \sum_{i=1}^{n} W_i^2 \sigma_{ei}^2}$$

σ^2_p = Varian portofolio

σ_p = Standar deviasi portofolio

Portfolio variance

σ_p = Portfolio standard deviation

14. Portfolio Performance

After the selected stock forming portfolio for the period 2013-2017, then its performance is measured in 2018 which is then compared with its market performance with the method Sharpe. The market is described by ISSI and risk free is described by Bank Indonesia Syariah Certificates. Portfolio performance is measured by comparing the portfolio risk premium with portfolio risk expressed by standard deviation (total risk) (Halim, 2005: 51).

$$\text{Spi} = \frac{Rpi - Rf}{SDpi}$$

Spi = Index Sharpe Portfolio

Rpi = Average Portfolio Yield i

Rf = Average SBIS Yield

SDpi = Standard Deviation from Portfolio Yield i

Rpi - Rf = Portfolio Risk Premium

4. Description of Research Results

4.1. Establishment of optimal portfolio

1. Realized return, expected return ¸ standard deviation and variance,error variance stock, market and SBIS.

   Based on the calculation of 224 samples of Islamic stocks. In table 1, the return highest expectation of E (Ri) is owned by SMDR with a value of 0.1134, while the lowest return of expectation E (Ri) is owned by the MERK with a value of -0.3076. Shares that have a return positive expectation are good stocks and have the opportunity to be able to provide returns high.

   Standard deviation and variance highest is MERK with a value of 2.5831 and 6.6723, while the lowest standard deviation is SRSN with a value of 0.0036. The variance lowest is AALI with a value of -0.0190. The higher the standard deviation and variance value, the higher the risk value and vice versa. return Expectation, standard deviation, variance SBIS that reflects risk-free assets (Rf) because Bank Indonesia is guaranteed to pay its obligations at maturity.

   In table 2, expectations, standard deviations, variance market are respectively 0.0048, 0.0346, and 0.0012. Return positive value markets means investing in shares in ISSI the period 2013-2017 benefit investors. Whereas the return expected, standard deviation, variance are SBISworth 0.0063, 0.0151 and 0.0002.

2. Beta, alpha and error variance stock

   Beta risk coefficients reflect the sensitivity of a stock to change markets with greater beta ($\beta > 1$) are increasingly sensitive to market changes (stocks that are increasingly at risk). Including systematic risk that cannot be eliminated even by forming a portfolio. If the alpha value is negative, it means that it is not included in the optimal portfolio. Shares is negative means the risk of such shares is greater than return of this.

   Error variants are unique risks or non-systematic risks of a stock. In table 3, shares with the highest beta value are SONA, which is 4,2501, the lowest value is SPMA which is -11,5278. The highest alpha value is SMDR of 0.1095 and the lowest value is MERK of -0.2707. The value error variance highest is BRAND of 6.6026 and the lowest value is ADES of -0.1095.

3. Optimal Portfolio Formation

First, calculate the value of excess return to beta (ERB). Shares with a negative ERB value means that the stock has a stock return below the risk-free rate of return. ERB calculations require data on risk-free asset returns using the average monthly SBIS reward rate during the study period and the average monthly SBIS reward rate of 0.0063%. The ERB calculation results show that there are 74 issuers whose ERB is positive and there are 150 ERB issuers with negative values which are automatically excluded from the optimal portfolio candidate list. Then look for the Cut Off Rate (Ci) value. Optimal portfolio candidates if the ERB value is> C *. In table 4, the highest Ci value is 0.0346 in the lowest INCY and Ci shares of -0.011 in EKAD shares. The biggest ERB value is 0.1343 in the lowest SMDR and ERB shares of 0.0002 in INDY shares. Criteria that fulfill the optimal portfolio formation are 58 shares.

4. Determination of Proportion of Funds

   The proportion of funds (Wi) invested in each portfolio share is shown in table 5.

5. Calculation Expected Return and Portfolio Risk

   In table 6, the formed portfolio gives an expected return of 2,62% per month or 31.5% per year. The value of systematic risk relative to market risk (beta) of the portfolio is around 0.7855. The portfolio standard deviation or risk value is 0.0275 or around 2.75%.

6. Optimal Portfolio Performance

   In table 7, the performance of the optimal portfolio of shares listed in the ISSI 2018 with a index sharpe of -0.495, with return -0.022 and standard deviation of 0.054. The market in research is ISSI. The calculation results of 2018 market performance with sharpe index are -0.708 with return -0.012 and standard deviation of 0.024.

5. Discussion

5.1. Optimal portfolios formed 2013-2017

To find out how well the portfolio is produced, it is necessary to compare it with other stock indices, namely JII, ISSI, and IHSG. Comparison of portfolio performance with several indices based on a comparison of returns monthly during the 2013-2017 period.

TABLE 1: Expected Return, Standar Deviation, Variance Individual Stocks (Source: prepared by the authors).

CODE	E(Ri)	σi	σ^2_i	CODE	E(Ri)	σi	σ^2_i	CODE	E(Ri)	σi	σ^2_i	CODE	E(Ri)	σi	σ^2_i
AALI	-0,0036	0,1021	-0,0190	DEW	-0,0027	0,0816	0,0067	KBLV	-0,0013	0,2145	0,0460	RANC	-0,0137	0,1025	0,0105
ABBA	-0,0081	0,0661	0,0044	DGIK	-0,0207	0,2086	0,0435	KDSI	0,0016	0,2034	0,0414	RICY	-0,0017	0,0502	0,0025
ACES	0,0083	0,1038	0,0108	DILD	0,0033	0,1188	0,0141	KIJA	0,0035	0,1095	0,0120	RIGS	-0,0205	0,0942	0,0089
ADES	-0,0203	0,0988	0,0098	DNET	0,0604	0,2366	0,0560	KKGI	0,0041	0,1649	0,0272	RIMO	0,0060	0,3853	0,1485
ADMG	-0,0085	0,1352	0,0183	DPNS	0,0015	0,0994	0,0099	KLBF	0,0078	0,0641	0,0041	RODA	-0,0046	0,1483	0,0220
ADRO	0,0034	0,1233	0,0152	DSFI	0,0203	0,2218	0,0492	KOBX	-0,0233	0,0924	0,0085	ROTI	0,0011	0,0797	0,0063
AIMS	0,0285	0,4446	0,1977	DSSA	0,0045	0,1834	0,0336	KOIN	0,0135	0,1791	0,0321	RUITS	0,0059	0,0647	0,0042
AISA	-0,0154	0,1402	0,0196	DVLA	0,0022	0,1039	0,0108	KPIG	-0,0011	0,0970	0,0094	SAME	0,0321	0,1768	0,0313
AKKU	0,0224	0,2475	0,0613	EKAD	0,0108	0,0674	0,0045	LION	0,0126	0,1159	0,0134	SCCO	0,0177	0,0879	0,0077
AKRA	0,0105	0,0873	0,0076	ELSA	0,0156	0,1397	0,0195	LPCK	-0,0063	0,1536	0,0236	SCMA	0,0030	0,0749	0,0056
ALKA	0,0269	0,3498	0,1224	ELTY	-0,0012	0,0541	0,0029	LPKR	-0,0132	0,1092	0,0119	SDMU	0,0175	0,1804	0,0326
ALMI	-0,0032	0,0711	0,0051	EMDE	0,0133	0,1072	0,0115	LPLI	-0,0183	0,1642	0,0270	SDPC	0,0043	0,1014	0,0103
AMFG	-0,0631	0,2827	0,0799	ERAA	-0,0270	0,1611	0,0259	LPPF	0,0164	0,1338	0,0179	SGRO	0,0030	0,0831	0,0069
ANTM	-0,0090	0,1444	0,0209	FAST	-0,0093	0,0938	0,0088	LSIP	-0,0066	0,1454	0,0211	SIMA	0,0119	0,2962	0,0877
APLN	-0,0120	0,1054	0,0111	FISH	0,0078	0,1426	0,0203	LTLS	-0,0172	0,2216	0,0491	SIMP	-0,0141	0,0937	0,0088
ARII	-0,0136	0,2095	0,0439	FMII	0,0208	0,1737	0,0302	MAGP	-0,0127	0,0758	0,0057	SIPD	0,0099	0,1024	0,0105
ARNA	-0,0029	0,1160	0,0135	FPNI	-0,0001	0,1685	0,0284	MAIN	-0,0249	0,1359	0,0185	SKBM	0,0106	0,1583	0,0251
ARTA	0,0097	0,1663	0,0277	GAMA	-0,0714	0,5454	0,2974	MAPI	-0,0004	0,1271	0,0162	SMDM	-0,0087	0,1134	0,0129
ARTI	-0,0399	0,2195	0,0482	GDST	-0,0041	0,0936	0,0088	MASA	-0,0086	0,1612	0,0260	SMDR	0,1134	0,3658	0,1338
ASGR	0,0014	0,1198	0,0144	GEMA	0,0169	0,1032	0,0107	MBSS	-0,0067	0,1650	0,0272	SMGR	-0,0064	0,0724	0,0052
ASII	0,0045	0,0658	0,0043	GIAA	-0,0125	0,0950	0,0090	MBTO	-0,0191	0,0806	0,0065	SMMT	-0,0565	0,2846	0,0810
ASRI	-0,0112	0,1224	0,0150	GJTL	-0,0211	0,1485	0,0220	MDLN	-0,0015	0,1045	0,0109	SMRA	-0,0109	0,1509	0,0228
AUTO	-0,0052	0,0971	0,0094	GOLD	0,0083	0,1151	0,0133	MERK	-0,3076	2,5831	6,6723	SMRU	0,0111	0,3013	0,0908
BAPA	-0,0084	0,0978	0,0096	GPRA	-0,0020	0,1518	0,0230	META	0,0009	0,1197	0,0143	SMSM	0,0174	0,1593	0,0254
BATA	0,0234	0,1988	0,0395	GWSA	-0,0058	0,1189	0,0141	MIRA	-0,0113	0,0625	0,0039	SONA	-0,1026	1,8101	3,2765
BAYU	0,0242	0,1310	0,0172	HERO	-0,0299	0,0863	0,0074	MITI	-0,0325	0,0910	0,0083	SPMA	-0,0175	1,6936	2,8682
BBRM	-0,0238	0,1128	0,0127	HEXA	-0,0076	0,1231	0,0152	MKPI	0,0344	0,0805	0,0065	SRSN	0,0000	0,0036	0,0000
BCIP	-0,0171	0,2475	0,0613	HITS	0,0285	0,1615	0,0261	MLPL	-0,0137	0,1824	0,0333	SSIA	0,0429	1,3381	1,7906
BEST	-0,0187	0,1501	0,0225	HOME	-0,0020	0,1903	0,0362	MNCN	-0,0088	0,1461	0,0214	STAR	0,0140	0,1196	0,0143
BIPP	-0,0095	0,0781	0,0061	HRUM	-0,0128	0,1669	0,0278	MPPA	-0,0149	0,1490	0,0222	STTP	0,0317	0,1257	0,0158
BISI	0,0170	0,1173	0,0137	IATA	-0,0195	0,1124	0,0126	MRAT	-0,0105	0,1115	0,0124	SUGI	-0,0024	0,1236	0,0153
BKDP	-0,0031	0,0923	-0,0140	IBST	0,0099	0,2163	0,0468	MTLA	-0,0056	0,1114	0,0124	TBLA	0,0165	0,0860	0,0074
BKSL	-0,0135	0,2217	0,0491	ICBP	0,0162	0,0707	0,0050	MYOH	0,0021	0,1139	0,0130	TBMS	0,0201	0,1648	0,0272
BMTR	-0,0247	0,1383	0,0191	IGAR	0,0092	0,2254	0,0508	MYOR	0,0279	0,0975	0,0095	TINS	-0,0050	0,1231	0,0151
BRMS	-0,0278	0,2222	0,0494	IIKP	0,0265	0,2889	0,0835	MYRX	0,0099	0,1027	0,0106	TIRA	0,0135	0,0911	0,0083
BRNA	0,0091	0,0654	0,0043	IKBI	0,0015	0,1029	0,0106	NELY	-0,0062	0,1111	0,0123	TLKM	0,0164	0,0584	0,0034
BSDE	0,0034	0,0912	0,0083	INAF	0,0477	0,2996	0,0898	NIKL	0,0720	0,3484	0,1214	TOBA	0,0173	0,0971	0,0094
BSSR	0,0005	0,1162	0,0135	INAI	0,0309	0,0912	0,0083	NIPS	0,0306	0,1870	0,0350	TOTL	0,0317	1,9245	3,7038
BTEK	0,0152	0,1891	0,0358	INCI	0,0091	0,0698	0,0049	PALM	-0,0043	0,0950	0,0090	TOWR	0,0071	0,0569	0,0032
BTON	-0,0057	0,0809	0,0066	INDS	-0,0086	0,1511	0,0228	PANR	0,0193	0,0795	0,0063	TPIA	0,0447	0,1475	0,0218
BUDI	-0,0050	0,0738	0,0054	INDY	0,0067	0,1926	0,0371	PGAS	-0,0159	0,1040	0,0108	TRIL	-0,0113	0,1175	0,0138
BULL	-0,0225	0,2075	0,0431	INPP	0,0115	0,1984	0,0394	PGLI	0,0146	0,2151	0,0463	TRIS	-0,0041	0,0479	0,0023
BUVA	0,0048	0,0667	0,0044	INTD	0,0266	0,0853	0,0073	PICO	-0,0016	0,1077	0,0116	TSPC	-0,0104	0,0877	0,0077
BYAN	0,0068	0,1208	0,0146	INTP	0,0029	0,0951	0,0029	PJAA	0,0092	0,1465	0,0215	TURI	0,0065	0,0956	0,0091
CASS	0,0050	0,0746	0,0056	ISAT	-0,0058	0,0844	0,0071	PLIN	0,0176	0,1372	0,0188	ULTJ	0,0204	0,1044	0,0109
CEKA	0,0185	0,3132	0,0981	ITMA	0,1125	0,8470	0,7175	PRAS	-0,0019	0,1225	0,0150	UNIT	0,0003	0,1457	0,0212
CENT	-0,0154	0,1202	0,0145	ITMG	-0,0056	0,1496	0,0224	PSAB	0,0055	0,1686	0,0284	UNTR	0,0135	0,0713	0,0051
CKRA	-0,0222	0,1735	0,0301	JIHD	-0,0071	0,1421	0,0202	PTBA	0,0127	0,1568	0,0246	UNVR	0,0173	0,0569	0,0032
CLPI	-0,0038	0,1179	0,0139	JPFA	0,0013	0,1536	0,0236	PTPP	0,0207	0,1128	0,0127	VIVA	-0,0067	0,1464	0,0214
CMNP	0,0057	0,1144	0,0131	JPRS	-0,0157	0,0817	0,0067	PTRO	-0,0032	0,1446	0,0209	VOKS	0,0151	0,1314	0,0173
CNKO	-0,0347	0,1145	0,0131	JRPT	0,0072	0,0822	0,0068	PTSN	0,0085	0,1130	0,0128	WAPO	0,0133	0,2082	0,0433
CPIN	-0,0031	0,1110	0,0123	JTPE	-0,0047	0,0946	0,0089	PUDP	-0,0025	0,0892	0,0080	WEHA	0,0032	0,1151	0,0133
CSAP	0,0132	0,1127	0,0127	KAEF	0,0261	0,2359	0,0557	PWON	0,0177	0,1193	0,0142	WICO	0,0452	0,2728	0,0744
CTRA	0,0055	0,1392	0,0194	KARW	-0,0282	0,3005	0,0903	PYFA	-0,0007	0,0660	0,0044	WIKA	0,0028	0,1082	0,0117
CTTH	0,0095	0,0951	0,0091	KBLI	0,0114	0,1335	0,0178	RAJA	0,0114	0,1384	0,0192	WINS	-0,0036	0,1503	0,0226
DART	-0,0106	0,1208	0,0146	KBLM	0,0158	0,1882	0,0354	RALS	0,0040	0,1253	0,0157	WSKT	0,0288	0,1342	0,0180

TABLE 2: Expected Return, Standard Deviation, Variance Markets and SBIS (Source: processed by the author).

	ISSI (Rm)	SBIS (Rf)
E(Ri)	0,0048	0,0063
σi	0,0346	0,0151
σ^2_i	0,0012	0,0002

The results of the comparison of performance between the portfolio and the three stock indices are shown in graph 1.

Based on graph 1, shows that the portfolio performance produced tends to be better than the three other stock indices. The portfolio line in the graph is almost always higher

Table 3: Beta, Alpha, and Variance Error (Source: processed by the author).

CODE	βi	αi	σei	CODE	βi	αi	σei	CODE	βi	αi	σei	CODE	βi	αi	σei
AALI	0,4600	-0,0059	0,0102	DEWA	0,0439	-0,0029	0,0067	KBLV	1,3515	-0,0079	0,0438	RANC	1,0259	-0,0187	0,0093
ABBA	0,0658	-0,0084	0,0044	DGIK	2,3523	-0,0321	0,0369	KDSI	1,2492	-0,0044	0,0414	RICY	0,3049	-0,0032	0,0024
ACES	1,1850	0,0026	0,0091	DILD	1,5369	-0,0042	0,0113	KIJA	2,2348	-0,0073	0,0060	RIGS	0,3807	-0,0224	0,0087
ADES	1,4653	-0,0258	-0,1095	DNET	-0,0195	0,0613	0,0559	KKGI	0,7103	0,0007	0,0266	RIMO	2,6577	-0,0068	0,1400
ADMG	0,9764	-0,0132	0,0171	DPNS	0,5923	-0,0014	0,0095	KLBF	1,0855	0,0025	0,0027	RODA	0,0776	-0,0050	0,0220
ADRO	0,8365	-0,0007	0,0144	DSFI	1,2597	0,0142	0,0473	KOBX	-0,1283	-0,0227	0,0085	ROTI	0,7945	-0,0028	0,0056
AIMS	0,6428	0,0254	0,1972	DSSA	-0,2833	0,0059	0,0335	KOIN	0,7736	0,0097	0,0314	RUIS	0,6671	0,0027	0,0037
AISA	1,5201	-0,0227	0,0169	DVLA	1,0618	-0,0029	0,0094	KPIG	0,8615	-0,0052	0,0085	SAME	0,9683	0,0274	0,0302
AKKU	0,9306	0,0179	0,0602	EKAD	1,0437	0,0057	0,0032	LION	-0,2942	0,0141	0,0133	SCCO	1,0029	0,0129	0,0065
AKRA	0,8361	0,0064	0,0068	ELSA	0,5295	0,0130	0,0192	LPCK	2,4122	-0,0180	0,0166	SCMA	0,6794	-0,0003	0,0051
ALKA	-0,0139	0,0269	0,1224	ELTY	-0,0335	-0,0011	0,0029	LPKR	1,4479	-0,0202	0,0094	SDMU	1,1806	0,0118	0,0309
ALMI	0,4975	-0,0051	0,0035	EMDE	0,2172	0,0122	0,0114	LPLI	1,9474	-0,0277	0,0224	SDPC	1,2095	-0,0016	0,0085
AMFG	0,1600	-0,0639	0,0799	ERAA	2,3025	-0,0381	0,0196	LPPF	1,4082	0,0096	0,0155	SGRO	0,4936	0,0006	0,0066
ANTM	0,7507	-0,0126	0,0202	FAST	0,4956	-0,0117	0,0085	LSIP	0,7906	-0,0105	0,0204	SIMA	0,1896	0,0110	0,0877
APLN	1,5652	-0,0196	0,0082	FISH	0,7734	0,0040	0,0196	LTLS	0,2271	-0,0183	0,0490	SIMP	0,8494	-0,0182	0,0079
ARII	-0,3043	-0,0121	0,0438	FMII	0,8290	0,0168	0,0293	MAGP	0,2049	-0,0137	0,0057	SIPD	0,6506	0,0067	0,0100
ARNA	1,6557	-0,0109	0,0102	FPNI	1,3701	-0,0068	0,0261	MAIN	1,6058	-0,0326	0,0154	SKBM	0,0927	0,0102	0,0251
ARTA	0,6253	0,0067	0,0272	GAMA	3,5657	-0,0887	0,2822	MAPI	1,8483	-0,0093	0,0121	SMDM	0,0080	-0,0088	0,0129
ARTI	0,9153	-0,0443	0,0472	GDST	0,4631	-0,0063	0,0085	MASA	-0,2117	-0,0076	0,0259	SMDR	0,7974	0,1095	0,1330
ASGR	0,6745	-0,0019	0,0138	GEMA	0,2029	0,0159	0,0106	MBSS	1,4174	-0,0135	0,0248	SMGR	1,3010	-0,0127	0,0032
ASII	1,3586	-0,0020	0,0021	GIAA	0,1103	-0,0131	0,0090	MBTO	0,6409	-0,0222	0,0060	SMMT	0,9325	-0,0611	0,0799
ASRI	2,2826	-0,0223	0,0150	GJTL	2,5460	-0,0334	0,0143	MDLN	1,3382	-0,0079	0,0088	SMRA	2,1173	-0,0212	0,0174
AUTO	1,3499	-0,0117	0,0072	GOLD	0,4696	0,0061	0,0130	MERK	-7,6334	-0,2707	6,6026	SMRU	0,9302	0,0066	0,0898
BAPA	0,3810	-0,0103	0,0094	GPRA	0,8654	-0,0062	0,0221	META	1,0836	-0,0044	0,0143	SMSM	0,3771	0,0156	0,0252
BATA	-1,2481	0,0294	0,0377	GWSA	1,4264	-0,0127	0,0117	MIRA	0,0601	-0,0116	0,0039	SONA	4,2501	-0,1231	3,2549
BAYU	0,5327	0,0216	0,0168	HERO	0,7449	-0,0335	0,0068	MITI	0,2412	-0,0337	0,0083	SPMA	-11,5278	0,0383	2,7093
BBRM	0,7789	-0,0276	0,0120	HEXA	1,1371	-0,0131	0,0136	MKPI	0,2993	0,0330	0,0064	SRSN	-0,0015	0,0000	0,0000
BCIP	1,0929	-0,0224	0,0598	HITS	0,2524	0,0273	0,0260	MLPL	3,2149	-0,0293	0,0209	SSIA	4,1781	0,0227	1,7697
BEST	2,5355	-0,0309	0,0148	HOME	1,0678	-0,0071	0,0349	MNCN	1,6719	-0,0169	0,0180	STAR	0,7856	0,0102	0,0136
BIPP	0,4836	-0,0118	0,0058	HRUM	0,9645	-0,0175	0,0267	MPPA	2,4571	-0,0268	0,0150	STTP	0,2898	0,0303	0,0157
BISI	1,2550	0,0109	0,0119	IATA	1,0743	-0,0247	0,0113	MRAT	0,4017	-0,0124	0,0122	SUGI	-0,0179	-0,0234	0,0153
BKDP	0,6551	-0,0063	0,0080	IBST	0,5816	0,0071	0,0464	MTLA	1,5580	-0,0132	0,0095	TBLA	0,5954	0,0136	0,0070
BKSL	1,6857	-0,0216	1,6857	ICBP	1,1950	0,0104	0,0033	MYOH	0,9815	-0,0026	0,0118	TBMS	1,0856	0,0148	0,0258
BMTR	1,3368	-0,0311	0,0170	IGAR	1,7687	0,0060	0,0471	MYOR	0,6769	0,0246	0,0090	TINS	0,4098	-0,0070	0,0149
BRMS	1,6096	-0,0356	0,0463	IIKP	2,0907	0,0164	0,0782	MYRX	1,0310	0,0049	0,0093	TIRA	-0,5052	0,0159	0,0080
BRNA	0,5623	0,0064	0,0039	IKBI	0,5397	-0,0011	0,0102	NELY	0,3379	-0,0078	0,0122	TLKM	0,8406	0,0123	0,0026
BSDE	1,9781	-0,0062	0,0036	INAF	2,9259	0,0335	0,0795	NIKL	2,3142	0,0608	0,1149	TOBA	-0,0876	0,0178	0,0094
BSSR	0,0471	0,0043	0,0135	INAI	0,6049	0,0280	0,0079	NIPS	1,7880	0,0219	0,0312	TOTL	0,7226	0,0283	3,7032
BTEK	1,1468	0,0096	0,0342	INCI	0,6351	0,0060	0,0044	PALM	0,3994	-0,0063	0,0088	TOWR	-0,0183	0,0072	0,0032
BTON	-0,0642	-0,0053	0,0065	INDS	1,5246	-0,0160	0,0201	PANR	0,4502	0,0171	0,0061	TPIA	0,3116	0,0432	0,0216
BUDI	0,5553	-0,0077	0,0051	INDY	1,7711	-0,0018	0,0333	PGAS	1,2208	-0,0218	0,0090	TRIL	-0,1395	-0,0106	0,0138
BULL	1,0967	-0,0278	0,0416	INPP	0,6924	0,0081	0,0388	PGLI	0,2137	0,0136	0,0462	TRIS	0,1777	-0,0049	0,0023
BUVA	0,4825	0,0025	0,0042	INTD	-0,2204	0,0277	0,0072	PICO	0,2477	-0,0028	0,0115	TSPC	0,9832	-0,0151	0,0065
BYAN	-0,0373	0,0069	0,0146	INTP	1,3485	-0,0037	0,0069	PJAA	-0,0740	0,0095	0,0214	TURI	1,2871	0,0003	0,0072
CASS	0,4684	0,0027	0,0053	ISAT	0,2917	-0,0072	0,0070	PLIN	-0,6500	0,0207	0,0183	ULTJ	0,7825	0,0166	0,0102
CEKA	0,7768	0,0147	0,0974	ITMA	2,1092	0,1023	0,7122	PRAS	1,1627	-0,0075	0,0134	UNIT	0,3295	-0,0013	0,0211
CENT	0,9653	-0,0201	0,0133	ITMG	0,8071	-0,0095	0,0216	PSAB	1,1464	0,0000	0,0269	UNTR	0,5149	0,0110	0,0048
CKRA	1,0332	-0,0272	0,0288	JIHD	1,2086	-0,0129	0,0185	PTBA	1,6811	0,0045	0,0212	UNVR	0,6483	0,0142	0,0027
CLPI	1,3901	-0,0105	0,0116	JPFA	2,8562	-0,0125	0,0138	PTPP	1,4391	0,0137	0,0103	VIVA	1,4442	-0,0137	0,0189
CMNP	0,4783	0,0034	0,0128	JPRS	0,3083	-0,0172	0,0066	PTRO	1,0998	-0,0086	0,0195	VOKS	0,4667	0,0129	0,0170
CNKO	0,5461	-0,0373	0,0128	JRPT	1,0864	0,0019	0,0053	PTSN	0,7013	0,0051	0,0122	WAPO	0,8219	0,0093	0,0425
CPIN	1,8671	-0,0121	0,0081	JTPE	0,1955	-0,0057	0,0089	PUDP	1,0200	-0,0074	0,0067	WEHA	0,9633	-0,0015	0,0121
CSAP	0,6761	0,0100	0,0122	KAEF	2,4042	0,0145	0,0557	PWON	1,8850	0,0086	0,0100	WICO	1,4758	0,0381	0,0718
CTRA	2,5078	-0,0066	0,0119	KARW	0,7907	-0,0320	0,0895	PYFA	0,4657	-0,0029	0,0041	WIKA	1,4426	-0,0042	0,0092
CTTH	0,6506	0,0064	0,0085	KBLI	1,8876	0,0023	0,0136	RAJA	1,4298	0,0045	0,0167	WINS	1,6991	-0,0118	0,0191
DART	1,5124	-0,0179	0,0118	KBLM	1,7650	0,0072	0,0317	RALS	1,6047	-0,0037	0,0126	WSKT	1,9635	0,0193	0,0134

than the other three stock indices. In table 8, the resulting portfolio has the average return highest among the three other stock indices, which is 2.62% much higher than ISSI (0.48%), JII (0.06%), and IHSG (0, 67%). At the level of risk, the lowest risk JII index with a standard deviation value of 0.49%, rather than the ISSI of 3.46%, JCI shares of 3.5% and portfolio shares of 2.75%. For the level of portfolio risk, although not the lowest, at least the risk level is still below the level of stock index risk and the market risk (ISSI).

Following are comparisons of return and risk portfolio, market, and SBIS in 2013-2017

The average return portfolio is 0.026 which is higher than the return market which is 0.0048 and the return risk-free(SBIS) is 0.0063. So by forming a portfolio, it gives return a higher than not forming a portfolio.risky portfolio with a value of 0.0275, market 0.0346, and SBIS 0.0151. This proves that by forming a portfolio that provides higher profits with a lower level of risk than market risk. This study is in accordance with the opinion of

Table 4: Comparison of ERB with Ci (Source: processed by the author).

CODE	ERB	Ci	CODE	ERB	Ci	CODE	ERB	Ci	CODE	ERB	Ci
ACES	0,0017	-0,0004	GOLD	0,0043	-0,0020	MKPI	0,0941	-0,0017	SMRU	0,0052	0,004
AIMS	0,0346	-0,0090	HITS	0,0880	-0,0039	MYOR	0,0319	0,011	SMSM	0,0298	0,0003
AKKU	0,0173	-0,0022	IBST	0,0062	-0,0053	MYRX	0,0035	0,0093	SSIA	0,0088	0,0003
AKRA	0,0050	-0,0016	ICBP	0,0083	-0,0082	NIKL	0,0284	0,0126	STAR	0,0098	0,0012
ARTA	0,0054	-0,0044	IGAR	0,0016	-0,0027	NIPS	0,0136	0,0101	STTP	0,0877	0,0007
BAYU	0,0336	-0,0075	IIKP	0,0097	0,0053	PANR	0,0289	0,0149	TBLA	0,0172	0,0137
BISI	0,0085	-0,0042	INAF	0,0141	0,0058	PGLI	0,0390	0,0067	TBMS	0,0127	0,0125
BRNA	0,0050	-0,0051	INAI	0,0407	0,0074	PTPP	0,0100	0,0127	TLKM	0,0120	0,0113
BTEK	0,0077	0,0021	INCI	0,0044	0,0346	PTSN	0,0032	0,0099	TOTL	0,0352	0,0172
CEKA	0,0157	-0,0002	INDY	0,0002	0,0052	PWON	0,0061	0,0068	TPIA	0,1233	0,0116
CSAP	0,0103	-0,0091	INPP	0,0075	0,0085	RAJA	0,0036	0,0108	TURI	0,0002	0,0142
CTTH	0,0050	0,0030	ITMA	0,0504	0,0034	SAME	0,0267	0,0051	ULTJ	0,0180	0,0074
DSFI	0,0111	-0,0023	JRPT	0,0008	0,0029	SCCO	0,0114	0,0025	UNTR	0,0140	0,0163
EKAD	0,0043	-0,0110	KAEF	0,0082	0,0064	SDMU	0,0095	0,0077	UNVR	0,0170	0,0083
ELSA	0,0175	-0,0003	KBLI	0,0027	0,0053	SIMA	0,0298	0,0115	VOKS	0,0189	0,0141
EMDE	0,0321	-0,0005	KBLM	0,0054	0,0053	SIPD	0,0055	0,0076	WAPO	0,0085	0,0133
FISH	0,0019	-0,0062	KLBF	0,0013	0,0022	SKBM	0,0466	0,0091	WICO	0,0264	0,0149
FMII	0,0174	-0,0021	KOIN	0,0093	0,0075	SMDR	0,1343	0,0082	WSKT	0,0144	0,0172
GEMA	0,0523	0,0024	LPPF	0,0072	-0,0009						

Table 5: Calculation of Proportion of Funds (Wi) (Source: processed by the author).

CODE	Xi	Wi	CODE	Xi	Wi	CODE	Xi	Wi	CODE	Xi	Wi
ACES	0,274	0,60%	EMDE	0,621	1,35%	KOIN	0,044	0,10%	SMRU	0,012	0,03%
AIMS	0,142	0,31%	FISH	0,320	0,70%	LPPF	0,736	1,60%	SMSM	0,441	0,96%
AKKU	0,301	0,66%	FMII	0,552	1,20%	MKPI	4,480	9,77%	SSIA	0,020	0,04%
AKRA	0,812	1,77%	GEMA	0,955	2,08%	MYOR	1,572	3,43%	STAR	0,497	1,08%
ARTA	0,225	0,49%	GOLD	0,228	0,50%	NIKL	0,318	0,69%	STTP	1,606	3,50%
BAYU	1,303	2,84%	HITS	0,892	1,94%	NIPS	0,201	0,44%	TBLA	0,298	0,65%
BISI	1,339	2,92%	IBST	0,144	0,31%	PANR	1,033	2,25%	TBMS	0,008	0,02%
BRNA	1,456	3,17%	ICBP	5,975	13,03%	PGLI	0,149	0,33%	TLKM	0,226	0,49%
BTEK	0,188	0,41%	IGAR	0,162	0,35%	SAME	0,693	1,51%	TOTL	0,004	0,01%
CEKA	0,127	0,28%	IIKP	0,118	0,26%	SCCO	1,373	2,99%	TPIA	1,611	3,51%
CSAP	1,075	2,34%	INAF	0,306	0,67%	SDMU	0,069	0,15%	ULTJ	0,813	1,77%
CTTH	0,153	0,33%	INAI	2,550	5,56%	SIMA	0,040	0,09%	UNVR	2,089	4,55%
DSFI	0,357	0,78%	ITMA	0,139	0,30%	SKBM	0,139	0,30%	VOKS	0,132	0,29%
EKAD	4,990	10,88%	KAEF	0,078	0,17%	SMDR	0,756	1,65%	WICO	0,236	0,52%
ELSA	0,491	1,07%	KBLM	0,006	0,01%						

Tandelilin (2010: 156) that risk can be controlled by increasing the type of shares in its investment. An investor will most likely not see the whole picture of investment, which may inadvertently cause investment decisions to be bad. So, the need to measure portfolio performance because it is not known how much risk is caused. Based on this

TABLE 6: Return and Risk of Optimal Portfolio (Source: prepared by the authors).

CODE	Wi	E(Ri)	β	CODE	Wi	E(Ri)	β	CODE	Wi	E(Ri)	β	CODE	Wi	E(Ri)	β
ACES	0,60%	0,002%	0,007	EMDE	1,35%	0,017%	0,003	KOIN	0,10%	0,001%	0,001	SMRU	0,03%	0,000%	0,000
AIMS	0,31%	0,008%	0,002	FISH	0,70%	0,003%	0,005	LPPF	1,60%	0,016%	0,023	SMSM	0,96%	0,015%	0,004
AKKU	0,66%	0,119%	0,006	FMII	1,20%	0,020%	0,010	MKPI	9,77%	0,332%	0,029	SSIA	0,04%	0,001%	0,002
AKRA	1,77%	0,012%	0,015	GEMA	2,08%	0,033%	0,004	MYOR	3,43%	0,087%	0,023	STAR	1,08%	0,011%	0,008
ARTA	49,00%	0,003%	0,003	GOLD	0,50%	0,003%	0,002	NIKL	0,69%	0,043%	0,016	STTP	3,50%	0,107%	0,010
BAYU	2,84%	0,062%	0,015	HITS	1,94%	0,532%	0,005	NIPS	0,44%	0,010%	0,008	TBLA	0,65%	0,009%	0,004
BISI	2,92%	0,034%	0,037	IBST	0,31%	0,002%	0,002	PANR	2,25%	0,039%	0,010	TBMS	0,02%	0,000%	0,000
BRNA	3,17%	0,021%	0,018	ICBP	13,03%	0,168%	0,156	PGLI	0,33%	0,005%	0,001	TLKM	0,49%	0,006%	0,004
BTEK	41,00%	0,004%	0,005	IGAR	0,35%	0,002%	0,006	SAME	1,51%	0,042%	0,015	TOTL	0,01%	0,000%	0,000
CEKA	28,00%	0,004%	0,002	IIKP	0,26%	0,004%	0,005	SCCO	2,99%	0,040%	0,030	TPIA	3,51%	0,153%	0,011
CSAP	2,34%	0,024%	0,016	INAF	0,67%	0,023%	0,020	SDMU	15,00%	0,002%	0,002	ULTJ	1,77%	0,030%	0,014
CTTH	33,00%	0,002%	0,002	INAI	5,56%	0,162%	0,034	SIMA	9,00%	0,001%	0,000	UNVR	4,55%	0,067%	0,029
DSFI	78,00%	0,011%	0,010	ITMA	0,30%	0,031%	0,006	SKBM	0,30%	0,003%	0,000	VOKS	0,29%	0,004%	0,001
EKAD	10,88%	0,075%	0,114	KAEF	0,17%	0,003%	0,004	SMDR	1,65%	0,183%	0,013	WICO	0,52%	0,020%	0,008
ELSA	1,07%	0,014%	0,006	KBLM	0,01%	0,000%	0,000								
Portofolio		Total Wi													100%
		Total E(Ri) tiap bulan													2,62%
		Total E(Ri) tiap tahun													31,50%
		Total Beta (β)													0,7855

TABLE 7: ISSI Optimal Stock Portfolio Performance and Market Performance in 2018 (Source: processed by writer).

Performance	Portfolio	Market
Expected Return [E(R)]	-0,022	-0,012
Standar Deviasi [SD]	0,054	0,024
Rf [Risk free]	0,005	0,005
Sp	-0,495	-0,708

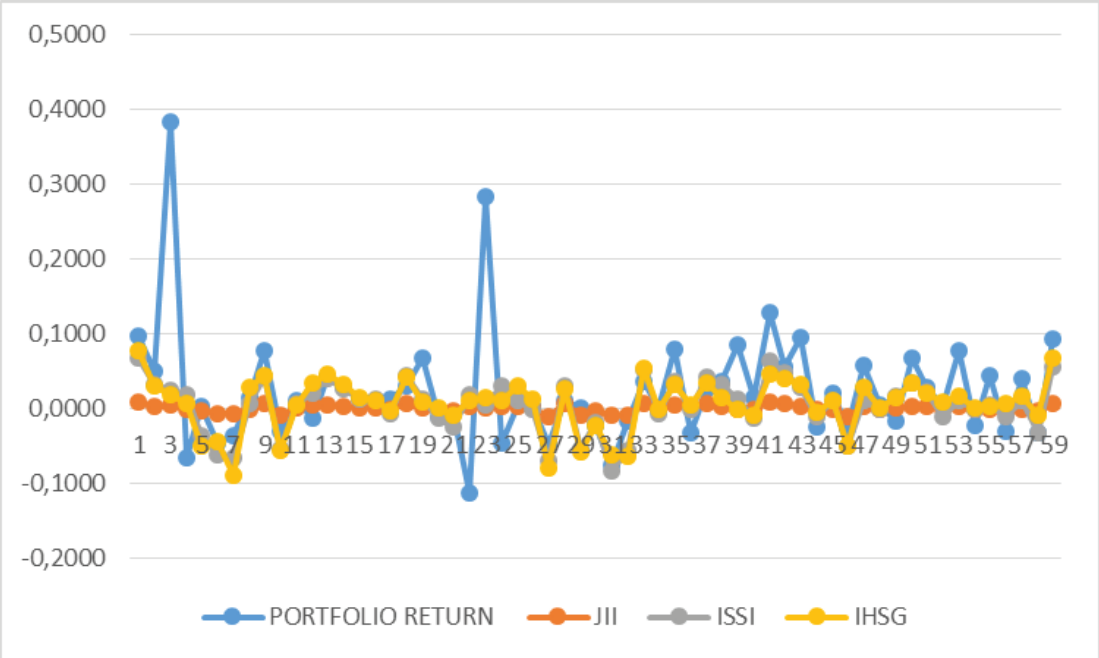

Figure 1: Comparison of Portfolio Performance (Source: Monthly portfolio and index return data processed, Ms. Excel).

TABLE 8: Expected Return and Standard Deviation between Portfolio Shares, ISSI, JII, and IHSG Stocks for 2013-2017 (Source: Data processed by the authors).

	ISSI	JII	IHSG	Portfolio
E(Ri)	0,0048	0,0006	0,0067	0,0262
σi	0,0346	0,0049	0,0350	0,0275

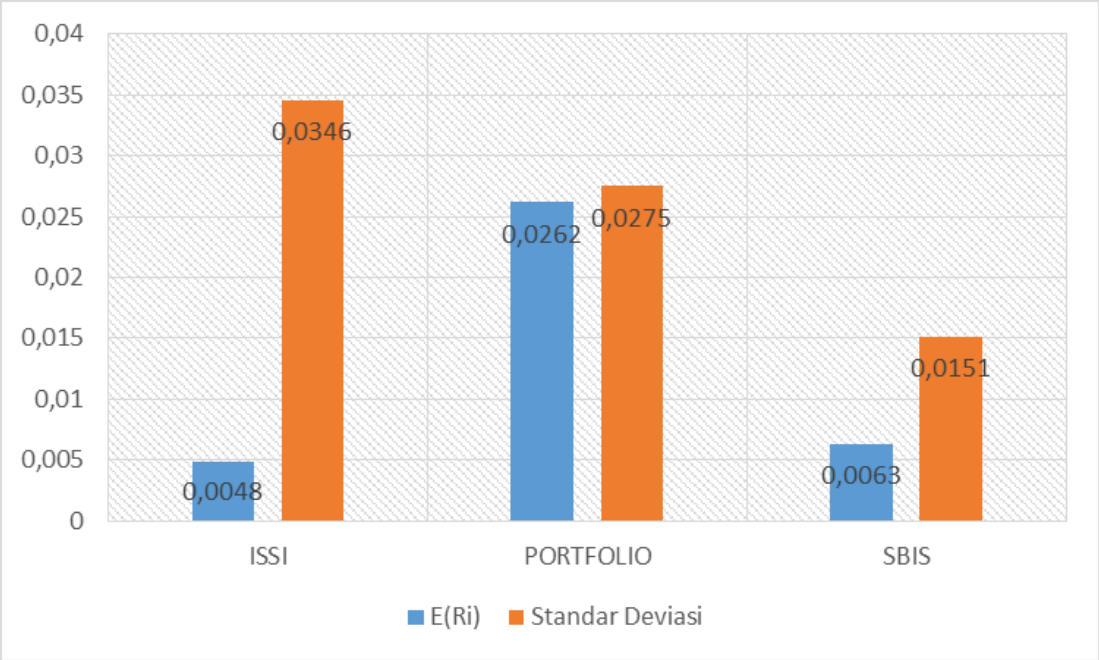

Figure 2: Comparison Return and Risk (Source: processed by author).

phenomenon, it is explained that the portfolio formed in 2013-2017 will be good in generating returns.

5.2. Optimal portfolio performance

Based on the results of the study prove that returns high do not necessarily have good performance. Portfolio and the market has return negative with market returns greater than portfolio returns, means that portfolio and market returns in 2018 have decreased overall stock prices due to external factors. Although portfolio risk is greater than market risk, the performance produced by the portfolio is higher than market performance even though both are negative. This is because the risk described by the market standard deviation is 0.024, which has a difference with the return market of 3.6% while the return portfolio with portfolio risk is 7.6% difference.

6. Conclusion

1. Stocks form an optimal portfolio based on active shares in ISSI for the period January 2013-December 2017, out of 366 listed shares produced 58 shares which formed the optimal portfolio along with the proportion of funds for each share. The formed portfolio gives an expected return of 2.62% per month or 31.44% per year. The portfolio beta value is 0.79 with a standard deviation value of 0.0275. ISSI stock portfolio formation period of 2013-2017 with a single index models produce return a higher than the return ISSI, Jakarta Islamic Index (JII), and JCI Index.

2. Portfolio performance as measured by the index sharpe for January 2018-October 2018 produces a value of -0.495, while market performance produces a value of -0.708, the index sharpe portfolio is higher than the index sharpe market even though both are negative. Based on the results of the study prove that returns high do not necessarily have good performance. Stock portfolio formed are returns lower than return, the market however the resulting higher risk than market risk. The resulting portfolio performance is higher than market performance. So, in this study the portfolio formed in 2013-2017 was good in the 2018 period, so investors or investment managers could make this portfolio a consideration in investing.

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